# Agriculture Education AFF

# \*\*\*\*Plans/Drafts

## Important Note

The examples below are draft 1ACs and plans to serve as models for how this can be organized. These are not final products. Each advantage section also has a draft version you can use as a model.

### Plan Ideas

#### Resolution (for reference when writing plan texts):

Resolved: The United States federal government should substantially increase its funding and/or regulation of elementary and/or secondary education in the United States.

#### Plan Text Model:

The United States federal government should increase its funding and/or regulation of elementary and secondary education in the United States by requiring that schools receiving Career and Technical Education and/or Farm to School grants incorporate school-based agricultural education and nutrition programming, including, but not limited to: teaching certification, performance incentives, and curriculum for agricultural science education.

#### Potential Programs/Concepts to incorporate into plan, based on solvency evidence

* Career and Technical Education/Perkins/Perkins Plus
* Incentives
* Citizen Science
* School Based Agriculture Education
* Supervised Agricultural Experiences
* Work-based
* Project-based
* Curriculum for Agricultural Science Education
* Healthy Hunger-Free Kids Act
* Farm to School
* Teacher development
* Review committee
* Charter schools
* Food Corps

## Nutrition 1AC Model

### Advantage 1 – Food Justice

#### Millions of American Households go hungry- Fed key to bring food security to low income communities and end institutionalized racism in food supply.

**Meals, social worker, writer, JD from St. Mary’s 12** [Kate,” St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities – A. Who Are the Hungry,” http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=2, 7/1/17, KF]

Over the past decade, the United States has seen a dramatic increase in awareness of the state of our food supply, urban agriculture, and nutrition. Often missing from these discussions, however, **is an understanding of food oppression's structural causes**. Instead, the **focus typically lies on personal responsibility** and the need to bring in outside information to educate communities deemed to be suffering from hunger and health problems. Because many people who work to address food access are outsiders to urban communities of color, “many community organizations remain unaware or closed to the ways racism works in the food system.” Such **food organizations often overlook the histories of institutionalized racism when proposing “solutions” or goals such as self-sufficiency**. **Funding needs often demand allegiance to organizations outside of the community and thus do not challenge the power structures that create racial disparities**.

Throughout the United States, many **low-income communities and communities of color face a daily food crisis.** According to the U.S. Department of Agriculture (USDA), **17.2 million households were “food insecure” in 2010, and struggled to acquire adequate food** due to lack of financial resources. In addition to facing food insecurity, urban areas often exist in what are commonly called “food deserts” or grocery gaps, locales in which there are no grocery stores or other opportunities to purchase fresh, healthy food, which typically co-exist with “food swamps,” areas which have a high prevalence of unhealthy food options, such as fast food and convenience stores. In a 2009 report to Congress, the USDA also found that “higher levels of racial segregation and greater income inequality” define urban areas. The USDA also found that close to **six percent of all U.S. households lacked access to obtain the food they** “wanted or **needed,”** and over half of these households also lacked sufficient financial resources for food.

#### Community production is key to food justice– current lack of access to resources prevents change.

**Purifoy, J.D. Harvard Law School, Ph.D, Duke University, 14 -** [Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, pp. 379-380, 7/1/17, KF]

Food Justice is an emerging movement that can be understood as a **departure from the sustainable food movement.**24 Like environmental justice, food justice centers its activities on achieving equality for low-income and low-access communities.25 Rather than aiming for food practices and policies—like do-it-yourself food cultivation and expensive fresh food markets—which require significant disposable income and presume easy access to other necessary resources26, food justice aspires to establish healthy food as a fundamental right and to eliminate barriers to its access.27 The term “food justice” is defined in several ways, likely as a result of its recent emergence as a social movement. Some have attempted to define it in terms of the injustices it is designed to combat, such as advocating against “the maldistribution of food, poor access to a good diet, inequities in the labour process and unfair returns for key suppliers along the food chain.”28 Others, like attendees of the 2012 Food + Justice = Democracy conference, define it as **“the right of communities everywhere to produce, process, distribute, access, and eat good food regardless of race, class, gender, ethnicity, citizenship, ability, religion, or community.”**29 The conference attendees also defined **“good, healthy food and community wellbeing” as “basic human rights**.”30 In the 2000 edition of the journal Race, Poverty, and the Environment, which was devoted to the food system, the editors observed that the environmental justice definition of the environment as the place “where we live, work, and play,” could be extended to “where, what, and how we eat.”31 In all these interpretations, **the food justice movement is a direct critique of the global industrial food system and the negative impacts of its policies, laws, and practices on human health, the environment, culture, and equity.**

#### Plan is necessary to facilitate food security - cultivates a skilled workforce needed for scientific and technological innovation

Doerfert, Texas Tech University, Agricultural Communications Associate Chair & Professor, 11

[Doerfert, D. L. (Ed.) (2011), American Association for Agricultural Education, “National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015,” <http://aaaeonline.org/resources/Documents/AAAE%20National%20Research%20Agenda.pdf>, pg. 19-20, accessed 6.28.2017]//TRossow

With the global population expected to increase to **nine billion by 2050**, food security is of **paramount importance** to countries everywhere. Failure to address food security concerns could cause **political instability in many parts of the world**. Riveria and Alex (2008) connected this global need to a need for change in the development of the agricultural workforce:

Greater commercialization of agricultural systems and increasing trade liberalization dictate the need for better capacity on the part of the agricultural workforce in the 21st century. Global changes in the roles of the public and private sectors and dramatic advances in technology have also strongly affected agricultural workforce development needs. These evolving changes have important policy, institutional, and programmatic implications. (p. 374)

**The need to provide a highly educated, skilled workforce capable of providing solutions to 21st century challenges and issues has never been greater**. The issues that face our society have grown increasingly complex and harder to solve, even with the products of sophisticated scientific discovery and application. In the meantime, our educational system is being challenged by cultural, economic and structural factors that threaten our nation’s standing as a global leader in **scientific and technological innovation**. There is therefore a growing need to develop strategies to create a society of diverse, highly educated professionals and knowledge workers to address major societal challenges and develop innovations that **drive** the engines of **economic growth.**

There is also a commensurate need for relevant, rigorous, and actionable research into the human factors that influence educational preparation, quality teaching and learning outcomes and life-long human capital development of our workforce, especially in discovery science and STEM disciplines. This will require changes in university-level agricultural education.

If we are to be able to recruit and retain students to study in and prepare for careers in agriculture and natural resources related fields, we must be able to better understand the models, strategies, and tactics needed to best prepare, promote, and retain new professionals who demonstrate the requisite content knowledge, technical competence, and cultural awareness, coupled with communication and interpersonal skills. ,mThis will require that adequate numbers of well-prepared, highly effective agricultural educators, communicators, and leaders be made available to meet current and future needs.

Opportunities to Respond The agriculture industry represents a major driver of economic growth and development; it requires a stable, qualified workforce that possesses a diverse range of skill sets suitable for employment in jobs ranging from the on farm setting to positions as Ph.D. scientists in highly sophisticated laboratories. However, attracting the best and the brightest to pursue careers in agriculture remains a challenge. According to the Coalition for a Sustainable Agricultural Workforce (n.d.), major obstacles exist to recruiting students into careers in the agricultural sciences, including budget constraints, student misconceptions and competition for the most talented from the basic sciences and industry.

These challenges also represent our opportunities. The National Academy of Sciences (2009) stated that:

During the next ten years, colleges of agriculture will be challenged to transform their role in higher education and their relationship to the evolving global food and agricultural enterprise. If successful, agriculture colleges will emerge as an important venue for scholars and stakeholders to address some of the most complex and urgent problems facing society. (p. 1)

Our discipline is uniquely positioned for an immediate, positive impact on this need as research outcomes are quickly communicated and **integrated into K-12**, pre-professional, and professional-level **educational opportunities**. Our profession’s knowledge base is rich with cognitive, affective, psychomotor and experiential research and practical understandings. Collectively, we have a foundation towards a comprehensive theory of human learning. This includes retraining existing and developing new human capital in agriculture as part of a lifelong learning system.

Our specializations in teacher education, agricultural communication, leadership development, and extension education are grounded in the applied research tradition of solving problems, and our knowledge bases focus on understanding the dimensions of human and social capital in educational and organizational settings. The research endeavors of those in the agricultural education profession are focused on discovering, testing and refining those very models, strategies, and tactics that will be needed to create a sufficient scientific and professional workforce that can effectively address current and future challenges.

#### Urban Gardening cannot solve long-term­– permanent school programs can solve.

**Meals, social worker, writer, JD from St. Mary’s 12** [Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, 7/1/17, KF]

The permanence of urban gardens is consistently in question. Often, rather than repeal or rewrite restrictive zoning ordinances to allow for urban agriculture, cities prefer to grant informal permission to community groups to create gardens on vacant lots. This structure is problematic because community groups have no legal recourse when the city decides to use the land for another purpose. In New York City Environmental Justice Alliance v. Giuliani, plaintiffs argued that “community gardens are highly beneficial to minority communities and that the elimination of gardens would therefore have an adverse impact on some aspects of the lives of the neighborhood residents.” Rejecting testimony that there were other available parcels suitable for development that would be less harmful to communities of color, the court held that the harm from eliminating the community garden was justified by the city's plan to “build new housing and foster urban renewal.” Here, as in the case of the Morning Glory Community Garden, the city prioritized other types of land use over urban agriculture. Community gardeners seeking to secure land sometimes achieve this goal thorough the use of intermediaries, such as land trusts to clear title, or through typically impracticable measures such as adverse possession or implied dedication.

#### Gardening allows children to experience a greater connection to nature, fostering self-confidence and focus at school and reducing obesity.

Parker, et al., Institute of Medicine Food and Nutrition Board scholar, 12

[Lynn, Emily Ann Miller, Dietrician, Elena Ovaitt, Institute of Medicine Keck Center S enior Program Assistant, and Stephen Olson, Rapporteur, 2012, The National Academies of Sciences, Engineering, Medicine, “Alliances for Obesity Prevention: Finding Common Ground: Workshop Summary,” <https://www.nap.edu/read/13305/chapter/4#20>, pp.18-20, 6/28/17, KF]

G**ardening has many positive effects on children**, adults, and the community (Box 3-1), but its most enduring effects may be the least tangible. “Go back to a time when you found yourself in a garden. What does that bring to mind?” asked Mike Metallo, president and chief executive officer of the National Gardening Association (NGA). “For me, it hits a reset button. **It helps me put everything in perspective. I have a sense of place. I understand myself in relation to the world.**”

**Many children today, especially in the inner cities, lack opportunities to experience a garden.** They live in an environment of concrete, asphalt, and maybe a few scraggly trees and other plants. “**They are not experiencing the benefits of having a connection with nature**,” said Metallo.

Urban gardens can be any collection of plants with which children or adults are engaged. **It can be herbs in pots on a fire escape. It can be plants in a raised bed indoors or outdoors. “There are all types of gardens, and each garden has its place and its purpose and its uses,**” said Metallo.

NGA, a leading authority and resource for gardeners of all ages, **has a grant program through which it works with corporate donors to install gardens in schools.** The observed **effects of these gardens are increased fruit and vegetable consumption, increased physical activity, and decreased sedentary behavior. Children also learn more about the sources of the foods they eat**. “**People don’t understand where their food is coming from because they don’t live in an environment** where [unprocessed] food is easily accessible,” Metallo said. “It comes to them packaged, it comes to them in cans, it comes to them sorted out. But they have no idea what happened to get it there. And that is a serious issue.”

Besides its demonstrated potential to increase fruit and vegetable consumption and boost physical activity (see Box 3-1), **gardening changes the relationships among children, parents, and the community. In this way, gardening contributes to a variety of social, cultural, and educational goals.** For example, NGA has developed a curriculum that uses gardening to teach the academic content specified in education standards so teachers can achieve the same outcomes as they would using their usual curriculum.

Data compiled from educator observations of NGA’s garden grant program point to a variety of benefits**, including better attitudes toward school, greater self-confidence, and improved social skills.** Two of the attitude changes cited most frequently are in attitudes toward nutrition and the environment. “The children didn’t mean to learn about nutrition this way, but they did, just by engaging in the experience,” Metallo said. He ended by mentioning NGA’s initiative “A Garden in Every School,”17 a manifestation of the organization’s belief that school gardens are a component of positive change that will lead to achieving positive outcomes**, such as a reduction in obesity.**

#### A lack of healthy food disproportionately creates health issues along class and race lines.

**Purifoy, J.D. Harvard Law School, Ph.D, Duke University, 14 -** [Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 386, 7/1/17, KF]

Historic **outflows of capital from urban centers starting in the second half of the 20th century** took many food retailers away from cities, where supermarkets proliferated rapidly in suburbia.66 Despite densely populated communities with considerable market power, **many urban food deserts have not been able to attract supermarkets back to inner-cities** in part because of misconceptions about lack of profitability and security embedded into decades’ old business plans.67 Higher development costs in low-income areas may create further barriers to entry for major food retailers.68 **The result is a significant market failure,** wherein food desert residents are left with few local healthy food choices, and supermarkets compete for a smaller share of an oversaturated suburban market.69 Further, the types of food retailers that are available in these neighborhoods— convenience stores, liquor stores, and fast food restaurants—often have few healthy food options.70 **The lack of healthy food choice has major implications for health outcomes in these communities. Diabetes, heart disease, and other diet-related illnesses are prevalent in these environments,** **causing further disparities in the quality of life along race and class lines.7**

#### Racism is a prior ethical question—refusing to reject racism normalizes animality and corrupts the foundation of society Memmi, Professor Emeritus of Sociology at the University of Paris, 2000

(Albert Memmi, translated by Steve Martino, University of Minnesota Press, “Racism”, p.163-165)

The struggle against racism will be long, difficult, without intermission, without remission, probably never achieved, yet for this very reason, it is a struggle to be undertaken without surcease and without concessions. One cannot be indulgent toward racism. One cannot even let the monster in the house, especially not in a mask. To give it merely a foothold means to augment the bestial part in us and in other people which is to diminish what is human. To accept the racist universe to the slightest degree is to endorse fear, injustice, and violence. It is to accept the persistence of the dark history in which we still largely live. It is to agree that the outsider will always be a possible victim (and which [person] man is not [themself] himself an outsider relative to someone else?). Racism illustrates in sum, the inevitable negativity of the condition of the dominated; that is it illuminates in a certain sense the entire human condition. The anti-racist struggle, difficult though it is, and always in question, is nevertheless one of the prologues to the ultimate passage from animality to humanity. In that sense, we cannot fail to rise to the racist challenge. However, it remains true that one’s moral conduct only emerges from a choice: one has to want it. It is a choice among other choices, and always debatable in its foundations and its consequences. Let us say, broadly speaking, that the choice to conduct oneself morally is the condition for the establishment of a human order for which racism is the very negation. This is almost a redundancy. One cannot found a moral order, let alone a legislative order, on racism because racism signifies the exclusion of the other and his or her subjection to violence and domination. From an ethical point of view, if one can deploy a little religious language, racism is “the truly capital sin.”22 It is not an accident that almost all of humanity’s spiritual traditions counsel respect for the weak, for orphans, widows, or strangers. It is not just a question of theoretical counsel respect for the weak, for orphans, widows or strangers. It is not just a question of theoretical morality and disinterested commandments. Such unanimity in the safeguarding of the other suggests the real utility of such sentiments. All things considered, we have an interest in banishing injustice, because injustice engenders violence and death. Of course, this is debatable. There are those who think that if one is strong enough, the assault on and oppression of others is permissible. But no one is ever sure of remaining the strongest. One day, perhaps, the roles will be reversed. All unjust society contains within itself the seeds of its own death. It is probably smarter to treat others with respect so that they treat you with respect. “Recall,” says the bible, “that you were once a stranger in Egypt,” which means both that you ought to respect the stranger because you were a stranger yourself and that you risk becoming once again someday. It is an ethical and a practical appeal – indeed, it is a contract, however implicit it might be. In short, the refusal of racism is the condition for all theoretical and practical morality. Because, in the end, the ethical choice commands the political choice. A just society must be a society accepted by all. If this contractual principle is not accepted, then only conflict, violence, and destruction will be our lot. If it is accepted, we can hope someday to live in peace. True, it is a wager, but the stakes are irresistible.

### **Plan**

#### Text

The United States Federal Government should:

Increase federal funding for school gardens and provide money to buy land for larger scale farms in urban communities.

Establish funding for teacher development in agriculture and stipends for after-hours mentoring in work based learning programs.

### Advantage 2 – Nutrition

#### Nutrition programs crucial for lowering obesity levels

**Fox, NBC News senior health writer, 12**

[Maggie, was Health and Science editor for 3 years at Reuters, and a Health and Science Correspondent for 11, 9/18/12, NBC News, “If you think we’re fat now, wait till 2030”, http://www.nbcnews.com/health/if-you-think-were-fat-now-wait-till-2030-1B5955205, accessed 7/1/17, JBC]

Think Americans are fat now? After all, a third of us are overweight and another 35 percent are obese. But a report out Tuesday projects 44 percent of Americans will be obese by 2030.

In the 13 worst states, 60 percent of the residents will be obese in less than two decades if current trends continue, the report from the Trust for America’s Health projects. That’s not chubby or a little plump – that’s clinically obese, bringing a higher risk of heart attacks, strokes, diabetes, several forms of cancer and arthritis.

“The initial reaction is to say, ‘Oh it couldn’t be that bad’,” says Jeff Levi, executive director of the Trust for America’s Health. “But we have maps from 1991 and you see almost all the states below 10 percent.” By 2011 every single state was above 20 percent obesity, as measured by body mass index (BMI), the accepted medical way to calculate obesity. Those with a BMI or 30 or above are considered obese.

In August, the Centers for Disease Control and Prevention reported that 12 states have an adult obesity rate over 30 percent. Mississippi had the highest rate of obesity at 34.9 percent. On the low end, 20.7 percent of Colorado residents are obese. CDC projections for obesity resemble those in Tuesday's report - it projects 42 percent of adults will be obese by 2030.

The problem isn’t just cosmetic. “The number of new cases of type 2 diabetes, coronary heart disease and stroke, hypertension and arthritis could increase 10 times between 2010 and 2020 — and then double again by 2030,” the report projects. “Obesity-related health care costs could increase by more than 10 percent in 43 states and by more than 20 percent in nine states.”

That’s bad news when states are already strapped to pay for public health programs such as Medicaid and the federal government is struggling to fund Medicare.

Over the next 20 years, more than 6 million patients will be able to blame obesity for their diabetes, 5 million will be diagnosed with heart disease and 400,000 will get cancer caused by obesity.

And some of them are frighteningly young.

"Now I am seeing 25-year-olds weighing 350 pounds who present with chest pain or shortness of breath," says Dr. Sheldon Litwin, a cardiologist at Georgia Health Sciences University. “Everything from the heart disease process to its diagnosis and treatment are affected by obesity. We see it every day. This really is the number-one issue facing us," added Litwin, who worked on one of a series of obesity studies published in this week’s issue of the Journal of the American Medical Association.

The trend is not inevitable, according to the report, entitled “F as in Fat.” Some programs are beginning to make a dent in the rising rates. “We certainly see, in some communities, the beginning of some changes,” says Levi. “We know what some of the answers are.”

For instance, making it easier for people to exercise day in and day out, and **making it easier to get healthy food**. “A large-scale study of New York City adults found that **increasing the density of healthy food outlets, such as** supermarkets, **fruit and vegetable** markets, and natural food **stores is associated with lower BMIs and lower prevalence of obesity**," the report reads.

What about initiatives like New York’s controversial ban on the largest sodas? “Every community is going to experiment with different approaches. It is going to be very interesting to see what happens in New York and whether this makes a difference,” Levi said.

New York’s health commissioner, Dr. Thomas Farley, defends the move in the medical journal’s obesity issue. "How should government address the health problems caused by this successful marketing of food? To do nothing is to invite even higher rates of obesity, diabetes, and related mortality,” he wrote.

Trust for America's Health

Many studies have also shown that people who live in big, walkable cities such as New York and Washington D.C. are thinner than their rural and suburban counterparts, and it’s almost certainly because they walk more and use public transportation instead of sitting in cars.

If everyone lost just a little weight, the savings would be enormous, the study predicts.

“If we could lower obesity trends by reducing body mass indices (BMIs) **by only 5 percent in each state, we could spare millions of Americans from serious health problems and save billions of dollars in health spending —between 6.5 percent and 7.8 percent in costs in almost every state**,” the report says.

**Education can’t hurt, either. The more educated people are, the less likely they are to be obese. Higher-earners are also thinner.** “More than 33 percent of adults who earn less than $15,000 per year were obese, compared with 24.6 percent of those who earned at least $50,000 per year,” the report notes. And several studies have shown that people who eat more fruits and vegetables are thinner, as well as healthier. “Seven of the 10 states with the highest rates of obesity were also in the bottom 10 for fruit and vegetable consumption,” the report says.

Levi believes **it’s worthwhile targeting kids the hardest. New nutritional guidelines for schools will help**, he said, as will initiatives to restore recess and physical education classes. Beverage makers have agreed to replace sugary sodas in vending machines with water and other low-calorie drinks. “It is as simple as an hour a day less of screen time and one less sugar beverage,” Levi says. “**Just 120 calories can make a big difference as to whether a kid crosses over from being normal weight into overweight and obesity.”**

#### Obesity biggest internal link to health care costs – destroys economic sustainability

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 14-16, RK]

IV. The Weight of the Nation Threatens National Security Because it Costs So Much Lack of eligible troops is not the only way obesity can be portrayed as a national security issue. Having nearly 70% of Americans overweight or obese places an enormous financial drain on America as well. Worse still, if unchecked, the burden will likely worsen over time. As will be explained below, the financial burden created by the obesity crisis strongly indicates that America may not be able to adequately defend itself in the future, because so much money will be going towards health care costs related to diseases associated with obesity.

A) Untenable Health Care Costs The rising share of U.S. gross domestic product (GDP) devoted to health care has been well documented and often lamented.81 In 2000, 13% of America’s GDP was spent on health care.82 By 2015, that number has climbed to 18%.83 Most nations spend less than 9% of their GDP on health care, many doing so with successful programs.84 More specifically, in 2014 the Commonwealth Fund did a survey of 11 similarly situated industrialized nations, including most European countries, the United States and Australia.85 The United States had the most expensive and also the worst performing health care system of any nation surveyed.86 Thus, most nations spend nowhere near what America spends on health care. Having health care costs account for 18% of GDP is an alarmingly high and unsustainable percentage, one that places America at a strategic disadvantage geopolitically. By spending so much to care for the diseases that come with being overweight and obese, America will continue to have less to spend on national security.

Too often people are consumed in debating what type of health care system America should employ rather than examining the sheer cost of taking care of its sick, regardless of the plan.87 In other words, because Americans are so overweight, the delivery of the health care plan is far less important to keeping health care costs down.88 This makes intuitive sense as well. If people are sick and need care, that care costs money. The less sick people a country has, the less money will have to be spent on health care.

There are undoubtedly a number of reasons for such high costs. But the obesity epidemic is far and away the greatest reason for rising health care costs.89 In fact, obesity has surpassed smoking as the number one contributor to high health care costs.90 As a result, the Pentagon has declared the obesity epidemic as a serious national security issue.91

The following two projections help explain. First, if Americans continue to gain weight at their current pace, by 2075 America is projected spend nearly 40% of its GDP on health care costs.92 18% is already more than double every major developed nation, many of which have arguably better health care as well.93 40% is simply untenable.

Second, according to an article published in the U.S. National Library of Medicine by the National Institutes of Health, it is projected that 100% of Americans will be overweight or obese by 2048. 94 That is not a typo. Sometimes statistics are misleading and fail to tell the whole story. Unfortunately here, there is nothing too confusing or misleading about an entire nation comprised of overweight or obese citizens. This will lead to increases in health care expenditures that America simply cannot afford.

One does not need an advanced economics degree to understand this is problematic. In sum, if everyone in America is overweight or obese, thereby facilitating well beyond 18% GDP spent on health care, there will be little money for anything else. No nation as large and powerful as the United States can effectively defend itself when everyone is overweight or obese and some much of it’s GDP is devoted to health care expenditures.

#### Continued health care crisis trades off detrimentally for military spending

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 18-19, RK]

D) Problems With Cutting The Military’s Budget To Pay For America’s Obesity Crisis In order to cover the increase in health care costs, a significant reduction in military spending would likely be necessary. Significantly reducing the military’s budget may not inherently be a negative outcome, though. Many people (including the author of this Article) feel the current military is probably too bloated and could benefit from less money and wiser allocation of resources. 103 However, such a focus misplaced. The point is not to debate whether or not military spending should be reduced, but rather the dangerous consequences if it has to be reduced. There is a difference between the federal government deciding, based on the current international and political landscape, that military spending can safely be reduced, versus forcibly shrinking the military because too many Americans are overweight or obese forcing unsustainably high health care costs.

Even the most ardent anti-military advocates and political theorists would have to admit that a forced, substantial reduction in military spending, amidst an already growing troop shortage problem, would likely weaken America for several reasons. First and most basically, America would have fewer troops available to defend itself from future attacks. The necessity of a healthy military, ready to deploy at any time in defense of the nation should not be underestimated. September 11, 2001 showed that people do not fear attacking mainland U.S. Reducing the military to the point where we would not be able to defend the nation could have the domino effect of emboldening America’s enemies, making them more likely to strike while America’s defense are depleted.

#### If healthcare costs increase, Congress will be forced to cut military – other large expenditures are fixed and smaller programs not enough

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, 17-18, RK]

B) What to Cut As shown above, the two largest categories of government spending per year are on Social Security, Unemployment and Labor, and Medicare and Health Care.97 Those two comprise 60% of the budget, with the military being the next largest expenditure at 15.8%.98 The two next largest expenditures are interest on America’s outstanding debt (7%) and veteran’s benefits (4%). 99 Every other category of expenses comprises 3.5% or less of the federal budget.100

Thus, the above diagram provides a useful context for the growing health care expenditures. Currently, with over two-thirds of Americans overweight or obese, onethird of America’s budget is spent on Medicare and Health Care. This is an alarming high amount and an unsustainable situation. America cannot sustain its current pace of health care expenditures.

Of even greater concern, however, is what happens if America does not reverse the obesity trend and all of Americans are overweight or obese as projected? If the remaining 1/3 of Americans that are currently not overweight or obese become so, then the already too large Medicare and Health Care expenditures will likewise increase to keep pace. Hence the looming national security concern - where is that increase in spending going to come from? What program or programs are most likely to be cut in order to pay for America’s sick?

The most logical starting point for cutting is to examine the greatest expenditure. For America’s budget, that means Social Security and Unemployment and Labor. However, any such move would be extremely difficult to effectuate. It would take a massive, bipartisan collaboration, the likes of which America hasn’t seen in decades, to eliminate so called “entitlement” programs. This is in part because the baby boomer generation, which still comprises a large part of Congress, is unlikely to reduce benefits, such as social security, to themselves or their children. It is unwise to expect Congressmen to take the counterintuitive measure of voting to cut programs that reduce the amount of money they will receive in the future. 101

The remaining major non-military categories do not offer much relief for rising health care costs. Seven percent of the budget is used to pay off interest on the federal debt, which is a fixed cost. After that, the next highest cost is veteran’s benefits. Thus, like social security, one could conceivably cut veteran’s benefits, although even the smallest cuts are likely to face fierce backlash. 102 Even if one did cut veteran’s benefits, that still only amounts to 4.5% of the budget total. In sum, unless more drastic and unlikely measures are undertaken, the most logical choice to ensure America cares for it’s sick is to significantly reduce the 15.8% of the budget devoted to the military.

#### Military cuts from nuclear weapons programs – triggers nuclear proliferation

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 19-20, RK]

America will undoubtedly retain enough nuclear weapons to sufficiently destroy/retaliate against any nation that attacks her. Currently, America has approximately 7,100 nuclear weapons available. 104 Thus, this Article is not saying that if America’s military budget is reduced, America would lose if Venezuela invaded and attempted to take over the country. America will likely maintain its nuclear capabilities to discourage/stop such an attack. But nuclear weapons as a primary defense have their limitations. Having the largest nuclear arsenal in the world did not prevent 9/11. Nor has it played a role in, much less ended, the war on terror. Individual groups and/or smaller factions require something less than nuclear bombs to defeat. Asymmetric warfare and on the ground guerilla tactics are often better utilized when fighting terrorist organizations, the type of enemy the U.S. is likely to face in the future.

Thus, even though America will likely retain nuclear preeminence in the world, to ward off relatively smaller in scale (but by no means small) attacks and attackers, America will likely need the rest of its military. Keeping nuclear weapons but reducing military spending on almost everything else would not be an effective national security strategy. On the other hand, an obesity necessitated reduction in budget, that leads to significant military cuts from the nuclear weapons program, would also be problematic. It is expensive to properly dispose of, and maintain effective safeguards in so doing, for thousands of nuclear weapons. Without the money to maintain and keep safe track of all of our nuclear weapons, one can imagine a sort of Wild West in which advanced nuclear materials and weapons are siphoned off to the highest bidder. One need only look to what has happened with some of the states in the former Soviet Union and the disorganized dismantling of its nuclear weapons program as a model the U.S. does not want to follow.105

Note – “her” describing US

### Solvency

#### Incentives for teachers and accountability measures boosts education – fed key to remedy differences in state and local laws.

Solomonson, Orion High School CTE Director and Agriculture Teacher, **16**

[Jay, November 2016, The Agricultural Education Magazine, “Crazy about Co-op: Best Practices to Create a Successful Work- Based, Cooperative Education Program at Your School” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 12, 6/30/17, KF]

**Have adequate supervision time and conduct regular site visits.**

**Make sure your school administration provides adequate time for supervision as well as time to physically go out and make site visits at your students’ employment locations**. In my state, the school code (educational l**aws and policies set forth by the state legislature) indicate that a cooperative education supervisor should receive a half hour per student,** per week for supervision. I recommend reviewing your state’s policies before negotiating that time with your administration. **School districts should always provide either release periods for making visits or some type of monetary compensation if the supervision occurs outside of school hours**. Currently, my district offers one supervision period and a stipend to compensate for the time required to complete the coop duties beyond our regular contract.

**Every nine weeks, have both employers and students complete a job performance review.**

At the end of each nine-week period**, I require all employers fill out a performance evaluation on their coop student.** This essentially turns into the grade for the on-the-job component of the program. The **performance review form I utilize asks employers to evaluate the student on criteria including attendance, punctuality, dependability, trustworthiness, attitude, work habits, and abilities, among others.** I encourage all of the employers I work with to sit down and discuss the evaluation with students. This is an excellent opportunity for students to learn and grow personally and professionally. A week after the employer submits the evaluation, **I have the students complete a self- assessment using the same evaluation instrument and we sit down to discuss both evaluations and how the student can improve work habits.** I have found these student conferences and reflective pieces to be an invaluable component of the work-based experience.

**Require a year- long classroom component to the program.**

While some schools may only have the on-the-job component of the cooperative education program, our district requires that all students involved be concurrently enroll in a year-long cooperative education course. **The classroom portion focuses on self-assessment, career exploration, finding a dream job, developing an effective résumé and cover letter, interviewing, workplace ethics, development of leadership skills and personal finance.** This course also meets the consumer education graduation requirement. By having an actual sit down class, it not only allows me to see and communicate with students daily, but it is also a great way to **reinforce concepts and habits they learn in the workplac**e.

#### Lack of funding presents problems to accessing healthy food in schools

**Purifoy, J.D. Harvard Law School, Ph.D, Duke University, 14 -** [Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, pp. 380-382, 7/1/17, KF]

One important example of a food justice challenge is the source and quality of food served in school cafeterias. Although problems are pervasive in school food programs across the United States,32 they are particularly dire in under-resourced public schools, **which often do not have the means to create alternative school food programs or to secure resources for farm-to-school programs**.33 However, **the food justice framework views impacted communities as leaders in defining the problems and helping to craft viable solutions.** In a case study in examined in Gottleib and Joshi’s Food Justice, public school students from New Orleans—a city with a rich local food culture—were served cafeteria food that was imported from distant sources, “tasted terrible” and did not support the local economy.34 The middle school activists in the study, called the Rethinkers, defined **the problem in their schools not only as a matter of where their food came from and its quality, but also as a problem of the broader conditions of the cafeterias** where they ate, and the amount of time they were given to eat their food.35 Their advocacy also extended to support the local shrimp industry, which, as they learned, was being displaced because of imports of cheap, chemical-laden shrimp from abroad.36 Rather than relying on an authoritative, top-down solution to the problem, the students ensured that they had a say in the outcome, appealing to the school district Superintendent for eliminating “junky eating utensils,” using healthy, local food sources,, and placing local shrimp on the menus.37

In this way, Gottlieb and Joshi suggest**, the movement for food justice is about advancing “opportunities for moving toward a more just, healthy, democratic, and community-based system.**”38

Advocacy around food justice in the United States has manifested in many forms, from activism around domestic food law and policy (most notably, around the federal Farm Bill, which has historically created farm subsidies for commodity crops (e.g., corn, soybeans, wheat) **and public assistance funds for food to low-income individuals and families**39)or around developing programs and institutions designed to reconfigure local and regional food systems **such that they will provide all communities with greater and more equitable access to safe, healthy, and local food**.40 Urban agriculture, community supported agriculture (CSAs), kitchen gardens, coops, and local food artisans joined the menu of other food initiatives, most of which targeted hunger at an individual level.41 Food policy councils, first established in Knoxville, Tennessee in 1981,42 have rapidly proliferated in the past decade as forums through which concerned citizens and government officials can collaborate on resolving critical challenges to the local food system. This concentration on local food systems, with which local residents are most familiar, creates new opportunities not only for bolstering local economies, but also for gradually altering the global food system as localized policies are replicated across the nation.

## Ag 1AC Model

### Advantage 1 – STEM

#### There is a shortage of agricultural students in stem now

Bloom, Plant Path- way Coordinator at Curriculum for Agricultural Education Sci- ence Education, AND Eddy, agricultural education teacher at Southeast Polk High School in Pleasant Hill, Iowa, 16

(Melanie and Matthew, 5/16/16, The Agricultural Education Magazine,” Securing STEM Dollars for CASE and Agricultural Education.” ProQuest, P. 25, Accessed 6/30/17, GDI JMo)

The following points were used to underscore the relation- ship between agricultural educa- tion and STEM education.

* “The greatest challenge that confronts our generation is to feed a rapidly growing global population that will rise from seven billion to nine billion by 2050.” (STEM Food & Ag Council Report, 2014).
* “An average of 35,400 new U.S. graduates with expertise in food, agriculture, renew- able natural resources, or the environment are expected to fill 61% of the expected 57,900 average annual open- ings.” (Goecker et al, 2015).
* Agriculture has been hobbled in this challenge by a lack of quali ed candidates. “We are not producing nearly enough of these professionals to meet industry demand – which continues to grow year over year.” (STEM Food & Ag Council Report, 2014).
* “Agriculture career fields are chronically short of quali- fied candidates for their open positions - thousands of can- didates short,” (STEM Food & Ag Council Report, 2014) which doesn’t take into ac- count retirements.
* “Answering the call requires us to develop a human capital pipeline that will invigorate America’s scientific, techno- logical and business leader- ship in food and agriculture so that we can lead the way to global food security.” (STEM Food & Ag Council Report, 2014).

[Note: CASE = Curriculum for Agricultural Science Education]

#### The plan solves -

#### Expanding agriculture is critical to STEM - it’s needed for real world application

Rada, Minnesota FFA Association Leadership Development Coordinator, 15

[Lavyne, March/April 2015, The Agricultural Education Magazine, “STEM Education Beyond the Classroom”, Volume 87, No. 5, p. 10-11, KW]

As a former agricultural educator, I know the desire to connect classroom experiences to SAE and FFA so students are able to gain hands-on career skills and understand the relevance of classroom content. The AgriScience Fair was one way I was able to see the science concepts taught in a class being applied as the students designed and completed a research experience. Students also used a variety of technology and engineering principles to design the experiment, gather data, and display their results to the audience. The data gathered was then analyzed using math principles so it could either support or disprove the student’s hypothesis. This is just one example of how agricultural education students are applying STEM concepts in FFA, but AgriScience research projects were also one of my favorite ways as a teacher to incorporate inquiry based thinking and allow students to demonstrate their understanding of a topic and the scientific method. Career development events (CDEs) in FFA also have many examples of how STEM concepts are reinforced. Whether it is Agricultural Technology and Mechanical Systems, Food Science and Technology, Milk Quality and Products, Meats Evaluation and Technology or Floriculture, science, technology, engineering and math are used in all of these CDEs and more! Members in the Agricultural Communications event are asked to use a variety of technology to share key messages with an audience on radio, television, print, or on a website. Likewise, Agricultural Technology and Mechanical Systems competitors use technology, engineering and math throughout the event to solve problems related to machinery, electrical systems, construction, and much more. Members in the Nursery/Landscape event apply engineering and math skills as they calculate the needs to execute a landscape plan while maintaining a profit. Members in the Veterinary Science event apply a variety of biology and chemistry scientific principles as they prepare to work with a variety of animals while also applying mathematical concepts including conversions, dose calculations, and invoices. These are just a few examples of how FFA is continuing to provide relevant experiences to members as they apply STEM concepts with Career Development Events. The SAE program is another way for students to apply STEM concepts. Some entrepreneurship SAEs allows students to engineer a product to sell or provide a service while another expands a student’s ability to apply math principles to tracking the income and expenses of their business. One student’s placement SAE applies the science concepts they learned while they work for the local greenhouse and identifies the nutritional deficiency appearing on the plants while another student uses the drone technology to scout and diagnose threats in a corn field. A student with a research SAE is analyzing the effects of organic and inorganic crops on the local watershed while another student is researching the opinions in his community about genetically modified-organisms being labeled on food packaging. A student with an exploratory SAE is researching and completing a job shadow at General Mills with a food scientist learning about how new food products are developed and marketed while another student explores the options for renewable energy sources for her high school. All of these students have experiential learning experiences related to STEM concepts.

#### Ag education is essential – makes STEM real world and cultivates critical thinkers

Elliott, Director of STEM for Metropolitan Nashville Public Schools, 16

[Dr. Kristopher, 8-26-16 American Farm Bureau Foundation for Agriculture, “Is Ag the Answer to STEM?” <http://www.agfoundation.org/news/is-ag-the-answer-to-stem>, accessed 6.27.2017]//TRossow

There is no doubt that STEM has become a hot topic in education. Teaching science and math with a silo approach **does not reflect the real world**, and often falls short of giving students the ability to problem solve as **critical thinkers**; a vital skill set business and industry are becoming more and more vocal about. Moreover, the interest in STEM has started to materialize in the form of grants, private funding opportunities and block funding to many schools and districts across the country.

With all of this interest, it can seem like a no brainer to move toward more purposeful STEM instruction, but this is easier said than done. If you’ve ever done a search for STEM curriculum you will quickly find that the problem is not a lack of information. It is actually quite the opposite; your browser will be full of lessons, resources and activities, often to the point it becomes overwhelming. Additionally, cherry picking cool lessons without a comprehensive approach to STEM instruction can cause confusion among students - they need to know where it all fits together in a way that connects to their own lives.

**Agriculture may be the answer.**

One thing is for certain, **in order to survive**, your students need food, fiber, and shelter - all of which are provided by agriculture. Surprisingly though, most students don't seem to make that connection, and furthermore, many teachers don’t recognize how agriculture can be a useful context to teach STEM. But without an agricultural background, how do teachers use this context as a teaching tool? How does an urban educator connect students with agriculture when many of them are generations removed from the farm and live far from production areas? The answer is pretty simple actually: Know the resources available to you. Organizations like the American Farm Bureau Foundation, Agriculture in the Classroom Organization, and Beef Checkoff, offer numerous resources for teachers to incorporate agriculture and STEM concepts into the classroom. For example, when discussing genetics with students, teachers can explore how purposeful selection of breeding stock in beef animals has helped produce leaner animals with more efficient feed conversion ratios. Additionally, science, engineering, and technology has produced equipment that can sort sperm cells in order to produce female offspring, which are much more valuable to beef breeders. And if ethical concerns arise in such discussions, the use of socioscientific issues can help guide discussion of how ethics keep up with our scientific and technological developments.

The technological advancements in agriculture, particularly with regard to sustainability, GPS, and computers, are **staggering**. For example, computers and software can help farmers more precisely apply fertilizers, leading to **less waste and potential runoff**. Modern tractors drive themselves, can call the service technician when they need maintenance, and even give their exact location so the technician will have precise directions. With all of this in mind, teachers will find just a few clicks can help them locate lessons rooted in agriculture that have standards based scientific, mathematical, technological and engineering applications. **Agriculture is a great option for teachers to engage students in STEM concepts in a way that directly and indirectly impact their lives.**

#### AND, STEM is key to cyber security

Levy, Jack Kent Cooke Foundation, executive director, & Plucker, University of Connecticut Neag School of Education professor, 15

[Harold O. Levy, Jonathan A. Plucker, 6-5-2015, US News & World Report, "Brains, Not Brawn," <https://www.usnews.com/news/the-report/articles/2015/06/05/lack-of-stem-students-is-bad-for-national-security>, accessed 7-3-17, TR]

The country's defensive capabilities often depend on brains, not brawn. Development of nuclear weaponry is but one example. And the biggest contemporary threat – one that could surface at any time and on an unfathomable scale – is the likelihood of a massive cyberattack. Study after study warns that our dependence on advanced technology in almost every aspect of communication, commerce and transportation makes us highly vulnerable to the armies of hackers in countries that wish us harm.

[SEE: Political Cartoons on the Economy]

Recent mini-attacks make clear the scope of the threat: It ranges from China's compromising our banks, critical pipelines and military to North Korea's recent disruption of Sony Pictures. Nor have we been able to bring the hackers to justice using traditional means. The Department of Justice actually indicted three members of the Chinese military for hacking. There have been recent hints that the hackers who stole data from JP Morgan Chase affecting tens of millions households were about to be extradited.

Yet too few students choose to study engineering, physics, computer science and mathematics, all necessary areas to shore up our cyberdefenses. One traditional solution for our shallow talent pool has been to import talent, but this strategy is showing considerable strain. Even when we still use this strategy – for example, by issuing H-1B visas (85,000 this year) or encouraging foreign university students (just shy of 900,000) to stay in the country upon graduation – it does not improve our national security: Government, defense, and aerospace companies can't hire foreign citizens for jobs requiring a domestic security clearance, yet increasing numbers of jobs in these fields require such clearances. It is literally impossible for us to "talent import" our way to a well-defended nation. As long as national security clearance is required for data warriors (and we think it should be), an army of mercenaries can't defend us from a cyberattack.

The way to start to deepen the American talent pool is to acknowledge that, for far too long, American education policy has primarily focused on basic proficiency, not academic excellence. The U.S. produces advanced students at a much lower rate than other developed countries, according to international assessments. The graduate programs in engineering and the hard sciences in our elite colleges are dominated by foreign students; government subsidies for these departments, properly understood, should be classified as a form of foreign aid. If it's true that "bright students can take care of themselves," then our bright students are doing a particularly poor job of it.

Meanwhile, we are overlooking a major source of home-grown talent. Thousands of innovative minds are sitting on the sidelines; they are the nation's high-ability, low-income children. Because we do not provide basic support programs, far too few of them are attending selective universities, earning advanced degrees or acquiring security clearances.

There is a measurable difference among lower-income versus higher-income students who reach advanced levels of academic performance – an "excellence gap." For example, 2 percent of low-income students scored at the highest level on a recent national math test in fourth grade, compared with 13 percent of higher-income students. High-ability, low-income students have difficulty pulling themselves up by their bootstraps, and often they backslide as they plod – largely ignored – through our schools. If they aren't given the support they need, we've lost them for good.

The lost potential is staggering. Even small improvements in the excellence gap will yield many more high-performing students who can form the next generation of innovators, leaders and home-grown cybersecurity scientists. Closing the excellence gap in math by just half would mean an additional 85,000 high-performing students entering high school each year. Put another way, over 1 million students in grades K-12 today could be moved from proficiency to excellence, flooding our society and economy with world-class thinkers, some of whom could help improve our cybersecurity.

#### Cultivating critical thinking is particularly key to cybersecurity

McAllister, Carnegie Mellon University, Software Engineering Institute, Senior Analyst, 16

(Jay, 2/15/16, Software Engineering Institute, “Cyber Intelligence and Critical Thinking”, <https://insights.sei.cmu.edu/sei_blog/2016/02/cyber-intelligence-and-critical-thinking.html>, Accessed 6/28/17, VB)

The importance of applying critical thinking to cyber intelligence cannot be overstated. In our work with organizations, we have noticed that when a new threat arises, instead of holistically assessing it, organizations often simply request the latest, greatest analytic tool or contract out the work to third-party intelligence providers. As a former intelligence analyst--prior to joining the SEI, I served as a counterintelligence and counterterrorism analyst for the Naval Criminal Investigative Service (NCIS)--I know from experience that the operational tempo required for intelligence analysts to keep pace with the ever-changing cyber environment is overwhelming at best. While technology and external resources offer value, analysts also need to critically assess the information they receive.

In 2013, the Defense Science Board echoed a similar sentiment. In their report, Resilient Military Systems and the Advanced Cyber Threat they included the following among their recommendations to improve DoD systems' resilience: "Refocus intelligence collection and analysis to understand adversarial cyber capabilities, plans and intentions, and to enable counterstrategies."

Foundations of Our Work

Our work in cyber intelligence started in 2012 with a request from the government to assess the state of the practice of cyber intelligence. Our work on that initial project involved an examination of the cyber intelligence practices of 30 organizations (6 from government and 24 from industry), specifically their strategic approaches to cyber intelligence. Our work focused on identifying the methodologies, processes, tools and training that shaped how these organizations assessed and analyzed cyber threats. As detailed in an earlier blog post, our work on this project resulted in an implementation framework that captured best practices.

When this work concluded, several participant organizations approached the ETC about leading an effort that would research and develop technical solutions and analytical practices to help people make better judgments and quicker decisions with cyber intelligence. As a result, ETC launched the Cyber Intelligence Research Consortium.

The first year of this consortium focused primarily on continuing our research in cyber intelligence, as well as identifying best practices and challenges. Nearly four years after our initial research began, we have noted clear examples of a strategic shift among participant organizations with respect to cyber intelligence. They are investing resources in hiring intelligence analysts from a pool of vetted and qualified experts, and they are investing significant resources in acquiring tools and tradecraft. However, they are not yet making effective use of the intelligence provided by these resources.

In both government and industry, organizational resilience in the wake of an attack relies on an analyst's ability to holistically assess a threat. The remainder of this post proposes a three-step approach for holistically approaching a cyber threat.

Three Steps to Holistically Assess Cyber Threats

First and foremost, applying critical thinking--which brings together all the skills shown in the "conceptual framework" above--to cyber threats improves an analyst's ability to accurately evaluate and estimate a threat's potential to impact and expose its target. My ETC colleagues and I propose a three-step approach to holistically assess cyber threats:

Establish a baseline of how the threat will be analyzed. This step involves outlining the approach so that the analyst uses all the skills represented in the conceptual framework. Since the framework is non-linear, the components can be approached in whatever order makes sense.

Leverage creative brainstorming. When facing a potential cyber threat, analysts don't have the luxury of time to stare into space and wait for an "ah ha" moment. Creative brainstorming techniques such as those found in human-centered design accelerate the time it takes to get to an "ah ha" moment. To enhance an analyst's creative brainstorming skills, I recommend looking at recent brainstorming research including that by Luma Institute, specifically their 36 techniques for creative brainstorming and practice them daily.

Perform the holistic threat assessment. The assessment evaluates the threat from the three perspectives shown in the figures below (these charts are available as fillable templates):

The three steps outlined in this approach enable analysts to avoid intelligence tunnel vision and seek to understand all causes and effects of relevant threats, which can significantly improve the efficiency and effectiveness of cyber intelligence efforts.

#### Cyberattacks are increasing now – conflict escalation is becoming uniquely likely

Lindsay et. al 15 (Lindsay, Jon R., Tai Ming Cheung, and Derek S. Reveron. China and Cybersecurity: Espionage, Strategy, and Politics in the Digital Domain. Print., Jon R. Lindsay is an assistant research scientist at the University of California Institute on Global Conflict and Cooperation and an assistant adjunct professor at the University of California, San Diego School of International Relations and Pacific Studies)

Cyber war, compared with conventional wars, is rather inexpensive; it can be initiated from anywhere and does not require large amounts of troops and weapons, but only a computer and Internet access. The “cyber conflicts” and “cyberwars” in which they can grow are among the greatest challenges of today and tomorrow. Because of the nature and speed of destruction may be affected thousands of targets across the planet. The cyberwar phenomenon itself is not discussed widely and availably for comparison and in this case even the Cold War would prove “an era of publicity and openness”. Therefore, the investigation and detection of problems related to the use of cyberspace as a platform for keeping secrets strife is more than obsolete. In the scientific literature it is accepted that for the first time the concept of “information war” was used in the publication by Thomas Rhona back in 1976 [1]. Although the fact that the exact boundaries of the “cyber war” phenomenon have not yet been identified and are contested in research circles a more general working definition can be formulated as a “war waged in cyberspace, using information and communication technologies in order to destruct ICT probable opponent” [2]. According to the security expert of the US government Richard Clarke in his book “Cyber Warfare” [3], “cyber war” – this is the action of a nation state intrusion into computers or networks of other national state in order to achieve the objectives of loss or destruction. The British magazine “The Economist” describes cyber war as a “fifth field of the war, after land, sea, air and space” [4]. Assuming that “cyberspace” is a conceptual and physical reality, the escalation of conflicts in it to higher levels, leads to serious losses in almost all spheres of public life and allows us to introduce the concept of “cyber war”. Information environment creates new possibilities for military impact. It changes in a very high degree the preparation as well as the actual conduct of modern war. “New technologies have made it possible to increase the precision of weapons, to achieve an exceptional degree of complexity of military offensive and defensive systems, to use ultra-modern, including spacecraft means of intelligence, to improve significantly, to the utmost degree the coordination of warring parties on the battlefield. Information from a supportive, tactical, operational maximum resource has turned into a resource of strategic importance” [5, 6]. Among the main objectives of fighting in the first phases of the war is already the achieving of information superiority: “To win wars today, one must first win the information war. Today the ability to collect, share, process and store information is the most important determinant of military power” [7]. The intensive introduction of new electronic technologies increases to utmost degree the combat capabilities of conventional armaments and especially of the military equipment. This is the original cause that today military experts consider ICT as an extremely effective weapon, which is also the priority target for destruction because of the same quality, and assess cyberspace as a convenient area for the deployment of military action, like land and sea, air and space. As noted by a former general in the Armed Forces of the United States “These communication and information technologies that connect major economic, physical and social assets have been adopted and adapted by the military and paramilitary organizations, 262 Military Art and Science REVISTA ACADEMIEI FORĥELOR TERESTRE NR. 3 (79)/2015 thus bringing about revolutionary changes in warfare altering the way for planning, organizing and conducting combat operations. These quality changes include and at the same time increase the opportunities for intelligence, surveillance and evaluation, and for command and control of forces. They help optimizing the transport of forces and means, ensuring the accuracy of navigation using intellectual-saturated highly precise weapons and using «The Network» as an environment, with the assistance of which and between the limits of which are conducted military operations” [8]. New information technologies allow multiple increase speed in processing large amounts of data, which eases making complex operational decisions and essentially creates new tactical methods of armed struggle. They sharply increase the combat potential of electronic systems, which turns them into a new type of information weapons intended to defeat both the military and the civilian infrastructure of the enemy by damaging or destruction of its computer networks. Using the cyber environment, the opponent may deploy information weapons (e.g. tools for data collection and analytical processing, stations for radio-electronic combat, impulse and electromagnetic weapons, etc.) and use it in a defensive or offensive operation together with traditional weapons. According to some expert data the invisible weapon is capable to end the conflict before the start of physical combat, because the escalation of information confrontation could lead to disaster for one of the opposing sides. In this sense it can be claimed that the possession of a high technology information weapon provides outstanding benefits and if not today, then in the foreseeable future will successfully compete even with nuclear weapons. These two weapons will become a powerful factor for political pressure and threat. Information weapon gradually becomes one of the main components of the military potential of modern states and today many countries, especially the highly developed (the USA, China, the Russian Federation and many others) consistently and persistently prepare for keeping information wars. To this aim also not so technologically advanced countries as they strive to acquire options for keeping information wars. It is quite possible because the information weapon has certain characteristics that make its spread fast and difficult to control. It has relatively low prices and this makes it quite accessible to various malevolent entities. It can be developed, built, implemented and even used hidden to the general public from various aggressive regimes which raise it in rank of a too dangerous global problem.

#### Cyber attacks cause critical infrastructure failure and nuclear war

**Tilford, Graduate US Army Airborne School, 12**

[Robert, Graduate US Army Airborne School, Ft. Benning, Georgia, Examiner, "Cyber attackers could shut down the electric grid for the entire east coast", 7-12-12, Examiner, <http://web.archive.org/web/20120812000707/http://www.examiner.com/article/cyber-attackers-could-easily-shut-down-the-electric-grid-for-the-entire-east-coa>, accessed 7-3-17, AFB]

To make matters worse **a cyber attack** that **can take out a civilian** power **grid**, for example could **also** cripple **the** U.S. **military**.

The senator notes that is that **the same** power **grids** that **supply** cities and towns, stores and gas stations, cell towers and heart monitors also power "**every military base in our country**."

"**Although bases would** be prepared to **weather a short** power **outage** with backup diesel generators, **within hours**, not days, fuel **supplies** would **run out**", he said.

Which means military **c**ommand **and c**ontrol centers **could go dark**.

**Radar systems that detect air threats** to our country **would shut Down completely**.

"Communication between commanders and their troops would also go silent. And **many weapons systems would be left without** either fuel or electric **power**", said Senator Grassley.

"So in a few short hours or days, the mightiest military in the world would be left scrambling to maintain base functions", he said.

We contacted the **Pentagon and officials confirmed the threat** of a cyber attack is something very real.

Top national security officials—**including the Chairman of the Joint Chiefs,** the Director of the National Security Agency, the Secretary of Defense, **and the CIA Director**— have said, "preventing a cyber attack and improving the nation~’s electric grids is among the most urgent priorities of our country" (source: Congressional Record).

So **how serious is the Pentagon** taking all this?

**Enough to start**, or end **a war over it**, for sure (see video: Pentagon declares war on cyber attacks http://www.youtube.com/watch?v=\_kVQrp\_D0kY%26feature=relmfu ). **A cyber attack today** against the US **could** very **well be seen as an "Act of War"** and could be **met with** a "**full scale"** US military response.

That could include the use of "**nuclear weapons**", if authorized by the President.

[Note – The senator = Senator Chuck Grassley, R-IA]

### Advantage 2 – Agricultural Literacy

#### Ag literacy is depressed now

Holden, Forbes contributor, 17

[Ronald, internally cites a new report in the Journal of Agricultural Education, 6-15-17, Forbes, “Do Not Underestimate The Ignorance Of The American Eater,” <https://www.forbes.com/sites/ronaldholden/2017/06/15/do-not-underestimate-the-ignorance-of-the-american-eater/#7ef6d75c7645>, accessed 6.27.2017]//TRossow

What we call "agricultural literacy" is at a **depressingly low point**, according to a [scholarly report](http://www.jae-online.org/attachments/article/1575/52.4.1%20Hess%20and%20Trexler.pdf) in the Journal of Agricultural Education. One grade-school respondent, for example, told researchers that "My mommy told me bread comes from an animal. I don't know which animal."

In a front-page story, The Washington Post [reports today](https://www.washingtonpost.com/news/wonk/wp/2017/06/15/seven-percent-of-americans-think-chocolate-milk-comes-from-brown-cows-and-thats-not-even-the-scary-part/)that a high percentage of Americans do not have the most rudimentary understanding of food or agriculture. "Today, many Americans only experience food as an industrial product that doesn’t look much like the original animal or plant," the Post says.

The story reports on an online survey commissioned by the Innovation Center of U.S. Dairy.

A few examples:

* **16 million people** think chocolate milk comes from brown cows
* 40% of California 4th-graders (5th and 6th graders, too) didn't know that hamburger comes from cows
* Orange juice is the nation's most popular "fruit"
* French fries and potato chips are the nation's most popular "vegetables"

Says the Post: "For decades, observers in agriculture, nutrition and education have griped that many Americans are basically **agriculturally illiterate**. They don’t know where food is grown, how it gets to stores — or even, in the case of chocolate milk, what’s in it."

There's actually a non-profit, FoodCorps, with a mission to bring more agricultural and nutrition education into elementary schools. But it may be a losing battle, according to Cecily Upton, FoodCorps co-founder. “Right now, we’re conditioned to think that if you need food, you go to the store. Nothing in our educational framework teaches kids where food comes from before that point.”

It wasn't that the kids didn't know, apparently; it's that they couldn't explain it in academic terms ““All informants recalled the names of common foods in raw form and most knew foods were grown on farms or in gardens," the researchers concluded. "They did not...possess schema necessary to articulate an understanding of post-production activities nor the agricultural crop origin of common foods.”

[Note: SBAE = School Based Agricultural Education]

#### Plan solves -- expanding agricultural education is necessary for literacy, allowing for informed decision making and better ag policies

Kovar, Southwest Minnesota State University Agricultural Education professor, & Ball, University of Missouri Graduate Studies for Agricultural Education and Leadership Director, 13

[Kristin A. & Anna L., Journal of Agricultural Education, Volume 54, Number 1, “Two Decades of Agricultural Literacy Research: A Synthesis of the Literature,” http://www.jae-online.org/attachments/article/1728/54.1.14.Kovar.pdf, p. 167-8, accessed 6.27.2017]//TRossow

“As our global population grows to a projected nine billion people by 2050, **the nonagriculture population has little to no understanding of the complexities involved with sustaining a viable agriculture system**” (Doerfert, 2011, p. 8). With a steady increase in the planet’s population, changes affecting agriculture are occurring such as increased production needs, widespread urbanization, and regulation and policy changes. The National Research Agenda for the American Association of Agricultural Education (AAAE) outlines six key research priority areas. Research priority one is “Public and Policy Maker Understanding of Agriculture and Natural Resources” (Doerfert, 2011). The emphasis placed on understanding agriculture in a modern world through research priority one communicates the need for an agriculturally literate society. Agricultural literacy is defined as an “understanding of the food and fiber system [that] includes its history and current economic, social, and environmental significance to all Americans” (National Research Council (NRC), 1988, p. 1). With fewer people directly involved in production agriculture and the complexity of agricultural issues presented to legislatures, the need for an agriculturally literate society is **imperative** so that informed individuals are able to make **educated decisions regarding agriculture** (Pope, 1990). The steady rise of urbanization has transferred the future of agriculture to a group of people with an overwhelming lack of support for agricultural issues. Agriculturally literate Americans are **more likely to support policies affecting agriculture than those Americans lacking agricultural literacy** (Ryan & Lockaby, 1996). Controversy in agriculture has continued to increase over the years due to genetically modified crops, animal rights, and food safety issues (Leising, Igo, Heald, Hubert, Yamamoto, 1998). Organizations and special interest groups have attacked the agricultural industry using the guise of creating an “informed public.” An agriculturally literate population is able to **see beyond emotional pleas** and **make informed decisions** on these issues. A society with an understanding of agriculture and current economic, social, and environmental impacts could **lessen current challenges facing agriculture through good decision making along with providing the necessary support**. Research efforts in agricultural literacy began after a publication by The National Research Council in September of 1988 entitled Understanding Agriculture—New Directions for Education (1988). This report was the result of a study initiated in 1985 due to concerns about the diminishing profitability of American agriculture and the decrease of agricultural education enrollments in secondary schools. At the request of U.S. Secretaries of Agriculture and Education, the National Research Council established the Committee on Agricultural Education in Secondary Schools to assess the contributions of agricultural instruction on the economic impact of U.S. agricultural production (Frick, Kahler, & Miller, 1991). Upon publication of Understanding Agriculture—New Directions for Education (1988), research on the concept of agricultural literacy began and has continued throughout the last 23 years. Publication of Understanding Agriculture— New Directions for Education (1988) sparked many changes in the management and operation of agricultural education programs in secondary schools. The publication stressed the establishment of programs in **urban and suburban** settings as well as a **broadening of agricultural instruction**. It also motivated a change in exclusivity by removing terms such as vocational, straying from traditional boundaries and attracting students of diverse interests. Aligning curriculum with science-based instruction methods and promoting a goal of increased program ethnic diversity was also encouraged (NRC, 1988). Agriculture as a whole has changed drastically since the publication of Understanding Agriculture—New Directions for Education (1988). The agricultural industry went through extremely trying times and financial crises in the 1980s, as evident in the dramatic rise of interest rates peaking over 20 percent, as well as a high debt-to-asset ratio (Boehlje & Hurt, 2008). Financial issues are still a concern in current times, but with agricultural loans at a much lower 4.5 percent and a significantly lower debtto-asset ratio across the industry, agriculture is in a more secure position than it was in the 1980s. Another change is the rise of corporate farming resulting in fewer people involved in production agriculture. As agriculture changed drastically over the years, one would expect to see a change in how society understands agriculture as well. Over the last two decades, the core concept of agricultural literacy, the understanding of agriculture, has stayed the same. However, understanding agriculture in 1988 and understanding agriculture in 2012 are two vastly different concepts. The change in **technology** alone warrants a new framework in which to examine agricultural literacy. Other changes include **organic farming**, **ethanol** production, international **trade**, buying local, **environmental stewardship and climate**, **g**enetically **m**odified **o**rganisms, as well as many other trends in agriculture. Agricultural educators designed programs to increase agricultural literacy prior to the publication of Understanding Agriculture—New Directions for Education (1988), but society is still considered agriculturally illiterate. If the concepts of agricultural literacy have evolved, but is being assessed through traditional methods, is the understanding of agriculture truly being evaluated?

#### The plan encourages critical thinking and personal creation of agricultural knowledge

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Teaching Methods/Approaches

SBAE has a tradition of utilizing teaching methods that support problem-based learning (Phipps et al., 2008). Teaching methods/approaches that have been categorized within problem-based learning include problem-solving, inquiry-based learning and experiential learning (Eggen and Kauchak, 2001). Teaching methods within the constructivist theory allow instructors to provide students with educational experiences that allow learners to construct their own knowledge in a way that encourages critical thinking and development of their own thoughts and opinions (Fosnot, 1996). The central tenet of constructivism posited that the learner creates personal knowledge and meaning based on their personal experiences (Steffe and Gale, 1995). Constructivism is divided into a continuum, which includes cognitive constructivism, social constructivism and radical constructivism (Doolittle and Camp, 1999). According to Doolittle and Camp (1999), Career and Technical Education aligns neatly with cognitive constructivism and adheres to the central tenets that knowledge is actively constructed and that cognition is a process that is continually evolving (Von Glasersfeld, 1984, 1998).

#### Ag literacy solves extinction - key to global growth and food security

\*\*\*NOTE -- gendered language

Malloy, Robeson County Center Extension Agent, Agriculture - Field Crops & Jones, Robeson County Center County Extension Support Specialist, Agriculture and FCS, 16

[Mac Malloy and Jessie Jones, 7-25-16, Robeson County Center, “The Importance of Agricultural Literacy,’ <https://robeson.ces.ncsu.edu/2016/07/the-importance-of-agricultural-literacy/>, accessed 6.27.2017]//TRossow

So why the big issue? **All citizens** need to understand the economic, social, and environmental significance of agriculture. Food production is the **basis of all civilization**. We need a well-educated public to contribute to the success of a safe and affordable food system that will attempt to feed the expected nine billion people in this world by 2050. Though only a small percentage of our population is actively producing our food, we all have a responsibility as voters that affect agricultural policy related to trade, employment, and environmental issues. We also need policy makers who are agriculturally literate to create responsible regulation that supports such an important industry in our **global economy.**

U.S. agriculture also plays a major role in supporting **other sectors of our economy**. According to the American Farm Bureau Federation, one in three U.S. farm acres is planted for **export**. According to the United States Department of Agriculture (USDA) Economic Research Service, in 2014, each dollar of agricultural exports stimulated another $1.27 in business activity. That means the $**150 billion** of agricultural exports in the 2014 calendar year produced an **additional $190.6 billion** in economic activity for a total output of $**340.6 billion**. Agricultural exports required **1.13 million** full-time civilian jobs, which included 808,000 jobs in the nonfarm sector the same year.

Society’s major challenge ahead is determining how to continue to feed a growing population on less land and with less resources. Maybe **it’s time we focus more on agricultural education** in our school systems to create a more literate public to meet this challenge. The National Academy of Science, Agricultural Education Committee, has stated that **agriculture is too important a topic to be taught to only a relatively small percentage of students** considering careers in agriculture and pursuing vocational agriculture studies.  Some have suggested all high school graduates need to take at least one agricultural course to gain a basic understanding. I guess it all depends on **how important we think agricultural literacy is to all mankind.**

#### We have two impacts –

#### 1. Food insecurity causes war

Koren, University of Minnesota Political Science PhD Candidate, & Bagozzi, Delaware University Political Science Assistant Professor, 16

[Ore Koren is a PhD candidate at the University of Minnesota in Political Science and a former Jennings Randolph Fellow at the United States Institute of Peace. October 2016, Benjamin E. Bagozzi is an Assistant Professor of Political Science & International Relations at the University of Delaware. [Food Security](https://link.springer.com/journal/12571), “From global to local, food insecurity is associated with contemporary armed conflicts,” Volume 8, [Issue 5](https://link.springer.com/journal/12571/8/5/page/1), pp 999–1010, on Springer, accessed 6.30.2017]//TRossow

This study adopts an economic perspective on food security to explain this variation in the concentration of social conflict. From the demand side, violent conflict is **most likely** to revolve primarily around access to food sources. When food insecurity produces higher demands for food, these demands will **directly compel** groups and individuals to seek out and fight over existing food resources, rather than leading these actors to pursue and fight over geographic areas that lack any (or have very little) agricultural resources. Thus, access to croplands and food is a necessary condition for food insecurity-induced conflict, which is confirmed in the cropland analyses presented here. From the supply side, and within those areas that do already offer access to agriculture and/or food, conflict is most likely to occur in regions that offer lower levels of food availability, or insufficient food supplies. This is because lower food availability (or supplies) in these contexts directly implies higher levels of resource scarcity, which can engender social grievances, and ultimately, social and political conflict (Brinkman and Hendrix 2011; Hendrix and Brinkman 2013). More broadly, **several causal mechanisms** could plausibly link food security and social conflict.

For one, conflict in regions with higher food access and lower availability might arise as a principal outcome of food insecurity. This approach is most directly in tune with the body of research concerned with the resource scarcity-based security implications of climate change (e.g. Miguel et al. 2004; Burke et al. 2009; O’Loughlin et al. 2012), as well as with broader studies of conflict dynamics and food security in both rural and urban contexts (Brinkman and Hendrix 2011; Hendrix and Brinkman 2013; Messer and Cohen 2006). From this perspective, individuals and groups actively fight with one another due to food insecurity-induced grievances, which may manifest in groups’ attempts to **overthrow existing political structures**, or in these actors’ efforts to more directly seize and control available (but scarce) agricultural resources in an effort to better guarantee long-term food security for their constituents. If future global projections for population growth, consumption, and climate change hold true, then these dynamics suggest that **incidences of violent conflict over food scarcity and food insecurity may increase** as individuals and groups fight over a continuously shrinking pool of resources, including food.

A second mechanism involves the existence of logistic support in conflict-prone regions, or lack thereof. Throughout history and well into the nineteenth century, armies living off the land have been a regular characteristic of warfare. The utilization of motorized transport vehicles and airlifts has significantly reduced the need of modern militaries to rely on local populations for support, at least among modernized, highly technological militaries (Kress 2002, 12–13). However, given the bureaucratic and economic capabilities required to maintain such systems, the majority of **state and non-state armed groups** in the developing world are still unlikely to be supported by well-developed logistic supply chains (Henk and Rupiya 2001). Taking into account the consistent relationship between economic welfare and conflict (Hegre and Sambanis 2006; Fearon and Laitin 2003), **unsupported warring groups** on all sides of a conflict may **move into regions that offer more access to cropland** in order to forage and pillage to support themselves, which in turn produces **higher incidences of hostilities**, especially if there is not much food per person available within these fertile regions. Hence, violent conflict in this case is not the direct result of food insecurity, but rather is shaped by food insecurity concerns.

The identified relationships between food security and conflict are **robust across numerous alternative model specifications**, and imply an **independent effect** of food insecurity in shaping conflict dynamics and conflict risk. Especially when considered alongside current, and projected, climatic and political-economic conditions, this linkage suggests that countries could see an increase in localized conflict worldwide in the coming years. However, this anticipated trend should be considered with caution for several key reasons.

**Specifically, food shortages guarantee the conflict is uniquely severe and drawn out**

**Simmons, Wilson Center guest contributor, 13**

[Emmy, September 3, 2013, New Security Beat, “Harvesting Peace: Food security, Conflict, and Cooperation”, <https://www.newsecuritybeat.org/2013/09/harvesting-peace-food-security-conflict-cooperation/#.Uth9YaCLDy8%29//JuneC//>, accessed: 6/30/17, SK]

Deaths directly attributable to war appear to be declining, but war and other kinds of conflict continue to take a toll on human health, often through food insecurity. Conflict induces the affected populations to adopt coping strategies that invariably reduce their food consumption and nutrition. Poor nutritional status in individuals of any age makes them more susceptible to illness and death.  But the acute food insecurity caused by conflict has especially potent and long-lasting effects on children. Children whose nutrition is compromised by food insecurity before they are two years old suffer irreversible harm to their cognitive and physical capacities.  Analysis of the causes of conflict and war has been an area of growing academic interest. Both theoretical work and empirical analyses substantiate the many ways in which food insecurity can trigger, fuel, or sustain conflict. Unanticipated food price rises frequently provide a spark for unrest. Conflict among groups competing to control the natural resources needed for food production can catalyze conflict. Social, political, or economic inequities that affect people’s food security can exacerbate grievances and build momentum toward conflict. Incentives to join or support conflicts and rebellions stem from a number of causes, of which the protection of food security is just one. Food insecurity may also help to sustain conflict. If post-conflict recovery proves difficult and food insecurity remains high, incentives for reigniting conflict may be strengthened.   Given the complexity of factors underlying food security, however, we do not yet understand what levels or aspects of food insecurity are most likely, in what circumstances, to directly contribute to or cause conflict. More explicit integration of food security variables into theories of conflict could help inform external interventions aimed at mitigating food insecurity and preventing conflict.   The high human and economic costs of conflict and food insecurity already provide substantial incentives for international humanitarian and development organizations to intervene in order to alleviate food insecurity in fragile states and conflict-affected societies. Experience suggests, however, that effective efforts to address food insecurity in these situations may require external actors to reconsider the ways in which they intervene.

#### 2. Growth is necessary to eliminate the incentive for war

Gartzke, University of California Political Science Associate Professor, 11

[Erik, associate Professor of political science at the University of California, San Diego PhD from Iowa and B.A. from UCSF, CATO, "SECURITY IN AN INSECURE WORLD" [www.cato-unbound.org/2011/02/09/erik-gartzke/security-in-an-insecure-world/](http://www.cato-unbound.org/2011/02/09/erik-gartzke/security-in-an-insecure-world/), accessed 7.1.2017]//TRossow

It would have been much easier for my commentary to be colorful were the essay “A More Secure World” fatally flawed, but Andrew Mack has things about right. The world has become more peaceful, particularly in recent decades and in certain regions. Let me try to sharpen or emphasize a few points. I would also like to try to dive a bit deeper into the big “why” question. We all want to know whether this peace is temporary or perhaps perpetual.

A Few More Pictures of the Peace

It will help to begin with a few longer-term images of conflict trends. The graphs Mack provided are indicative, but we cannot really be sure a trend is a trend by looking at the bit that is supposed to be the anomaly. Below is a graph of the number of militarized interstate disputes—conflicts involving militarized threats, displays, or force up to and including major war between at least two countries—per year adjusted for the number of country pairs in the world. After an unusually violent period at the beginning of the 20th century, peace has begun to take hold. The trend Mack identifies is not only present post–Cold War, but has been a part of the modern world since at least the end of the Second World War. Countries are fighting each other less, and at all levels of conflict intensity.

It could also be that the last two centuries are the anomaly. To look back further, we need to focus on Europe, where data is slightly better. The next figure details conflict in Europe between 1400 and 2000. These data come from Peter Brecke. Warfare here represents at least 32 conflict-caused deaths, with each tiny square detailing the number of conflicts in a given decade. There is quite a bit of “noise” in the amount of conflict by decade, but clearly, too, there is a prevailing trend. These results are generally consistent with findings using other compilations of conflict behavior. Conflicts decrease in Europe from an average of 30 per decade at the beginning of the fifteenth century to about 10 per decade in 2000.

What is Going On?

So peace has broken out, at least in some places. Yet peace has been sought so earnestly, for such a long time, and with so little demonstrable success that it would be **foolish**, even **irresponsible**, for scholars to pretend that evidence alone is sufficient to have confidence in optimistic conclusions. History has observed other periods of unusual peace (there is an interesting set of studies showing that the Cold War peace was not statistically abnormal). As a matter of practical contingency, even in Europe **war could recur at any time in large part because there is nothing in an anarchical world that prevents it from happening**. In the absence a compelling explanation for why many nations are, and will remain at peace, we must allow for the possibility that macro-historical tendencies toward war will recur.

So what is happening? My answer is similar to Mack’s, but I will pose it in a slightly different way. First, let us think about why anyone (individuals, groups, nations) resorts to violence. War is costly and, in nominal terms, inefficient. Blood, effort, and treasure are expended in contests that might well be used in other ways. Yet historically, these actors return to violence because it offers the potential to accomplish ends for which they strive.

Conflict has utility in politics for one of two reasons. Either actors want physical, tangible stuff (populations, minerals, or territory) that they cannot all have, or they want intangible states of the world (policies, prerogatives, political concessions) that they may not be able to share. Think of the difference here in terms of the Cold War, where opponents wanted to impose a state of the world on one another—the United States and the Soviet Union had policy differences but did not want to physically control one another’s territory—and a war like the First World War, where opponents had real, tangible territorial objectives.

A second, separate question, is what actors are willing and able to do about their conflicts. Individuals are much more likely to act violently against a neighbor, since they are close and there are many opportunities to interact. Similarly, neighboring states are historically much more likely to fight. At the same time, alternatives are important in terms of whether opportunity and willingness to fight result in violence. I may dispute my neighbor in court instead of with my fists, if this is an option. Nations can occasionally work out differences peacefully when there are dispute mechanisms that accomplish “warfare by proxy.”

Almost as informative as the decline in warfare has been where this decline is occurring. Traditionally, nations were constrained by opportunity. Most nations did not fight most others because they could not physically do so. Powerful nations, in contrast, tended to fight more often, and particularly to fight with other powerful states. Modern “zones of peace” are dominated by powerful, militarily capable countries. These countries could fight each other, but are not inclined to do so. At the same time, weaker developing nations that continue to exercise force in traditional ways are incapable of projecting power against the developed world, with the exception of unconventional methods, such as terrorism.

The world is thus divided between those who could use force but prefer not to (at least not against each other) and those who would be willing to fight but lack the material means to fight far from home. Warfare in the modern world has thus become an activity involving weak (usually neighboring) nations, with intervention by powerful (geographically distant) states in a policing capacity. So, the riddle of peace boils down to why capable nations are not fighting each other. There are several explanations, as Mack has pointed out.

The easiest, and I think the best, explanation has to do with an absence of motive. Modern states find little incentive to bicker over tangible property, since armies are expensive and the goods that can be looted are no longer of considerable value. Ironically, this is exactly the explanation that Norman Angell famously supplied before the World Wars. Yet, today the evidence is abundant that the most prosperous, capable nations prefer to buy rather than take. Decolonization, for example, divested European powers of territories that were increasingly expensive to administer and which contained tangible assets of limited value.

Of comparable importance is the move to substantial consensus among powerful nations about how international affairs should be conducted. The great rivalries of the twentieth century were ideological rather than territorial. These have been substantially resolved, as Francis Fukuyama has pointed out. The fact that remaining differences are moderate, while the benefits of acting in concert are large (due to economic interdependence in particular) means that nations prefer to deliberate rather than fight. Differences remain, but for the most part the capable countries of the world have been in consensus, while the disgruntled developing world is incapable of acting on respective nations’ dissatisfaction.

While this version of events explains the partial peace bestowed on the developed world, it also poses challenges in terms of the future. The rising nations of Asia in particular have not been equal beneficiaries in the world political system. These nations have benefited from economic integration, and this has proved sufficient in the past to pacify them. The question for the future is whether the benefits of tangible resources through markets are sufficient to compensate the rising powers for their lack of influence in the policy sphere. The danger is that established powers may be slow to accommodate or give way to the demands of rising powers from Asia and elsewhere, leading to divisions over the intangible domain of policy and politics. Optimists argue that at the same time that these nations are rising in power, their domestic situations are evolving in a way that makes their interests more similar to the West. Consumerism, democracy, and a market orientation all help to draw the rising powers in as fellow travelers in an expanding zone of peace among the developed nations. Pessimists argue instead that capabilities among the rising powers are growing faster than their affinity for western values, or even that fundamental differences exist among the interests of first- and second-wave powers that cannot be bridged by the presence of market mechanisms or McDonald’s restaurants.

If the peace observed among western, developed nations is to prove durable, **it must be because warfare proves futile as nations transition to prosperity**. Whether this will happen depends on the rate of change in interests and capabilities, a difficult thing to judge. We must hope that the optimistic view is correct, that what ended war in Europe can be exported globally. **Prosperity has made war expensive, while the fruits of conflict, both in terms of tangible and intangible spoils have declined in value**. These forces are not guaranteed to prevail indefinitely. Already, research on robotic warfare promises to lower the cost of conquest. If in addition, fundamental differences among capable communities arise, then warfare over ideology or policy can also be resurrected. We must all hope that the consolidating forces of prosperity prevail, that war becomes a durable anachronism.

### Advantage 3 – Small Farms

#### The US farm sector is consolidating now -- expanding agricultural education is critical to preserve small family farms

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 1, accessed 6-26-17, AFB]

Food and agricultural education in the United States has changed over the nation’s history, starting in the 18th century as a means of providing farmers with the basic skills they needed to prosper on their farms. In the 19th and early 20th centuries, traditional agricultural education was focused on increasing production to sustain a growing and increasingly urban and industrial population. Today, the range of issues and subject matters important to agriculture has broadened, and the educational system to provide skilled individuals to fill the needed occupations has scrambled to keep pace. The crucial areas of expertise now encompass not just those trained in production agriculture but also food and nutrition, natural resources, and the know-how to maintain and improve the physical and scientific infrastructure that underlies modern agriculture, including an increased role for information technology with the emergence of “big ag data.” For the U.S. food and agricultural sector to be in a position to compete in the global markets of the 21st century, the food and agricultural education system must be expanded and strengthened to address the challenges and opportunities facing the global food system. The world will likely become a much more politically stable place if we can make a further dent in the number of hungry people, estimated at 805 million people in 2014 by the UN’s Food and Agriculture Organization. This paper examines the evolution of U.S. food and agricultural education over time, its current structure, and how it must adapt to meet the challenges facing the sector.

Modern food and agricultural education takes many forms, ranging from children in grade school classrooms learning from “Agriculture in the Classroom” modules to undergraduate and graduate students enrolled in Colleges of Agriculture at land-grant universities and other schools with agricultural programs (such as Texas Tech and Southern Illinois Universities) to agricultural leadership programs available for adult professionals in farming and agribusiness in 42 states.1 This paper focuses primarily on food and agricultural education provided to students in elementary and secondary schools around the country (K-12), both inside and outside the classroom, and in community college programs. These programs are a means of exposing young people to careers in agriculture, and they are also a critical delivery mechanism to educate the general population about agriculture and food systems. The subjects covered in these educational settings have broadened in recent years to include health and nutrition and natural resource issues. The need for better knowledge in these areas has arisen as the general public has become more conscious of the health impacts of the food they eat and natural resource constraints such as water and arable land.

Today there are two primary reasons to support U.S. food and agricultural education activities for young people. First, we need to build a cadre of next generation farmers and ranchers as well as career seekers interested in food and agriculture. The 2012 Census of Agriculture reports that the average age of principal operators on U.S. farms is 58.3 years of age, with only 8.1 percent of all operators below the age of 35. U.S. agriculture would likely continue to produce abundant amounts of food and fiber if older farmers were not replaced as they retire, but the farm size composition of the sector could become further concentrated. To ensure that the social and economic stabilizing role of family farming is preserved, the U.S. government has for many decades taken steps to provide access to the two most important things a young farmer needs to get started: 1) adequate capital to buy or lease equipment and land to farm, and 2) adequate education so young people and other new entrants will have the know-how to farm. Today’s farmers must have an expanded technological skill set—for example, if they want to maintain their own farm equipment they need to have computer programming skills as well as be handy with a wrench and a screwdriver.

#### Small farms can succeed -- but more young people in the industry is needed

McAleer, National Institute of Food and Agriculture, 12

[Patricia, Summer 2012, Small Farms Digest, “Getting Started in Farming” <https://nifa.usda.gov/sites/default/files/sfd_s12.pdf>, Volume 15, pg. 2-4, accessed 7.1.2017]//TRossow

Many people are considering farming or ranching as a new occupation these days, and for various reasons. Some plan to enjoy their retirement in a rural setting, perhaps increasing their satisfaction by growing a few crops or tending a few animals. Others hope to become more traditional farmers, supporting their families through production agriculture. Some of them are young, perhaps with little or no farming background. Others may have waited and saved for years to afford this opportunity. Whatever motivation, no one takes the decision lightly. Like any other new business venture, starting a farm or ranch involves a great deal of thought and planning. This edition of the Small Farm Digest lays out key issues that must be considered, identifying challenges and offering examples of how these challenges can be met.

If you are interested in becoming a farmer or rancher, you are certainly not alone. A 2007 agricultural survey estimated that of the approximately 3 million U.S. agricultural operators1 , more than 650,000 were beginning farmers or ranchers (BFRs). This is a diverse group. It is often assumed that BFRs are young, but recent data show **only about 16%** of them are under 35, compared to 1% of established farmers and ranchers (EFRs.) 50% are between 35-50, 22% are between 50 and 64, and 12% are 65 or older.

Most BFR’s are men, but women are more likely to be principal operators on beginning operations than on established ones (15% versus 9%.) Pennsylvania State University professor Rachel Unger notes that despite ‘significant barriers to success for new and beginning women farmers, the number of female principal operators in the U.S. increased almost 30% between 2002 and 2007.’ Recent data show little difference in racial or ethnic backgrounds between BFRs and EFRs, but more detailed information may be available from the 2012 Ag. Census.

As with any new venture, beginning farms and ranches tend to be smaller than established operations (174 acres on average compared to 461 acres for EFRs) but there is wide variation across the country. Most BFR operations are less productive and profitable than more established ones. For example, in 2010 family farms with gross sales of $10,000 to $249,999 (i.e. excluding the smallest operations) accounted for 17% of the value of U.S. agricultural production while all BFR operations were responsible for 10% of the value of production by family farms.

This is not surprising. It may take several years to generate a significant harvest (think of tree crops) and in 2010 nearly 32% of Beginning Farms were ‘without production.’ Also, as noted above, many BFRs focus on rural retirement with little interest in farming or ranching for profit.

How likely are you to succeed as a BFR? A 2007 ARMS Survey analysis of linked Census data showed that 45% of farms and ranches started between 1978 and 1982 survived the first 5-9 years. 19% were still in business by 1997. The failure rate is comparable to that of other new businesses. Analysis also showed that the longer an operation is in business, the greater the chance that it will survive. More information is in the ERS report: Understanding U.S. Farm Exits.

There are various reasons why new enterprises fail, but finding good land is a key challenge. Unlike established operators, many BFRs buy most of the land they operate, and carry a heavy load of debt. Kathy Ruhf’s article, How Will the Next Generation of Farmers Acquire Land to Farm or Ranch, discusses the availability and high cost of land, and lays out sound alternatives to land purchase. In Starting a Small Farm, Rachel Pollock describes how leasing very small urban plots often helps establish immigrant farmers.

Some BFRs do acquire land within the family, by inheritance or by working with existing family members. Professor Duffy’s article, Inheriting a Farm, not only clarifies issues related to inheritance but is also a useful guide on what to look for when any piece of land is being considered for a farm or ranch. Similarly, in On the Home Farm he gives a thorough discussion of issues that must be considered when family members or any group of operators decide to farm or ranch together.

Significant capital is essential when starting a new farm or ranch, not only to find land but for other investments such as farm machinery, and as a steady supply of operating capital. Few new operations generate much cash in the early years, however, and many BFRs use their off-farm income to subsidize the farm or ranch, hoping it will eventually become profitable enough to be their sole source of income. Professor Duffy’s article PartTime or Small Farms discusses this approach in some detail. He also raises a concern that young BFRs may skimp on health insurance in the interim.

The **2008 Farm Bill** introduced or expanded several opportunities to help BFRs. In particular, USDA’s Farm Service Agency offers considerable support. James Radintz’ article explains the kinds of loans available, addresses eligibility, and clarifies steps BFRs must follow. See also the article on U.S. Farm Bill Resources and Programs for Beginning Farmers by S. Ritchie and S. Sureshwaran in Choices Magazine.

Individual Development Accounts also help BFRs save and increase their own savings. Molly Bloom’s article on California Farmlink’s 20 years of experience shows how these accounts work and how effective they can be.

\* BFRs = beginning farmers or ranchers

\*EFRs = established farmers or ranchers

#### Industrial farms are collapsing biodiversity now - only a shift towards family farming solves

\*multiple warrants - monocultures, pesticides, diets

\*A2 - industrial farms key to food

Kravitz, Food journalist, 16

[Melissa, writer in New York City who writes about food and culture for First We Feast, Thrillist, Elite Daily, Edible, and other publications, internally cites American Farmland Trust, a Washington, D.C.-based nonprofit that promotes environmentally sound farming practices, Severine von Tscharner Fleming, founder of the [Greenhorns](http://www.thegreenhorns.net/category/about/aboutus/), a non-profit group working to support a new generation of young farmers, a 2012 United Nations [report,](http://www.un.org/esa/dsd/dsd_sd21st/21_pdf/agriculture_and_food_the_future_of_sustainability_web.pdf) "Food and Agriculture: The Future of Sustainability, and the US Department of Agriculture.”, 10-12-16, Alternet, “The Many Ways Farmer's Markets and Small Family Farms Are Essential to Our Future,” <http://www.alternet.org/food/why-farmers-markets-are-critical-food-security-environment-and-public-health>, accessed 6.27.2017]//TRossow

**Ending food insecurity** may be as easy as supporting your local farmers market. In advance of [World Food Day](http://www.fao.org/world-food-day/2016/home/en/)on October 16, American Farmland Trust, a Washington, D.C.-based nonprofit that promotes environmentally sound farming practices, named its [top farmers markets](http://markets.farmland.org/) in the nation, many of which are based in warmer southern states like Florida and Virginia. But no matter what region you live in, farmers markets and small farms are essential to community health.

“**Small family farms** have been shown to be the **most effective**, per acre, at **ecological stewardship, biodiversity and production of nutrition**,” said Severine von Tscharner Fleming, founder of the [Greenhorns](http://www.thegreenhorns.net/category/about/aboutus/), a non-profit group working to support a new generation of young farmers. “Small family farms employ more workers, supporting the local economy and rural prosperity … and can adapt and change with the market demands or shifts in climate," she argues.

Rather than **massive monoculture farms**, which may vend millions of pounds of corn to be turned into animal feed or sugary cereal, smaller farms grow a variety of products—and it’s in the farmers’ best interest to treat their land sustainably (i.e., not decimate the soil with **toxic pesticides** and fertilizers), as well as treat their animals with respect and compassion.

While factory farms may produce a higher quantity of food, the "more is better" logic is not particularly relevant to our public health concerns—or our economy. “The current ‘more production’ orientation is so outdated and unresponsive to our current needs that it is causing its own problems, particularly for our environment and natural resources,” according to a 2012 United Nations [report,](http://www.un.org/esa/dsd/dsd_sd21st/21_pdf/agriculture_and_food_the_future_of_sustainability_web.pdf) "Food and Agriculture: The Future of Sustainability." The report suggests a significant investment in small- and medium-sized farms to improve the overall health and viability of our food system worldwide.

By not using massive industrial farming and irrigation equipment, small farms better maintain the quality of our soil, air and water, which, from a public health standpoint, is pretty essential to our daily well-being. In contrast, explained von Tscharner Fleming, "large scale agribusiness landscapes not only degrade soil and water quality in the short term, reducing the biological health of the soil ecosystem, but also make them much more vulnerable to **disease** and **drought**, to **crisis and collapse."**

Moreover, small farmers can have closer connections to particular needs of a community and "have an investment in community health," said Juliet Sims,  program manager at the Prevention Institute, a community health nonprofit based in Oakland, California. "We see support for small and mid-size farmers to engage in sustainable food production as a critical component of a sustainable food system that allows us to be food secure in the future."

The USDA’s most recent [Scientific Report of the Dietary Guidelines Advisory](https://health.gov/dietaryguidelines/2015-scientific-report/pdfs/scientific-report-of-the-2015-dietary-guidelines-advisory-committee.pdf)committee emphasizes the importance of fresh, unprocessed whole foods in American diets. "A diet higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in calories and animal-based foods is more health-promoting and is associated with less environmental impact than is the current U.S. diet,” the report states.

The key to reducing greenhouse gases and improving our overall health with better food options? You guessed it: **Small farms**. In its 100-plus pages of research, the USDA reiterates the importance of local agriculture to improve long-term food security. “Access to sufficient, nutritious, and safe food is an essential element of food security,” the report states. “A sustainable diet ensures this access for both the current population and future.”

And this isn’t just a research theory—supporting local agriculture works.

“Farmers markets and farm stands can really improve the diets of community members who are food insecure,” Sims said. For example, in 2015 the California Nutrition Incentives Act created financial incentives for [CalFresh](http://marketmatch.org/) (the equivalent of SNAP benefits) to match dollars spent on produce at farmers markets. Every CalFresh dollar spent on produce earns a matching dollar to spend on produce, which has “dramatically increased people’s intake of fruits and vegetables, often produced more sustainably and locally,” Sims explained. In Davis, the Market Match program has increased farmers market purchases [by almost 300 percent](http://www.sacbee.com/opinion/editorials/article81451527.html), building the local economy while simultaneously improving the health of the community.

Those not part of CalFresh or SNAP programs can support local agriculture by shopping at farmers markets, or subscribing to CSAs and local farm cooperatives. Even people in urban settings can get in on small farm purchasing, with services like FreshDirect delivering CSA boxes directly to New York City stoops. Sites like [Overstock](https://www.overstock.com/Farmers-Market/44/store.html) have also started delivering locally grown produce, and countless local initiatives by region bring the farmers market online and make it easier than ever to support local farms.

"We need to protect our remaining small farms, as teaching facilities, as places for ecological education and recreation, as **reserves of biodiversity and rare animal breeds**, as functional farm systems as a buffer against urban growth,” said von Tscharner Fleming.

#### Small farms sustain agrobiodiversity -- that contributes to both food security and forest diversity

Nowakowski, former National Geographic graphics reporter, 16

[Kelsey, 11/10/16, National Geographic, “On Tiny Island Farms, Biodiversity Is a Way of Life”, <http://www.nationalgeographic.com/people-and-culture/food/the-plate/2016/11/on-a-tiny-island--farmers-promote-biodiversity/>, accessed: 7/1/17, KW]

Growing a variety of plants like the Jamaican farmers do contributes to food security by maintaining agricultural biological diversity—known as agrobiodiversity for short. Protecting that diversity is becoming more difficult, though, since most of the world’s cultivated land is dedicated to growing the handful of staples we eat. According to the Food and Agriculture Organization, [75 percent of the world’s food comes from only 12 plant species](http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf).

“In rural Jamaica, small farms blend in with the forests. In that variety lays the protection of biodiversity. The farmers know that to keep the soil healthy and food production up, they need the wild trees and native shrubs,” says study co-author [Ina Vandebroek of the New York Botanical Garden](http://www.nybg.org/science/scientist_profile.php?id_scientist=83).

Agrobiodiversity can ensure there are many food source options in case something goes wrong with one. The Irish Potato famine of the mid 1850s, which was caused by a blight that devastated the island’s main food source, is the classic example of something going wrong. More recent examples abound: Bananas are cloned (See [The Miracle of the Modern Banana](http://www.nationalgeographic.com/people-and-culture/food/the-plate/2016/08/the-miracle-of-bananas/)), as is agave, leaving both vulnerable to pests or viruses.

#### Biodiversity loss is on the brink - but it’s not too late to solve

Eurasia Review, independent journal, 17

[Eurasia Review, independent journal that provides news and analysis on world events that affect Eurasia and Afro-Eurasia, internally cites Forest Isbell, of University of Minnesota’s College of Biological Sciences, McGill biologist Andrew Gonzalez and coauthors from eight countries on four continents. [June 2, 2017](http://www.eurasiareview.com/02062017-report-says-were-on-brink-of-mass-extinction-but-still-time-to-act/), “Report Says We’re On Brink Of Mass Extinction, But Still Time To Act,” <http://www.eurasiareview.com/02062017-report-says-were-on-brink-of-mass-extinction-but-still-time-to-act/>, accessed 7.1.2017]//TRossow

Imagine being a scuba diver and leaving your oxygen tank behind you on a dive. Or a mountain climber and abandoning your ropes. Or a skydiver and shedding your parachute. That’s essentially what humans are doing as we expand our footprint on the planet without paying adequate attention to impacts on other living things, according to researchers from the University of Minnesota and McGill University. Because we **depend on** plants and animals for food, shelter, clean air and water and more, **anything we do** that makes life harder for them eventually comes around to make life harder for us as well.

But, reporting with colleagues from around the world in this week’s special biodiversity issue of the scientific journal Nature, the researchers also note that **all is not lost**, and offer specific strategies for turning that tide **before it’s too late.**

Forest Isbell, of University of Minnesota’s College of Biological Sciences, McGill biologist Andrew Gonzalez and coauthors from eight countries on four continents provided an overview of what we know and still need to learn about the impacts of habitat destruction, overhunting, the introduction of nonnative species, and other human activities on biodiversity.

In addition, they summarized previous research on how biodiversity loss affects nature and the benefits nature provides — for example, a recent study showing that reduced diversity in tree species in forests is linked to reduced wood production. Synthesizing findings of other studies, they estimated that **the value humans derive from biodiversity is 10 times what every country in the world put together spends on conservation today** — suggesting that additional investments in protecting species would not only reduce biodiversity loss but provide economic benefit, too.

“Human activities are **driving the sixth mass extinction** in the history of life on Earth, despite the fact that diversity of life enhances many benefits people reap from nature, such as wood from forests, livestock forage from grasslands, and fish from oceans and streams,” said Isbell, who served as lead author the paper. “It would be wise to invest much more in conserving biodiversity.”

“Biodiversity plays a big role in the UN Sustainable Development Goals that aim to ensure human wellbeing in the long-term” said Gonzalez. “Attaining the UN SDGs will require action to conserve and restore biodiversity from local to global scales”.

#### Biodiversity is intrinsically valuable and prevents extinction -- it’s not too late but changing agricultural practices is required

Hicks, Eco-Business Deputy Editor, 17

[Robin, internally cites Marco Lambertini, director-general of environmental group World Wide Fund for Nature, also known as WWF. June 21, 2017, Eco-Business, “Why biodiversity loss is scarier than climate change,” <http://www.eco-business.com/news/why-biodiversity-loss-is-scarier-than-climate-change/>, accessed 7.1.2017]//TRossow

While the plight of tigers, sharks and rhinos may be sad, does it really matter to mankind if these species go extinct? Should we care if the only way to see these beasts is in a zoo or aquarium, or if they go the way of the Dodo?

Preserving these species is not only in the interests of zoologists and animal lovers, **it is essential to safeguard the future of our own,** says Marco Lambertini, director-general of environmental group World Wide Fund for Nature, also known as WWF.

Talking to Eco-Business on the sidelines of [Ecosperity](https://www.ecosperity.sg/), an annual sustainability conference held by Singapore investment firm Temasek, Lambertini pointed out that nature has an **intrinsic, intangible value that cannot be measured.**

A price tag cannot be placed on the feeling of wonder on seeing, say, an eagle soaring over a hillside, or the sense of calm one feels when strolling through a forest, although [“forest bathing”](http://www.shinrin-yoku.org/shinrin-yoku.html) - the act of simply being in a forest - has been a recognised healing method in Japan since the 1980s.

Calculations can be made about the value of individual animals, for example, an African elephant might be worth around US$2 million a year in tourism value, and a whale shark in the Philippines a similar amount, estimates Lambertini. But it is harder to work out how much an ecosystem is worth.

“A forest is not just a piece of greenery,” says Lambertini. “It’s a network of animals and plants all working together to make the forest a living system that **produces oxygen, regulates water and retains the soil** for us. It’s hard to put a price on that.”

The cost of loss

Although it is more difficult to work out how many species of plants and animals there are on Earth than stars in the sky, says the World Resources Institute, the rate of species loss can be more reliably measured.

It is estimated that **150 to 200 species of plant, insect, bird and mammal go extinct every 24 hours**. This, Lambertini observes, is almost **1,000 times the natural rate of extinction**, and the fastest rate of species loss since the demise of the dinosaurs 65 million years ago.

WWF’s [Living Planet report](http://awsassets.panda.org/downloads/lpr_2016_full_report_low_res.pdf)from 2016 showed that of 3,706 wildlife populations around the world, 60 per cent have disappeared in the last 40 years.

“We need to work out the **invisible value of nature**,” says Lambertini. “**We cannot have a prosperous society in a depleted planet.”**

The numbers behind the impact of this decline are stark. According to a [report from the United Nations-backed Business and Sustainable Development Commission](http://www.eco-business.com/opinion/the-us5-trillion-opportunity-asian-businesses-cannot-afford-to-ignore/) launched at Ecosperity, biodiversity loss in Asia could **reduce g**ross **d**omestic **p**roduct **globally by 18 per cent** by 2050, up from just over 3 per cent in 2008.

The reason for the decline is that, for most of the two million years that humankind has been around, “we’ve taken nature for granted. Fruits were there to be picked, fish to be fished, game to be hunted,” says Lambertini.

“Only in the last 50 years, because of the demographic and technological boom, we’ve realised that these resources are not infinite. Using them up will massively affect economic and social stability.”

People and companies must go from being “grabbers” of natural resources, to being stewards and managers of nature. “That’s a big cultural transition to make, but it’s not easy,” he says.

Paying for ecosystems

A [study in 2014 by ecologists](https://www.cieem.net/news/184/global-ecosystem-services-revalued-at-us125-145-trillion-per-year) found that the services provided by nature, such as trees filtering air and water, plants storing carbon, insects pollinating crops and the mental health benefits of green spaces, were worth US$125 trillion to **US$145 trillion a year**. The study also found that losses **from land use change** amounted to US$4 to US$**20 trillion a year.**

The services provided by nature are now increasingly being valued because they are becoming **less reliable and less available**, says Lambertini. The deforested areas of Sumatra in Indonesia, for example, are experiencing much less precipitation than they used to, because the forest has gone, he notes.

Even mining companies are starting to invest in conserving forests upstream because they are such big users of water.

But the **agricultural sector**, which uses **70 per cent of the world’s fresh water**, is **far behind**, and moving **much slower** towards recognising **its own dependence** on nature, notes Lambertini.

“We need to be able to plan agriculture in a way that **incentivises high yields instead of just using more land**,” says Lambertini, whose comments came on the same day that the chairman of the Indonesia Investment Coordinating Board, Thomas Lembong, told delegates at Ecosperity that years of deforestation and haze had been caused by [low productivity on the part of Indonesia’s agroforestry industry](http://www.eco-business.com/news/how-to-build-a-business-around-the-sdgs-and-do-more-with-less/).

“We need to produce more food with less of everything; water, land and energy. We need to get the right balance of where we produce and where we protect,” says Lambertini. “The forest provides water regulation, pollination and local microclimate and precipitation services.”

Cities depend on the water regulated by forests, and Lambertini points to Singapore as a country whose water supply is reliant on the Central Catchment Reserve, a small patch of forest surrounding a lake that also holds the richest of Singapore’s biodiversity.

“The reason there are still trees in the middle of the island is because of their function to regulate water for the city. Municipalities are beginning to preserve forest areas because of the services they provide,” he says, at a time when Singapore’s remaining forests - which make up just three per cent of the city-state’s land area -[face ongoing threats from construction and development](http://www.eco-business.com/opinion/planet-earth-ii-ignores-threats-to-singapores-last-forests/).

Reason to be optimistic

Though ecosystems face increasing pressure from human development, the head of an organisation with 5 million followers says he is optimistic.

“It couldn’t be a better time. I’ve never seen a stronger response to the ecological crisis than now, both from government and business,” says Lambertini, who has been a conservationist for the last 45 years, taking the top job at WWF three years ago, moving across from BirdLife International, where he was chief executive.

**But there is a long way to go.** While climate change has entered the mainstream of political thinking and is now used by corporates to assess business risk, biodiversity is treated as largely an irrelevance.

Biodiversity loss is **even scarier than climate change.**

“It’s extraordinary how climate change has in the last 10 years surged to top of the political agenda and is used in business risk assessment. With the [Donald] Trump announcement about [the United States pulling out of the] Paris [Agreement on climate change], [80 per cent of big businesses in the US stood up and complained](http://www.independent.co.uk/news/business/news/donald-trump-climate-change-paris-agreement-wall-street-exxon-blackrock-global-warming-united-states-a7766331.html),” says Lambertini.

“Climate change is now considered a serious issue and a dangerous issue, for society, for business, for everything.”

“With climate change we’re not there yet, but we’re on the right track. With biodiversity, we’re nowhere near,” he says.

“The concept [of biodiversity] is too remote, too esoteric, too intangible. People don’t connect. And yet people are sad when they hear about extinctions, or the decline of animal populations, or deforestation - but they’re not worried.”

That’s the difference with climate change, says Lambertini, while acknowledging that the two issues are often interlinked, for instance climate change leads to coral bleaching, which in turns leads to biodiversity loss.

“We need to make biodiversity loss and nature loss a serious issue, an issue that people are afraid of,” he says. “We are scared of climate change, but the loss of nature is “**even more scary**,” says Lambertini.

“If we lose the oxygen that comes from the ocean and the forest, then **we really are doomed**. There’s no doubt about that.”

The struggle for environmentalists, says Lambertini, is to find ways to connect biodiversity - the foundation of ecosystems - to the services people enjoy every day.

“That’s the challenge. I am optimistic that we won’t ignore that challenge, and make nature as a big an issue as climate change.”

### Plan

#### Text

The United States federal government should establish a Perkins Plus program, modeled after the Carl D. Perkins Vocational and Technical Education Act, that offers additional funds to agricultural education programs deemed to be top performers by the United States Department of Agriculture.

### Solvency

#### The plan is necessary to expand the scope of agricultural education in the US

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 15, accessed 6-26-17, AFB]

Rewarding Effective Programs

While state departments of education submit data on student performance in CTE programs to the U.S. Department of Education under the Perkins Act, there is little incentive for school districts to be identified as top performers because the funding available is provided under formulas at both the federal and state levels. It might be useful to consider establishing a ‘Perkins Plus’ program that offers additional funds to programs deemed to be top performers to help them expand their reach, either using the performance data already mandated to make the awards or setting up a separate competition. Because of current constraints on federal spending which suggests dim prospects of additional funding, it might be wise to consider a modest shifting of funds from the Perkins Basic Grants, which could serve as seed money for the ‘Perkins Plus’ endeavor, perhaps to be matched by funds from private sources such as foundations, farm groups and/or agribusinesses. An additional performance indicator that could be used in such a competition might be the rankings of states by USDA on their participation in Farm to School programs.

Key to this effort would be defining what constitutes success. If the primary goal is to create a stable and educated workforce for U.S. agriculture, moving students from secondary schools into post-secondary agricultural and agri-science fields should be the main performance indicator for this proposed competition.

#### Expanding agricultural education is necessary -- solves literacy, STEM, and cultivates new farmers – action now is key

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 16, accessed 6-26-17, AFB]

Concluding Remarks

Food and agricultural education in the United States has taken steps in recent years to adjust its curriculum to the modern agricultural reality, but most of its energy is currently focused in the rural and non-metropolitan regions of the country. In order to expand the pool of young people who might consider a career in a food and agricultural field, more should be done to teach children in elementary school in urban and suburban settings as well about the basic facts of food and agriculture in a way that holds their attention and interest. If basic knowledge about food and agriculture becomes more widely held, there will be opportunities to hold onto the interest of more of these students as they move through secondary school and into college. There’s an urgent need for better data collection on program performance and funding at the national, state, and local level for food and agricultural education, in order to be able to examine these issues in a more rigorous manner.

Traditional partnerships and programs will continue to play a key role in promoting food and agricultural education across the United States. Alternative mechanisms for promoting food and agricultural education should also be explored, such as through charter schools and innovative food education efforts. By incorporating more agricultural science across a variety of STEM fields, there will be new ways to touch students in every classroom across the country. There’s no time to lose, as the massive baby boom generation in this country begins to enter retirement years, today’s millennials will be the ones who will fill the jobs of tomorrow, in food, agriculture, and agribusiness as well as the rest of the economy.

# \*\*\*\*Solvency

## Descriptions of Policies

### Federal Laws – Perkins, NARETPA, SPECA

#### Description of current federal laws

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 4, accessed 6-26-17, AFB]

Over the last several decades, the scope of knowledge needed to be conveyed through traditional agricultural education expanded as there were many jobs with technical dimensions that did not require four years of college education to undertake. A key provision of the Vocational Education Act of 1963 (P.L. 88-210) expanded the purposes for which the funding could be used to include work study and demonstration programs. In 1984, the Carl D. Perkins Vocational and Technical Education Act (P.L. 98-524) (dubbed ‘Perkins I’) was enacted, which expanded the type of training to be supported to include technical training in other industrial fields. The 1990 reauthorization of these programs (Perkins II) sought to coordinate secondary and post-secondary vocational educational activities. In 1998, the reauthorization (Perkins III) increased the share of funds to be distributed to the local level by states and established accountability standards, and the 2006 reauthorization (Perkins IV) took the phrase ‘vocational’ out of the program entirely by renaming it ‘Career and Technical Education’ (CTE), and linked CTE programming with the overall standards for educational funding established under the Elementary and Secondary Education Act.17 All of the federal funds for CTE programs are disbursed by the U.S. Department of Education (USDE), although the programs are run at the state or local level.

The National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3121) established the U.S. Department of Agriculture as the lead agency for research, extension and teaching in the food and agricultural sciences. The original authorization was amended in the 2008 farm bill to give the Secretary of Agriculture the authority to award grants to “(a) promote and strengthen secondary and 2-year post-secondary agri-science and agribusiness education, and agriculture in the K-12 Classroom, in order to help ensure the existence in the United States of a qualified workforce to serve the food and agricultural sciences system; and (b) promote complementary and synergistic linkages among secondary, 2-year post- secondary, and higher education programs in the food and agricultural sciences in order to attain excellence in education and to encourage more young Americans to pursue and complete a baccalaureate or higher degree in the food and agricultural science,” 18 subject to annual appropriations. These grants are now administered under USDA’s National Institute of Food and Agriculture (NIFA) as Secondary and Two-Year Post-secondary Agricultural Education Grants (SPECA grants).19

### Perkins Funding Description

#### Perkins funding

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 8, accessed 6-26-17, AFB]

Funding for Food and Agricultural Education in the United States

Public Sector Funding

Under the authority of the Perkins Act described above, the U.S. Department of Education will provide $1.12 billion in funding for Career and Technical Education (CTE) programs in all states and territories in fiscal year 2015, the division of funding determined by formulas based on each state’s population in certain age groups and per capita income. California is the largest recipient of Perkins Basic Grant funds ($122 million in 2014), followed by Texas ($92 million), Florida ($61 million), and New York ($51 million).44 Perkins Act funds can be used to purchase occupation-specific equipment for student use, curriculum development, professional staff development, career and guidance counseling for students.45 States then have some leeway as to how the funds can be distributed among local school districts. No data are available that separate out Perkins Act funding for food and agricultural education as opposed to other CTE programs available in secondary or post-secondary schooling.46 Food and Agriculture is one of 16 designated clusters eligible for Perkins Act funding.

### History

#### History of agricultural education

Hillison, Virginia Tech University, Department of Agricultural, Leadership, and Community Professor Emeritus, 15

[Dr. John Hillison, December 2015, The Agricultural Education Magazine, “Our Future as Influenced by Our Past,” pg. 8, https://www.questia.com/library/journal/1P3-3957034861/our-future-as-influenced-by-our-past, accessed 6.30.2017]//TRossow

Before our profession can have an idea what our future might look like, we need to know where we came from. **History can be the guide for what our future will be like**. With that in mind, we need to start even before the Smith- Hughes Act.

Publicly supported agricultural education was taught earlier than most members of the profession realize. Examples include the Philadelphia Society for the Promotion of Agriculture in 1785, New Harmony (Indiana) Utopian Society in 1825, the secondary school of agriculture at the University of Minnesota in 1888, and the National Farm School in Doylestown, Pennsylvania in 1896.

Congressional District Agricultural Schools were started in Alabama in 1889, Georgia in 1906, and Virginia in 1910. Such schools were located in each Congressional district in the respective states. The Georgia schools were in existence when Hoke Smith was governor of Georgia and one was located in Congressman Dudley Hughes’ district. Such schools typically had instruction in a classroom setting, in school laboratories, and a school farm. Often times the Congressional District schools also had commodity based student organizations.

Prior to passage of the 1917 Smith-Hughes Act with the patrons of Hoke Smith and Dudley Hughes, agricultural education had been in existence for a long time in the United States. For example True (1929) reported that in school year 1915-16 there were 3,675 secondary schools with an enrollment of 73,000 students in agricultural instruction. The curriculum content of the courses for those students included academic instruction, vocational instruction, and agricultural literacy. **Leadership at the national level for agricultural education prior to 1917 came from the United States Department of Agriculture (USDA**) which provided instructors with subject-matter bulletins and circulars, information on boys’ and girls’ clubs, charts, photographs, lantern slides, chapters in yearbooks, and moving pictures (Report, 1914).

With passage of the Smith- Hughes Act the mission of agricultural education greatly narrowed from the three pronged approach of academics, vocational, and literacy to almost exclusively vocational. The emphasis on preparation for farmers became called vocational agriculture. A decade after the Smith-Hughes Act was passed the Future Farmers of America (FFA) was started in 1928 as a white boys’ organization for students enrolled in vocational agriculture.

## Solvency Mechanisms

### Agriculture Education Integration

#### Agriculture education creates informed citizens and should be included in formal secondary education

Lufkin et al, National Alliance for Partnerships in Equity Executive Director, 9

[Mimi, March 2009, Pennsylvania Department of Education, “Vision for Pennsylvania Agricultural Education,” http://www.education.pa.gov/Documents/K-12/Career%20and%20Technical%20Education/Teacher%20Resources/Agricultural%20Education/A%20Handbooks%20for%20Program%20Planning%20and%20Curriculum%20Development.pdf, pp. 8-9, 6/28/17, KF]

Education "about" agriculture, or agricultural literacy, provides individuals with practical and appropriate knowledge of food and fiber production, processing and domestic and international marketing and distribution. It also should include enough knowledge of food and nutrition to make informed personal choices about diet and health. Learning about agriculture is a lifelong process and should be included in the formal educational system K-adult. Achieving the goal of agricultural literacy will produce informed citizens able to participate in establishing and revisiting policies that will support a competitive agricultural and food industry in this country and abroad.

Education "in" agriculture has a long history in American education. Most programs consist of three parts: classroom and laboratory instruction, supervised agricultural experiences (SAE's) and leadership activities through the FFA. These programs are found in schools starting in the seventh grade and continuing into college. They are designed to give students the skills needed to enter and advance in agricultural careers and/or pursue postsecondary education.

Over 500 individuals involved in agriculture participated in developing a vision for Pennsylvania agricultural education. The vision statement “educating people for life through agriculture; food, fiber and natural resource systems” reflects the broad-reaching impact agricultural education has on everyone’s lives. The visioning process, completed through the Reinventing Agricultural Education for the Year 2020 project, also resulted in the development of a set of goals and objectives for six key areas. These areas included:

• **Lifelong Learning**

**• Personal Development (for all students)**

**• Professional Development (for all educators)**

**• Environmental Stewardship**

**• Long-term Agricultural Viability**

**• Emerging Technologies**

### Agriculutre Education Funding

#### Funding key to agricultural education – allows for better teacher training, curriculum, and job preparation

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

This study provides findings that elicit three overarching implications for local SBAE programs, agricultural education organizations and agriculture teacher education programs. First, based on the findings that SBAE prepares students to enter the workforce or post-secondary classroom (Hillison, 1987; Moore, 1987; Newcomb et al., 2004; Phipps et al., 2008), secondary agricultural educators and agricultural education organizations (National FFA Organization, The Council, Team Ag Ed, etc.) should promote the achievements of their students on the local and state level. This could promote the need for SBAE in every public school, state and federal funding and local support for appropriate agricultural teaching facilities. Second, because students have been found to increase knowledge gain due to proven teaching methods (Phipps et al., 2008; Ricketts et al., 2006), secondary agricultural educators should continue to utilize innovative and proven teaching methods. This will assist students in developing problem-solving, criticalthinking and personal development skills. Further, teacher education programs should continue to prepare preservice teachers to implement proven and innovative instructional strategies and teaching methods. Third, because SBAE has historically demonstrated the goals and innovations of Education Nation and the Common Core State Standards (Phipps et al., 2008; Ricketts et al., 2006), teacher educators and secondary teachers must continue to promote preservice teacher education programs to high school and undergraduate students. Fourth, agricultural education teacher preparation programs must continue to rejuvenate curriculum to incorporate new and innovative strategies that enhance the overall education experience of high school and middle school students.

[SBAE = School Based Agricultural Education]

### CASE Grants

#### Nationwide CASE programs key to teacher quality – more grants needed

Bloom, Plant Pathway Coordinator at Curriculum for Agricultural Education Science Education, AND Eddy, agricultural education teacher at Southeast Polk High School in Pleasant Hill, Iowa, 16

(Melanie and Matthew, 5/16/16, The Agricultural Education Magazine, “Securing STEM Dollars for CASE and Agricultural Education.” ProQuest, P. 25-26, Accessed 6/30/17, GDI JMo)

Nation-wide STEM grant agencies have begun to sponsor educational programming around the country. www.changethe- equation.org now has completed CASE education programming grants on file that can be utilized by groups searching for grant dollars to fund, or to provide ex- amples for companies who would like to fund STEM intiatives.

CASE provides detailed, itemized purchase manuals for each course which include ev- ery tool, material, supply and consumable needed to teach each course. By providing these manuals, CASE equips teachers with two important advantages: time and potential. First, by uti- lizing the purchasing manuals, time spent securing supplies and preparing purchase orders for the upcoming year is reduced to almost nothing. These manuals also provide a tool for lobbying administration for extra help. When a teacher shares a compre- hensive plan, national curriculum with third-party assessment, and support from potential employers it is much easier to justify local expenditures. The human capital potential in CASE curriculum is amplified when developing grant proposals. Grants require specific plans along with budget narra- tives that are comprehensive. The CASE purchase manuals make a very compelling demonstration of financial need by specifically spelling out what will be pur- chased. This is a great illustration of how Iowa Team Ag Ed has had success with grants. Compre- hensive plans, budget narrations, and potential employer support statements prove the need for dol- lars and allow the organization to complete the grant proposal - and funded project - successfully.

[Note: CASE = Curriculum for Agricultural Science Education]

#### CASE models good – leads to highly qualified teachers and allows for real world learning

Ulmer, Texas Tech University teacher educator, & Witt, Texas Tech University Agricultural Education, doctoral student, 11

(Dr. Jonathan and Phillip, September/October 2011, The Agricultural Education Magazine, “Integrating Science Instruction into Pre-Service Teacher Education.” ProQuest, Accessed 6/30/17, GDI - JMo)

A recent study conducted in conjunction with Texas Tech University and Oregon State University explored the professional development component of CASE. Requiring teachers to commit two weeks in the summer before they can use the curriculum is a huge commitment and might prevent many teachers who are interested from attending. Researchers wanted to know what impact the institute might be having on the teachers.

The purpose of this study was to discover if the science teaching efficacy belief of teachers changed after completing a CASE Institute. Beliefs are part of the foundation upon which behaviors are based and studies investigating teacher efficacy indicate that these beliefs may account for differences in teacher effectiveness (Enochs &Riggs, 1990). A teacher's efficacy belief is a judgment of his or her capabilities to bring about desired outcomes such as student achievement, motivation, and student engagement (Tschannen-Moran & Hoy, 2001).

The study explored the science teaching efficacy belief of agricultural education teachers before and after they participated in a CASE institute in order to determine what impact it might have on science teaching efficacy.

Researchers found that the CASE Institutes and the CASE curriculum are making a positive impact on agricultural science teachers and the courses they offer. They believe that the professional development requirement is a critical component of the CASE model because it provides teachers, regardless of the number of years they have been teaching, with the confidence they need to implement rigorous science and math content into their courses. Teachers also told the researchers they are implementing CASE curriculum into their classrooms because they, and their administrators, see the value of enrolling in the course.

CASE is one solution to the need for highly qualified and motivated teachers in agricultural education. Recent trends in education have required more and more agricultural education programs to demonstrate how they are contributing to the overall performance of students in core curriculum areas. The CASE curriculum is an option that teachers have to establish themselves as a critical component in the education system. Through CASE, teachers can create, for many students, a link between difficult concepts and a real world context for learning.

[Note: CASE = Curriculum for Agricultural Science Education]

### Perkins Grants

#### The Strengthening Career and Technical Education for the 21st Century Act is critical to the future of agricultural education

American Farm Bureau Federation, agricultural advocacy organization, 17

[American Farm Bureau Federation (AFBF), June 30, 2017, Farm Bureau News, “House Approves Technical Ag Education Bill,” <http://www.fb.org/news/house-approves-technical-ag-education-bill>, accessed 7.1.2017]//TRossow

The Strengthening Career and Technical Education for the 21st Century Act (H.R. 2353), recently passed by the House, **gives a boost to the high school career and technical agriculture education programs** that are so vital to developing the talent and leadership needed in the farming and agricultural services industries, according to the American Farm Bureau Federation.

The measure **reauthorizes the Carl D. Perkins Career and Technical Education Act.**

Rural America needs a skilled workforce as much as urban and suburban communities, AFBF President Zippy Duvall noted in a letter urging House lawmakers to support the bill.

“Agricultural education programs provide a well-rounded, practical approach to learning through classroom education in agricultural topics such as plant and animal sciences, horticulture, forestry, agri-marketing, etc., and hands-on supervised agricultural career experience, such as starting a business or working for an established company,” Duvall wrote.

#### Reforming Perkins Act key to modernize the ag education system

House Committee on Education and the Workforce, House of Reps. Committee, 16

[House Committee on Education and the Workforce, June 28, 2016, Press Release, “Members Introduce Bipartisan Bill to Strengthen Career and Technical Education,” <https://edworkforce.house.gov/news/documentsingle.aspx?DocumentID=400894>, accessed 7.1.2017]//TRossow

Led by Republican and Democratic members of the House Committee on Education and the Workforce, policymakers today introduced the Strengthening Career and Technical Education for the 21st Century Act. Introduced by Reps. Glenn “GT” Thompson (R-PA) and Katherine Clark (D-MA), [the legislation](https://edworkforce.house.gov/UploadedFiles/Strengthening_Career_and_Technical_Education_for_the_21st_Century_Act.pdf) reauthorizes and reforms the Carl D. Perkins Career and Technical Education Act and will help more Americans enter the workforce with the skills they need to compete for high-skilled, in-demand jobs.

“The importance of career and technical education has grown **exponentially** across the country since the Carl D. Perkins Career and Technical Education Improvement Act was **passed unanimously** by Congress in 2006,” Rep. Thompson said. “This well-engineered and robust reauthorization aims to close our nation’s skills gap by creating clear pathways to education and training for students eager to pursue careers in vital technical fields. As co-chair of the House Career and Technical Education Caucus, I am proud to join my colleagues in introducing the bipartisan Strengthening Career and Technical Education for the 21st Century Act.”

“Every student deserves a fair chance to earn the skills needed to thrive in the modern workforce,” Rep. Clark said. “That's why I'm introducing the **bipartisan** Strengthening Career and Technical Education Act for the 21st Century Act. This bill ensures our career and technical education system is flexible enough to adapt to the needs of emerging industries, is accountable to ensure every child has a chance to succeed, and is providing robust support for our educators. I look forward to working with the House Education and Workforce Committee to pass it into law.”

“For men and women trying to compete in today’s workforce, having the right knowledge and set of skills has never been more important,” said Education and the Workforce Committee Chairman John Kline (R-MN) said. “Career and technical education can provide incredible opportunities for Americans—especially younger Americans—to pursue good-paying jobs in industries critical to our economy. This bipartisan legislation will help more individuals seize those opportunities and achieve a lifetime of success. I want to extend my appreciation to Representatives Thompson and Clark for their hard work on this important proposal.”

“Once again, Committee Members were able to work together on a **true bipartisan effort**,” said Education and the Workforce Committee Ranking Member Robert C. “Bobby” Scott (D-VA). “With the assistance and counsel of our colleagues in the Career and Technical Education (CTE) Caucus, we are proud to introduce the Strengthening Career and Technical Education for the 21st Century Act, which will modernize federal support for career and technical education. Today’s CTE programs work to prepare millions of students for lifelong success and help bridge the divide between high school and postsecondary education and training. This bipartisan bill prioritizes equity of opportunity for all students to participate in, and benefit from, high-quality CTE programs and will prepare them for high-skill, high-wage jobs that lead to economic self-sufficiency in the 21st century workforce. I believe this legislation is another important step toward education and workforce development system alignment for the benefit of students, families, and our nation.”

BACKGROUND: Since 1984, the Carl D. Perkins Career and Technical Education Act has provided federal support to state and local career and technical education (CTE) programs. These programs offer students the opportunity to gain the knowledge, skills, and experience necessary to compete for jobs in a broad range of fields, such as health care and technology. However, because federal law has not been updated in more than a decade, it **no longer reflects the realities and challenges** facing students and workers.

**Building on recent reforms to K-12 education** and the workforce development system, Reps. Thompson and Clark—along with Reps. Bradley Byrne (R-AL), Carlos Curbelo (R-FL), Jim Langevin (D-RI), and Rick Nolan (D-MN)—introduced the Strengthening Career and Technical Education for the 21st Century Act. The bipartisan legislation will:

* Deliver states **more flexibility** to use federal resources in response to changing education and economic needs.
* Ensure career and technical education prepares all students, including historically **disadvantaged and vulnerable students**, for success in high-skill, high-wage occupations and careers in nontraditional fields.
* Improve alignment with in-demand jobs by supporting innovative learning opportunities, building better community partnerships, and encouraging stronger engagement with employers.
* Enhance career and technical education through increased focus on employability skills, work-based learning opportunities, and meaningful credentialing so students are prepared to enter the workforce poised for success.
* Streamline performance measures to ensure career and technical education programs deliver results for students and taxpayers.
* Reduce administrative burdens and simplify the process for states to apply for federal resources.
* **Reward success and innovation by directing federal resources to replicate promising practices that best serve students and employers.**
* Provide parents, students, and stakeholders a voice in setting performance goals and evaluating the effectiveness of local programs.
* **Empower state and local leaders** to develop plans that improve the quality of career and technical education and take into account unique ‎local and state needs.

### Trump Budget Cuts

#### Increased funding for Perkins is necessary – Trump’s budget does the opposite and cuts it

Perkins, OUTSET Magazine founder, 17

[Stephen S., founder of OUTSET Magazine (Dallas headquartered group with a team located throughout the United States), internally cites the Association for Career & Technical Education and a [survey by Adecco](https://www.adeccousa.com/employers/resources/skills-gap-in-the-american-workforce/), a U.S. staffing agency, June 5, 2017, OUTSET Magazine, [“The Trump-DeVos Budget Won’t Make the Economy Great](http://outsetmagazine.com/2017/06/05/trump-budget-career-technical-education/),” <http://outsetmagazine.com/2017/06/05/trump-budget-career-technical-education/>, accessed 6.30.2017]//TRossow

President Trump’s first budget proposal, titled “A New Foundation for American Greatness,” has received mixed reactions since its release a few weeks ago. Trump’s Budget Director, Mick Mulvaney, labeled it as a “taxpayer first budget,” but critics point out that the proposal would cut funding to **key programs** and departments that taxpayers depend on.

While a few Departments, such as Defense and Homeland Security, would receive increased funding, much of the budget focuses on spending cuts. Among the proposed cuts are a 13.5% decrease in the Department of Education’s budget and a 21% reduction in the Department of Labor’s budget. While these reductions may not seem as austere as other proposed cuts, they affect programs that are **essential to growing the economy** and preparing the American workforce.

The Administration is proposing a **15% cut** to the Department of Education’s “**Perkins Grants**,” which are discretionary funds that the federal government gives to states for the purpose of supporting Career and Technical Education (CTE) programs. **This amounts to a $168 million reduction**.

While the potential cuts to each state [vary](http://www.acteonline.org/uploadedFiles/Policy_and_Advocacy/Key_Issues/Perkins_State_Funding_Chart_FY17v18.pdf), this proposal would put many states’ ability to train their workforces into jeopardy. Nevada, a state whose principal industries of agriculture, health care, and manufacturing employ hundreds of thousands, would receive the largest cut to CTE funding of all – **about 52%.**

**Career and Technical Education is Vital to a Strong Economy**

The benefits of career and technical education are far-reaching, and it provides students with a connection between their curriculum and the workplace. For high school students, these programs – which prepare students for careers in everything from **agriculture** and manufacturing to healthcare and business – keep kids from **dropping out** and **motivate them** to perform better in all areas of their academic career, [according to](https://www.acteonline.org/uploadedFiles/What_is_CTE/Fact_Sheets/CTE_Works_Research_2016.pdf) the Association for Career & Technical Education. Students then take these skills into their postsecondary and career endeavors.

In economic terms, the need for career and technical education is at an all-time high, with many of the country’s **top industries** looking to employ those with a CTE background.

According to a [survey by Adecco](https://www.adeccousa.com/employers/resources/skills-gap-in-the-american-workforce/), a U.S. staffing agency, **92% of American business leaders** believe American workers are not as skilled as they need to be. Further, 22% and 14% of those executives believe workers lack technical skills and leadership skills, respectively. When asked about the source of the skills gap, 59% said the U.S. education system was at fault.

An unskilled workforce leads to job vacancies, which costs employers nearly $1 million annually, according to a 2017 [CareerBuilder study](http://press.careerbuilder.com/2017-04-13-The-Skills-Gap-is-Costing-Companies-Nearly-1-Million-Annually-According-to-New-CareerBuilder-Survey). An active economic policy would focus on **reducing these job vacancies, not increasing them.**

Another angle to the discussion around CTE is the idea that not everyone should go to college. In fact, Mike Rowe, the former host of Dirty Jobs, has been working the past few years to highlight the numerous alternative education and career options that are both in-demand and well-paying. These include many blue-collar jobs, such as auto mechanics or welding, as well as professional service jobs, such as cosmetology or nursing – all of which are available for study in high schools through CTE programs.

I know the effect these programs can have on a student because I was involved in DECA, a Career Technical Student Organization, in high school. This organization provided me with a diverse understanding and knowledge of business and marketing, and also allowed me to develop several “soft skills,” such as communication, collaboration, and critical thinking.

President Trump spoke many times during the campaign and into his administration about the need for training America’s future workforce.

“Secretary DeVos is working to ensure our workers are trained for the skilled technical jobs that will, in the future, power our country,” [Trump said](https://www.youtube.com/watch?v=hFTkBF5Faus&feature=youtu.be&t=40m3s) just last month at the signing ceremony for his Buy American, Hire American executive order.

Secretary Betsy DeVos echoed the President’s support for career training last week during her testimony to Congress.

“[CTE] clearly is an area that is of great focus on behalf of the President and this Administration,” DeVos [told Rep. Moolenaar](https://www.youtube.com/watch?v=fGb8xKtapu4&feature=youtu.be&t=1h20m40s) (R-MI) during the House’s hearing on the budget.

There is a significant discrepancy between the Trump administration’s words and actions. Despite Trump’s professed dedication to the working class, his budget signifies just the opposite. His administration’s proposal to reduce CTE funding would deal a major blow to the working class and the economy it powers.

Conservatives believe in a robust and prosperous economy. **Support for career and technical education is paramount to ensuring just that**. The good news is, the White House’s budget proposal is often not the one that gets adopted by Congress (if they even pass a budget, that is). Luckily, CTE enjoys **broad bipartisan support**. Given such, it is entirely likely that the final budget will include funding for these vital programs.

If President Trump wants to be remembered for enabling a period of prosperity, **he should consider increasing the funding for programs like CTE, not cutting it.**

#### Trump’s budget undercuts Perkins programming

Coppes, Association for Career and Technical Education Department of Public Policy Legislative Liaison, 17

[Mitch Coppes is the Legislative Liaison in the Department of Public Policy at the Association for Career and Technical Education (ACTE). He represents ACTE on Capitol Hill in all federal budget and appropriations issues. Mitch is graduate of Ohio Northern University, where he received a BA in political science in 2008. He previously worked at the U.S. House of Representatives and the National Republican Senatorial Committee before joining ACTE in 2011, May 23, 2017, Association for Career and Technical Education, “[Trump Budget Pushes Big Cuts for Perkins](http://ctepolicywatch.acteonline.org/2017/05/trump-budget-pushes-big-cuts-for-perkins.html),” <http://ctepolicywatch.acteonline.org/federal-funding/>, accessed 6.30.2017]//TRossow

Today, the White House released President Trump’s [full budget request](https://www2.ed.gov/about/overview/budget/budget18/justifications/m-ctae.pdf) to Congress for Fiscal Year (FY) 2018. This document outlines the Administration's spending priorities for the coming year fiscal year, including federal education and workforce training programs. **The budget proposes drastic cuts in federal support for CTE, including a $168 million cut in the Perkins Basic State Grant!** It also proposes to put an additional $20 million in the Perkins National Programs to establish a new grant that would support only certain CTE programs in STEM fields that are able to compete for funds.

Despite past statements from the president and members of his Administration in support of CTE, this **15 percent cut** in state grant funding would have a **devastating impact on millions of students across the country.** The cut would be so deep that it would actually **trigger a “hold harmless” provision in the Perkins Act and its “ratable reduction” rule**, which means that certain states would see **disproportionately larger cuts** to their funding allocations before all states are reduced. See the estimated impact of the president's budget on state allocations [here](http://www.acteonline.org/uploadedFiles/Policy_and_Advocacy/Key_Issues/Perkins_State_Funding_Chart_FY17v18.pdf).

In joint statement with Advance CTE, ACTE Executive Director LeAnn Wilson said of the budget plan, “While the Trump Administration talks about supporting workforce and skills development, this dramatic cut is nothing short of an attack on CTE and the students and employers who benefit from it. ACTE’s full statement on the budget request is available [here](https://www.acteonline.org/general.aspx?id=12169#.WSSUVOsrKUk).

Overall, the budget would cut $9 billion (13 percent) in total from the Department of Education and $2.5 billion (21 percent) from the Department of Labor. Many programs supporting students and job seekers would be drastically cut or eliminated under the president’s budget plan, including:

* Adult education would be cut by $96 million.
* Teacher Quality Partnership Grants for teacher education would be eliminated.
* ESSA Title IV grants that can support career guidance programs and other CTE-related initiatives would be eliminated.
* ESSA Title II funds to support effective educators would be eliminated.
* WIOA youth, adult, and dislocated worker state grants would see a combined cut of over $1 billion.

**We call on Congress to reject the Trump cuts to education and job training**. Take a few minutes to tell your [lawmakers on Capitol Hill](http://www.congressweb.com/ACTE/34) that we cannot cut our way to a 21st century workforce!

### Farm to School

#### Increasing Farm to school grant program solves nutrition and community building – Iowa proves

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 17, Accessed 7/1/17, GDI - JMo)

In 2013, NEIFFI received two years of funding from the USDA’s Farm to School Grant Program. Authorized by Congress in the HHFKA, these grants support schools’ efforts to build connections with farmers and educate children about healthy eating and the origins of their food. With this grant, NEIFFI is collaborating with local farmers and a new “food hub” that will allow farmers to increase production and aggregate their products to meet the purchasing needs of local schools. NEIFFI is working with four rural school districts to expand their farm-to-school programmingwith the goal of increasing their local food purchases by 200 percent.

The Farm to School Grant Program has also enabled schools to create gardens in which children learn to grow some of the produce that they eat in their cafeteria. In several school districts, schools started unlimited “veggie bars” in cafeterias. They also set up a cafeteria mentorship program where middle-school students distribute food samples of produce that they grew in the school garden and encourage younger children to eat more fruit and vegetables.

During the first year of funding from the Farm to School Grant Program, local produce, dairy, and meat purchases by the participating schools in northeastern Iowa increased sharply. From August 2014 to November 2014, participating schools served $33,000 worth of local foods, equivalent to the total cafeteria sales for the previous full year. Emily Anne Neal, director of school outreach for NEIFFI says, “Teachers, students, and food service staff see food not only as source of energy, but also a display of values, for our health, economy, environment, and our communities.” Children are now enjoying their vegetables and even encouraging their parents to buy produce they have learned about in school.

Increased funding for this program would allow more school districts across the country to share in this success. NEIFFI’s experience in just one year demonstrates the potential for the USDA’s Farm to School Grant Program to contribute to thriving local food systems at the same time that it improves child nutrition.

[Note: NEIFFI = The Northeast Iowa Food and Fitness Initiative]

### Nutrition Funding

#### Congress should increase funding for a ton of school nutrition programs

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 4-5, Accessed 7/1/17, GDI - JMo)

In 2010, the HHFKA took a significant step toward improving nutritional standards for school food by requiring that school meals comply with federal dietary guidelines. In the next reauthorization of the law, expected during 2015, Congress should build on this progress by strengthening standards fur- ther, particularly for fruits and vegetables. UCS recommends that Congress enact a series of measures to build upon earlier progress and further improve the health prospects of school children.

Specifically, we recommend that Congress:

• Protect the gains made in 2010. The vast majority of schools are in compliance with the 2010 law, and support is available for those who are struggling. Retreating from our commitment to healthier school food is not an option in the face of the childhood obesity crisis.

• Prioritize fruits and vegetables. Fruits and vegetables are critically under-consumed by children. More can and should be done to reverse this trend.

– Congress can further encourage fruit and vegetable consumption by offering funding and other incentives for schools to go beyond the minimum fruit and vegetable servings required by HHFKA and to offer these healthy foods as snacks between meals.

– Additional funding for research initiatives to mea- sure changes in fruit and vegetable consumption and track related health outcomes would help to assess program efficacy.

• Increase the federal reimbursement rate for healthy school meals. Schools have encountered the same reality already known to most Americans—less-healthy processed foods are often cheaper than whole-food ingredients like fresh fruits and vegetables and unpro- cessed meats. We recommend raising the reimbursement rate for meals in compliance with nutrition standards to allow schools more flexibility to buy the healthiest foods possible.

• Finance school cafeteria kitchen equipment. Outdated kitchen equipment creates barriers for cafeteria staff trying to prepare healthy, tasty meals on a large scale. Decades of underinvestment in school kitchens have left many schools with little capacity beyond heating and serving prepared, processed meals. Congress should expand the availability of grants and loans to help schools outfit and update their kitchens.

• Improve nutrition education for children. Improving nutrition education in schools can complement efforts to provide children with healthier food by giving them the information they need to make healthier choices.

We urge Congress to fund nutrition education programs that engage all school staff —from cafeteria workers to teachers—to help children understand the basics of food, nutrition, cooking, and healthy choices. Such efforts can improve children’s understanding and acceptance of healthier meals at school and elsewhere.

• Increase funding for the Farm to School Grant Program. This program supports educational initiatives related to food production and nutrition. Examples include establishing school gardens that allow students to obtain firsthand experience with growing food, and providing financial support so schools can source meal ingredients from local farms. Such initiatives have been shown to increase fruit and vegetable consumption. Given the overwhelming popularity and demonstrated success of the Farm to School Grant Program, we recommend increasing its funding.

• Not allow politics to trump science. Medical and nutrition experts are the best sources for setting nutritional standards for school lunches. Congress should continue to look to these experts for guidance on these standards.

Children spend more time at school than any other place outside the home. Investments in healthier school food today will yield better health, greater productivity, and lower 16 healthcare costs tomorrow.

[Note: HHFKA= Healthy Hunger-Free Kids Act]

### Curriculum – National Standards

#### **A national set of program standards is key to high quality agricultural education**

Touchstone, University of Idaho, The College of Agricultural and Life Sciences, Former Senior Instructor, 9

[Allison, January 2009, The Agricultural Education Magazine, “How Will a National Set of Program Standards Help Our Students”, <https://www.questia.com/library/journal/1P3-1660503291/how-will-a-national-set-of-program-standards-help>, accessed: 6/30/17, SK]

The current pilot program being implemented by National FFA may be the most effective in encouraging local programs to utilize national program quality standards, and part of the success of this effort may related back to the “team” approach being adopted. By involving community, school administration, and the local instructor(s), the buy-in for the standards is being established on several levels, and implementation support is being provided to the local instructor. Therefore, the Team AgEd concept is being utilized throughout the implementation process. It would make sense that this approach will not provide positive feedback for quality program growth, but also foster buy-in to the agricultural education program from all aspects of the local community. Although the National Program Quality Standards may initially seem to be a daunting document, the inherent concepts and the long term benefits of truly implementing quality program standards are worth the effort. Developing quality programs nationwide that strive to implement and adhere to the high expectations such as those articulated in the National Program Quality Standards, will not only increase the quality of education our current students are receiving, but also assure quality agricultural education programs nationwide for the future.

### Curriculum – National Standards – Citizen Science

#### The federal government is key to create a national curriculum for agricultural education – it gives students perspective and industry experience- Citizen Science Project proves

Romberger, Penn State Agriculture and Extension Education Professor, 16

[Darla, January 2016, The Agricultural Education Magazine, “Citizen Science—Inquiry In Action”, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume88/Jan_Feb_2016.pdf>, accessed 6/30/16, pg. 24, SK]

Agriculture programs are known for equipping students with problem-solving abilities, industry experience, and communication skills through class- room instruction, FFA, and SAE programs. The hallmark of Agriculture Education is incorporating hands-on activities into our curriculum that allow students to apply content knowledge in a practical way that connects to the real world. Classrooms frequently utilize open-ended problems and weave various levels of inquiry- based instruction into student projects allowing students to construct their own understanding of technical content knowledge. However, the majority of these skills are learned at the local level (i.e. in our own programs) and students may not get to see the regional, state, or national perspective for a given topic or issue. Integrating a Citizen Science project into the local Agriculture program has the possibility to allow students to experience agriculture in other regions, states, and even across the globe while learning how to communicate professionally and collaborate with other students in a scientific environment.

[NOTE: FFA = Future Farmers of America; SAE = Supervised Agricultural Experiences]

#### **Citizen Science provides real life education**

Romberger, Penn State Agriculture and Extension Education Professor, 16

[Darla, January 2016, The Agricultural Education Magazine, “Citizen Science—Inquiry In Action”, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume88/Jan_Feb_2016.pdf>, accessed 6/30/16, pg. 24, SK]

Many benefits can be realized by implementing a Citizen Science project into a secondary agriculture education curriculum. The most tangible benefit is a real-life application of the scientific method with a heavy emphasis of data collection and data analysis. Although students do not take part in designing the research project, educators can emphasize the importance of accurate measurement, recording adequate detail, and contributing to a community of learners—all of which provides an extra motivation for students to “buy-in” to the project. Citizen science projects may also provide a new perspective for students who traditionally do not enjoy science. Some students may perceive science being completed in an isolated location by highly educated individuals with years and years of experience in a laboratory setting. With many citizen science projects being completed in everyday settings (such as woodlands, back- yards, and outdoor classrooms), students can develop an attitude of “I can do science” which improves student self-image and can positively influence student participation in classroom activities (Raddick et al., 2009).

#### **Citizen Science can also broaden the educational experience beyond the walls of the classroom**

Romberger, Penn State Agriculture and Extension Education Professor, 16

[Darla, January 2016, The Agricultural Education Magazine, “Citizen Science—Inquiry In Action”, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume88/Jan_Feb_2016.pdf>, accessed 6/30/16, pg. 25, SK]

Citizen science projects can serve numerous purposes in the classroom—from a way to engage disinterested students to an independent study project for an advanced student. However, these unique projects offer a larger opportunity to broaden the educational experiences for students beyond the classroom walls. Although numerous classroom activities allow students to apply content from other academic areas in an agricultural context, many times students are unaware of how agriculture varies throughout their state, country, or continent. As the world continues to become more interconnected, it becomes imperative to take a global view of agriculture. Linda Cook offers a “Global Science Education Continuum” that provides six opportunities for educators to integrate a citizen science project into their classroom. A project could encompass multiple portions of the continuum or chose to focus on a given section to enhance class- room learning (Cook et al., 2015).

* Global Awareness-Students can utilize tools such as Google Earth and ArcGIS to compare the geographic and topographic differences of other individuals participating in the same citizen science project.
* Parallel Activity-Classrooms participate in a given project on the same day knowing they are contributing to a singular cause. An example could be a global celebration of Earth Day with classroom across the country participating in water quality studies simultaneously and reporting results to a re- searcher.

Shared Data-Participants can share data to a common location (commonly a website). Any group contributing data is allowed to view data reported by other groups as a means for comparing and contrasting results. Comparing and contrasting data is an excellent opportunity to facilitate discussions on global comparisons.

Limited Communication - Various classrooms participating in the same project reach out to one another via asynchronous (letters, emails, or videos) or synchronous (Skype, Google Hangouts) communication. Depending upon the reliability of technology, teachers choose the best meth- od for students to share their observations and offer a description of their geographic locations and surroundings.

Engaged Collaboration-This portion of the continuum involves more frequent communication between classrooms and extensive face-to-face collaboration. Additionally, classrooms may share data on a joint blog, classroom web- site, Social Media outlet, or Google Doc to add to real- time communications.

Global Contribution-At the end of the project, students may find a way to give back to the local or global community. Contributions could be anything from an international service trip, sharing project results with legislators that may influence policy, or creating an exchange program between participating classrooms.

#### Citizen Science should be incorporated into agricultural education-the program provides real life application

Romberger, Penn State Agriculture and Extension Education Professor, 16

[Darla, January 2016, The Agricultural Education Magazine, “Citizen Science—Inquiry In Action”, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume88/Jan_Feb_2016.pdf>, accessed 6/30/16, pg. 24, SK]

Inquiry-based instruction offers the construct that classrooms should shift toward student-centered learning with open-ended, hands on activities (Colburn, 2000). Although agricultural educators have been utilizing IBI in their curriculums for some time (due to the real-life application of content through agricultural con- texts), citizen science can easily become another method to include IBI in classroom settings. Due to the open-ended nature of citizen science experiences, students become engaged in a project that does not have a known outcome. In some cases, even researchers developing the study are unaware of the trends that may be revealed during the research project. With students involved in daily or weekly data collection, graphing trends, and reporting their data to the researchers, citizen science projects are an excellent example of a student-centered activity that offers endless potential for the student to become engaged in real-life application of agricultural content.

### Curriculum – Common Core

#### Agricultural education requires Common Core Standards – key to education and innovation

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 2016

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Based upon the research and literature analyzed, agricultural education has embraced and embodied the principles presented and discussed by NBC's Education Nation. Through the use of classroom/ laboratory instruction, the National FFA Organization and SAE, agricultural education provides examples for implementation of Education Nation's initiatives (Phipps et ai., 2008). Since the passage of the Smith-Hughes Act of 1917, agricultural education has promoted individualized instruction, utilized innovative and proven teaching methods, promoted community support, conducted home visits and prepared students for the workforce or post-secondary education (Hillison, 1987; Moore, 1987; Phipps et ai., 2008).

A variety of teaching methods are utilized within SBAE that promotes the overall goals of Education Nation. Some of the innovative teaching methods utilized in SBAE include: problem-based learning, experiential learning and inquiry-based learning (Boone, 1990; Myers et ai., 2009; Phipps et al., 2008; Roberts, 2006; Thoron et al., 2011). The use of these teaching methods promotes student learning and knowledge retention through agricultural education (Phipps et ai., 2008; Ricketts et al., 2006).

Members of the agricultural education profession must stand together and be recognized as an integral component to the educational profession/society. This requires agricultural education to adopt and implement the Common Core Standards and the initiatives of NBC's Education Nation. The need for preparing students for the workforce and postsecondary education is evident in SBAE (Newcomb et ai., 2004; Phipps et al., 2008). Further, agricultural education promotes skill and career training through the curriculumthat is taught in agricultural education programs (Newcomb et ai., 2004; Phipps et al., 2008), supporting the needs presented by Education Nation (2012). To enhance students' preparation for the workforce and post-secondary education, students in agricultural education are presented with the opportunity to experience and apply their knowledge to real-world situations through the National FFA Organization and SAE programs. Through each component of the total agricultural education program, students are adequately provided with the resources to be successful in the workplace and post-secondary classroom (Newcomb et ai., 2004; Phipps et al., 2008).

[NOTE: FFA = Future Farmers of America, SBAE = School Based Agricultural Education]

### Curriculum – Project-Based

#### Project-based learning is key for learning agriculture

Chumbley, Eastern New Mexico University Agriculture Education Assistance Professor, 15

[Steven, March/April 2015, Agricultural Education Magazine, “Taking Advantage of the STEM in Agriscience”, Volume 87, No. 5, p. 12, ProQuest, accessed 6/30/17, KW]

The benefit of project-based learning, which increases conceptual understanding of science and promotes positive attitudes towards learning science and contextualized science education (Rivet & Krajcik, 2008), is a promising teaching technique that should be used to support future leaders in agriscience. An example of such a lesson is the building of an efficient tower or “load bearing” wall. Such a project challenges students to construct a structure that can support a designated load. In the project students deal with the same problems faced by engineers in the real world. They are given specific design parameters that their structure must comply with (height, weight, time limit, etc.). While completing this laboratory exercise, participants must consider building materials, method of assembly and production costs. Their structure must perform a specific task. The parameters of this task may include supporting a specific weight (usually using an item commonly found within the classroom or spanning a certain distance while maintaining strength (emphasizing strength to weight ratios). There are a number of resources to assist teachers in developing this teaching skill. This can include participating in the Curriculum for Science Education (CASE) institutes, professional development at NAAE and state agriculture teacher annual meetings and collaboration with other faculty who have experience with this teaching method. The National Science Teachers Association (nsta. org) has multiple free resources for developing laboratory and problem based lessons. Teachers who challenge students with lab-based lessons foster the critical thinking skills that ultimately benefit students in other parts of their educational career.

### Curriculum – Cooperative Learning

#### Cooperative education is a win-win for students and companies.

Solomonson, Orion High School CTE Director and Agriculture Teacher, **16**

[Jay, November 2016, Agricultural Education Magazine, “Crazy about Co-op: Best Practices to Create a Successful Work- Based, Cooperative Education Program at Your School” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 19, 6/30/17, KF]

**Cooperative education programs are a great mechanism for supporting the economic and workforce development** needs of a community. They **provide local employers with a dependable labor supply** and **students with an opportunity to develop both soft and technical skills** needed for the workforce - a win-win situation. While these best practices have worked for us, they may not work at every school or in every community. However, they can certainly be used as an example of one successful approach to cooperative education.

#### Structured agricultural work based learning is supplemented by local industry

Schneider, Greensburg Community High School Agriculture Teacher, 16

[Greg, November 2016, The Agricultural Education Magazine, “Cultivating Careers through Work Based Learning,” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 15, 6/30/17, KF]

My “Teachers in Industry” experience resulted in a new agriculture internship course being developed for our students. First, during the summer **after the junior year of high school, students participate in a paid internship program**. **We have several local agriculture industries and farming operations that agreed to host students** for two-week intervals for a total of four placements over an 8-week period. The idea is for the student to experience a variety of agricultural career fields. All employers understand that in this two week period, the student will not become an effective employee, but rather, **the purpose for this time is for students to explore different agriculture careers.** The following **senior year is when the student will declare an interest and enter into a dedicated WBL internship** with the company of their choice. **This course is for high school credit,** with release time from school as well as the opportunity to work after school and weekend hours. While **the cost of the paid summer employment is supplemented by our local Community Foundation, the full cost of the dedicated school year WBL is covered by the respective employers**. During this time, the **students** hone their skills and **become valued employees.** A student training plan is written and follows the student throughout the experience. A mentor is assigned to the student by the host site, and as the agriculture teacher, I conduct regularly scheduled job site supervision visits.

[NOTE: WBL=Work based learning]

### Curriculum – Work-Based Learning

#### **Work-based learning – specifically in agriculture – creates job opportunities.**

Schneider, Greensburg Community High School Agriculture Teacher, 16

[Greg, November 2016, The Agricultural Education Magazine, “Cultivating Careers through Work Based Learning,” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 13, 6/30/17, KF]

**There is a fine line between being in a groove and being in a rut.** Whenever I find my teaching leaning towards the latter, **I look for new ways to invigorate my passion.** Recently, I found **a new passion in work based learning** (WBL). **WBL is an experience in which students meet real world challe**nges in an actual work place setting within their chosen career path, usually for high school credit, and can be a paid or volunteer experience.

WBL is **good for the agricultural industry**. By creating a pool of qualified candidates that have a verified list of skills, we are keeping our agricultural industries strong and growing. **WBL is good for the local community**. The vitality of youth keeps a community progressive. By inspiring our young people to return to live and work in our community, our community remains vibrant. Most importantly, WBL is good for students. It gives students the opportunity to explore career options before investing in post-secondary education and also gives them a skill set and experiences that will facilitate premier leadership, personal growth and career success.

#### Curriculum development student achievement locally – modeling proves.

Schneider, Greensburg Community High School Agriculture Teacher, 16

[Greg, November 2016, The Agricultural Education Magazine, “Cultivating Careers through Work Based Learning,” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, pp. 14-15, 6/30/17, KF]

For WBL to be truly successful, it **should be part of a declared career path**way. **IDOE required that I create a student training plan for each location I shadowed**. In this plan, I **identified agriculture course standards that would be addressed in the different career fields** and skills required for successful participation in those careers. I also created a four year plan of courses a student would take to prepare for each career. In our school, WBL internships are offered to upperclassmen. I don’t want my students entering an internship without some back- ground information and a bank of knowledge. I discovered I also don’t want to limit this background to just agriculture classes. For example, public speaking and basic computer skills were identified by employers as universal needs, more advanced computer programming classes are helpful for jobs involving technology, and biology and chemistry courses are helpful in many jobs that involve crop and/or animal science.

Each training plan also includes the cadre of related FFA career development events and experiences that would help prepare a student for a given career field. When properly used in conjunction with classroom instruction, opportunities through active participation in FFA activities are meaningful proving grounds for preparing students for career success. My goal for each student is to create a powerful resume that will place the student on the top of a job candidate list. In addition to technical skills, I also work to provide the students with experiences that help them develop interpersonal skills so they can convey their knowledge in an interview. Employers want to hire candidates with people skills that can communicate effectively and engage with the public. They want to see a good first impression - every time. **They want an employee with a work ethic that is a self-starter and a productive worker.**

Employers recognized that **the key to creating long-term employees that are dedicated to the company and the community is to hire from within the community.** Employers can recruit qualified graduates from other outside programs that will fill the employment needs, but if the employees are from another community, they will generally leave to return to their home community. This translates into lost time and money invested in employee training. As the agriculture teacher, it is my responsibility to prepare our students for these career opportunities and support our local agricultural industry.

[NOTES: IODE=Indiana Department of Education, WBL=Work based learning]

### Competition – Incentives

#### Rewarding program performance will expand their reach

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 15, accessed 6-26-17, AFB]

Rewarding Effective Programs

While state departments of education submit data on student performance in CTE programs to the U.S. Department of Education under the Perkins Act, there is little incentive for school districts to be identified as top performers because the funding available is provided under formulas at both the federal and state levels. It might be useful to consider establishing a ‘Perkins Plus’ program that offers additional funds to programs deemed to be top performers to help them expand their reach, either using the performance data already mandated to make the awards or setting up a separate competition. Because of current constraints on federal spending which suggests dim prospects of additional funding, it might be wise to consider a modest shifting of funds from the Perkins Basic Grants, which could serve as seed money for the ‘Perkins Plus’ endeavor, perhaps to be matched by funds from private sources such as foundations, farm groups and/or agribusinesses. An additional performance indicator that could be used in such a competition might be the rankings of states by USDA on their participation in Farm to School programs.

Key to this effort would be defining what constitutes success. If the primary goal is to create a stable and educated workforce for U.S. agriculture, moving students from secondary schools into post-secondary agricultural and agri-science fields should be the main performance indicator for this proposed competition.

### Competition – Application Process

#### **A competitive application process ensures quality of the program**

Solomonson, Orion High School CTE Director and Agriculture Teacher, **16**

[Jay, November 2016, The Agricultural Education Magazine, “Crazy about Co-op: Best Practices to Create a Successful Work- Based, Cooperative Education Program at Your School” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 11, 6/30/17, KF]

I experienced a huge learning curve that first year, but we got through it. Then, **I rewrote the curriculum and updated the on-the-job training policies and procedures**. Since that time, we have worked through kinks in the program and **it has evolved to become one of the most sought- after classes**. The following are best practices I would recommend to those either planning to start a cooperative education program or looking to revamp or revitalize an existing program. While some of the following may not be feasible in your situation, they have definitely helped shape our cooperative education program to one of the most respected programs in our school and community.

**Require that potential students apply and interview for a spot in the program.**

All of the students that wish to enroll in the cooperative education program at our school **have to complete an application, obtain three references, and interview with myself and our guidance counselor.** I believe that participation in Coop is a privilege and if a student is genuinely interested, s/he will take the time and effort to perform the tasks needed to be admitted to the program. Since our school limits the number of students that can participate in the program (20 students), it is a very competitive process and an honor to be considered a part of it. The selection committee takes into account the student’s attendance and disciplinary record, GPA, application, references, and the responses to their interview questions.

### Schools – Charter Schools

#### Charter school flexibility solves implementation of agriculture education programs

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 95, Accessed 6/28/17, GDI - JMo)

In addition to complementing their science and technology focus participants also indicated agricultural science courses to be a great fit for charter school models. Mr. Brooks noted that the flexibility of charter school systems decreased challenges when including agricultural science courses into school curricula:

We are our own school district so even though we are only one school, what we decide to do, we get to do which makes it very easy to bring in our Ag program, and it made it very easy to do some of the changes that I wanted to do right off the bat...

#### Charter schools good for agriculture education - flexibility

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 99, Accessed 6/28/17, GDI - JMo)

Flexible structures of non-traditional high schools such as charter schools provide multiple opportunities to develop rigorous agricultural education programs in urban communities. The authors did not find other studies conducted on agricultural education in charter schools in the literature; therefore, this is an area for further research. It would be advantageous for agricultural educators and higher education institutions to collaborate with charter schools to create and market agricultural education programs. Ultimately, this could lead to agriculturally knowledgeable students who may seek out and succeed in higher education institutions.

#### State funding now but it’s not enough – more funding key to charter school agricultural success

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 99, Accessed 6/28/17, GDI - JMo)

In [state] funding is available for Career and Technical Education programs to support agricultural education programs in urban high schools; however, not all states may have this funding stream. Alternative sources of funding should be continually explored and assessed to provide consistent sustainable funding for non-traditional high schools interested in developing urban agricultural education programs. Future development of sustainable funding sources for agricultural education programs has the opportunity to play a major role in increasing the number of urban agricultural opportunities. Funding for these programs is particularly important in non- traditional high schools such as charter schools where difficulties financing alternative educational programs are common.

### Teacher Development

#### Plan is key – ensuring proper teacher training is essential to create a steady flow of graduates that fills ag shortages

Willis, Clemson University, Agricultural Education graduate student and research assistant, 17

[Victoria, January-February 2017, Agricultural Education Magazine, “Nurturing our Established Roots: The Smith-Hughes Act as a Model for Agricultural Education Career Preparation,” pg. 26-27, ProQuest, accessed 6.28.2017]//TRossow

In order for agricultural educators to instruct industry related curriculum and advise Supervised Agricultural Experiences, instructors need to obtain the proper knowledge and resources themselves before teaching others. As stated previously, during the time of the Smith-Hughes Act, trainings focusing on the offered fields were made available to vocational education teachers. If we are to prepare our students for entering the industry, we first must ensure our teachers are given the proper opportunities and resources to do so through professional development and in-service training seminars (Slusher, et.al, 2011).

Once teachers are informed and knowledgeable on technical skills needed for various career opportunities within agriculture, the classroom curriculum should reflect industry-relevant instruction that results in observable skill attainment. Providing students a curriculum in which they are able to acquire technical skills applicable to industry careers is a **high school program necessity**. Career clusters are one possible way to set a course of offerings in which students are given the opportunity to specialize in a specific career interest area. Career clusters serve as a channel for curriculum delivery, to include necessary skills for employment (Slusher, et.al, 2011).

Just as the Smith-Hughes Act aimed to fill industry jobs during a time of labor shortage, we as agriculturalists are facing our own challenges to fill jobs within our industry, in order to provide for and educate our population. **Rapid retirement rates** from the “baby boomers” generation are leaving an alarming number of jobs in need of skilled employees. In addition, jobs focused on science, technology, engineering and math (STEM) concepts are rapidly emerging.

Considering retirement rates, the need to supply the STEM pipeline, and the worlds’ expected population growth to reach 9 billion by 2050, **we as a society need agricultural education more now than we ever have**. We, as an industry, are charged to provide for the world’s growing population, and **the only way to accomplish this task is to provide a steady flow of graduates that are prepared to be innovative, think critically, and solve problems within the industry and workforce.**

Agricultural education programs need to continue to create a rigorous, positive and respected program image in order to attract more participation and interest, while aiming to increase student retention. Student enrollments in high school vocational education were increasing in the 1960s and 1970s, but in the 1980s enrollments began a downward spiral**.** Data indicates that after decades of decline, secondary career and technical education enrollment is currently on the upswing in image and enrollment (High School Vocational Education). While vocational education’s image is on the upswing, it is still important to continue promoting the attributes, successes, and career preparation opportunities available within the agricultural education program. Industry and business professionals expect our graduates to possess literacy, numeracy, communication, technology, and general employability skills gained through participation in their high school program. “Business persons and community representatives are calling for input into standards development and assessment for high school programs and graduates, which should include standards targeted toward both academics and workplace” (High School Vocational Education).

While the Smith-Hughes Act was introduced many decades ago, much can still be learned and applied to present day agricultural education classrooms. By closing in on the gap between classroom curriculum and industry needs, **students will be better prepared to enter the workforce**. Students will apply classroom knowledge and life skills to a real world setting to contribute to society. Professional development and inservice opportunities to learn and collaborate with industry professionals should be made available to teachers to assist with the needs for college and career preparation in the 21st century. Agricultural education’s history of student career preparedness will continue to give the program a positive image within the educational system and local community. The roots of agricultural education have long been nurtured and established because of the Smith-Hughes Act and what the agricultural education program was built upon still greatly contributes to our program’s purpose and its impact on society by developing skilled students prepared to **take on the challenges of the future for the betterment of our society.**

#### Incentives for teachers and accountability measures boosts education – fed key to remedy differences in state and local laws.

Solomonson, Orion High School CTE Director and Agriculture Teacher, **16**

[Jay, November 2016, The Agricultural Education Magazine, “Crazy about Co-op: Best Practices to Create a Successful Work- Based, Cooperative Education Program at Your School” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, p. 12, 6/30/17, KF]

**Have adequate supervision time and conduct regular site visits.**

**Make sure your school administration provides adequate time for supervision as well as time to physically go out and make site visits at your students’ employment locations**. In my state, the school code (educational l**aws and policies set forth by the state legislature) indicate that a cooperative education supervisor should receive a half hour per student,** per week for supervision. I recommend reviewing your state’s policies before negotiating that time with your administration. **School districts should always provide either release periods for making visits or some type of monetary compensation if the supervision occurs outside of school hours**. Currently, my district offers one supervision period and a stipend to compensate for the time required to complete the coop duties beyond our regular contract.

**Every nine weeks, have both employers and students complete a job performance review.**

At the end of each nine-week period**, I require all employers fill out a performance evaluation on their coop student.** This essentially turns into the grade for the on-the-job component of the program. The **performance review form I utilize asks employers to evaluate the student on criteria including attendance, punctuality, dependability, trustworthiness, attitude, work habits, and abilities, among others.** I encourage all of the employers I work with to sit down and discuss the evaluation with students. This is an excellent opportunity for students to learn and grow personally and professionally. A week after the employer submits the evaluation, **I have the students complete a self- assessment using the same evaluation instrument and we sit down to discuss both evaluations and how the student can improve work habits.** I have found these student conferences and reflective pieces to be an invaluable component of the work-based experience.

**Require a year- long classroom component to the program.**

While some schools may only have the on-the-job component of the cooperative education program, our district requires that all students involved be concurrently enroll in a year-long cooperative education course. **The classroom portion focuses on self-assessment, career exploration, finding a dream job, developing an effective résumé and cover letter, interviewing, workplace ethics, development of leadership skills and personal finance.** This course also meets the consumer education graduation requirement. By having an actual sit down class, it not only allows me to see and communicate with students daily, but it is also a great way to **reinforce concepts and habits they learn in the workplac**e.

#### Agriculture opportunities for teachers increase student opportunity.

Schneider, Greensburg Community High School Agriculture Teacher, 16

[Greg, November 2016, The Agricultural Education Magazine, “Cultivating Careers through Work Based Learning,” <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, pp. 13-14, 6/30/17, KF]

I believe the future of agriculture hinges on students that do not come from an agricultural background. My number one goal as an agriculture teacher is to inspire these students to consider the wealth of possible career fields that support production agriculture. Within our immediate community, students can secure employment as service technicians, agriculture salespeople, agronomists, equipment operators, and animal health and nutrition specialists, among others. The list of opportunities literally goes on and on.

I have always **worked to actively engage my program with the local community** and agriculture industry visits are a regular use of my extended contract. This past spring, the Indiana Department of Education (IDOE) offered a summer program called “Teachers in Industry”. This program provides teachers with a paid internship in a local company for up to 100 hours to learn more about that particular facet of industry. I saw this program as a golden opportunity to learn more about the agricultural industries that support the local economy so I could better tailor my curriculum to prepare students to enter the workforce right after graduation or after their post-secondary education.

After securing permission from IDOE to deviate slightly from the program of spending 100 hours at one location, I instead spent 8-10 hours at as may different agriculture related jobs as I could arrange. My primary goal was to establish five agricultural industry internships within the 7-week summer break and learn the skills needed by the employers. **My secondary goal was to secure agreements for future student job placement** opportunities. **I found very willing partners in our local agriculture industry**. As a matter of fact, **I ran out of time, before I ran out of opportunities**.

### Accountability – Performance Standards

#### Normal means requires multiple levels of performance and accountability regulation

Dortch, Congressional Analyst in Education Policy, 12

[Cassandria, 12-5-12, Congressional Research Service, Carl D. Perkins Career and Technical Education Act of 2006: Background and Performance, <https://fas.org/sgp/crs/misc/R42863.pdf>, pg. intro, Accessed 6-29-17, RK]

The largest program authorized under Perkins IV is the Basic State Grants program. This program provides formula grants to states to develop, implement, and improve CTE programs, services, and activities. The formula awards proportionally larger grants to states with larger populations that are in the age range traditionally enrolled in high school or within two years of high school graduation and to states with a lower than average per capita income. Incorporated in the formula are certain features that guarantee minimum funding levels. These features are a FY1998 hold harmless and a minimum equal to 0.5% of the total amount available for state grants. Each state is able to decide how much of its federal funds will be dedicated to secondary education and how much to postsecondary education. Once this decision is made, funds must generally be distributed to the local secondary and postsecondary education providers through formulas defined by Perkins IV or the state. Over 12.4 million students enrolled in CTE courses during the 2008-2009 academic year (most recent data available). These courses may or may not be funded with Perkins IV funds.

Two key requirements for receiving funds under the Basic State Grants program are offering CTE programs of study and compliance with accountability requirements. Secondary and postsecondary education providers must adopt the appropriate elements of at least one state-approved CTE program of study. Programs of study incorporate secondary and postsecondary education elements into a coordinated, nonduplicative progression of courses leading to an industry-recognized credential, certificate, or degree. Perkins IV also requires that states and secondary and postsecondary education providers meet targets on statutorily defined performance measures or face sanctions.

#### Perkins ensures accountability through sanctions and minimum levels of performance

Dortch, Congressional Analyst in Education Policy, 12

[Cassandria, 12-5-12, Congressional Research Service, Carl D. Perkins Career and Technical Education Act of 2006: Background and Performance, <https://fas.org/sgp/crs/misc/R42863.pdf>, pg. 3, Accessed 6-29-17, RK]

The Carl D. Perkins Vocational and Applied Technology Education Amendments of 1998 (P.L. 105-332) reauthorized and revised Perkins II and renamed the act the Carl D. Perkins Vocational and Technical Education Act of 1998 (hereafter referred to as Perkins III).7 Perkins III increased the funds distributed to the local level by states from 75% to 85%, of which 8.5% could be reserved for programs in rural and other high-need areas. Perkins III also allowed states to set aside up to 1% of their total grant for programs for individuals in state institutions (such as prisons) and required that states set aside between $60,000 and $150,000 for services related to nontraditional programs and employment. The act strengthened accountability through the establishment of core indicators of performance with levels negotiated between each state and the Secretary (i.e., adjusted levels of performance), sanctions based on states’ failing to meet the performance levels, and incentive grants to states for exceeding performance levels established under Perkins III and under the Workforce Investment Act (WIA, P.L. 105-220)

On August 12, 2006, the Carl D. Perkins Career and Technical Education Improvement Act of 2006 was signed into law (Perkins IV; P.L. 109-270). Perkins IV renamed the act to refer to CTE rather than vocational and technical education. The act reinforced the existing accountability system by establishing separate core indicators of performance for the secondary and postsecondary levels, requiring grantees to meet at least 90% of their adjusted levels of performance on each of their core indicators of performance or be required to develop and implement an improvement plan, and limiting fiduciary sanctions. The act also explicitly linked CTE provisions with the academic standards required under the Elementary and Secondary Education Act (ESEA). Finally, the act permitted eligible agencies to consolidate their funding under the Tech-Prep program into the Basic State Grants program. Perkins IV was authorized from FY2007 through FY2012 (through FY2013 under GEPA).

Notes – ESEA = No Child Left Behind

### Accountability – Review Committee

#### Review committee to assess agricultural education can improve effectiveness

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 15-6, accessed 6-26-17, AFB]

Establish a Committee to Review Food and Agricultural Education’s Progress

The National Academies of Science established a Committee in 1985 to “to assess the contributions of instruction in agriculture to the maintenance and improvement of U.S. agricultural productivity and economic competitiveness here and abroad.” A report on that assessment was issued in 1988.77 The W.K. Kellogg Foundation funded a “Reinventing Agricultural Education for the Year 2020” project between 1996 and 1999.78 Now might be a good time to bring together a new Committee, either set up through the National Academies or another convening entity, to take a fresh look at what has been done to implement the 1988 and 1999 recommendations, how the U.S. food and agricultural environment has changed over the last few decades, and how these endeavors might be improved by taking advantage of new digital and telecommunication technologies. That new Committee should include representatives of USDA and USDE, colleges and universities, 4-H and FFA, practitioners of food and agricultural education at the elementary and secondary levels, and farm groups and agribusinesses, as well as representatives of some of the novel approaches to food and agricultural education described above.

In that effort, the new Committee might want to examine the following questions:

• What strategies/techniques can be used to incorporate food and agricultural education into other more “typical” in-school subjects?

• What techniques and/or approaches are most effective in drawing students into secondary food and agricultural education programs?

• How can we keep students interested enough to study agricultural disciplines in post-secondary or university institutions?

• How can we channel these students into the agricultural sector when they complete their educations? and

• Would establishing a national scholarship program for students entering post-secondary agricultural and agri-science fields be an effective use of limited resources in this field?

#### Literacy survey will facilitate closing literacy gaps

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 15, accessed 6-26-17, AFB]

National Survey of Agricultural Literacy

Although agricultural literacy of the general population is a significant focus of food and agricultural education in the United States today, there appears to have been no survey conducted on a national basis that probes this matter as the complex set of issues that it deserves. Such a national effort should be initiated, using the resources of USDA’s National Agricultural Statistics Service, which can help separate out farmers from non-farmers in establishing the survey sample, and perhaps involve the agricultural education staff at the Office of Career and Technical Education at USDE to help frame the survey questions. If the agriculture sector sees this is an important problem to address, it would serve that effort well to have a better grasp of where the gaps actually are in the general public’s knowledge of agriculture. One of the goals of this survey should be to examine whether or not the 1988 definition of agricultural literacy from the NAS report needs to be updated.

### FoodCorps

#### FoodCorps promotes food and nutrition education

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 11, accessed 6-26-17, AFB]

Other innovative approaches to bringing food and agriculture to public schools have emerged in recent years. FoodCorps was established as a component of AmeriCorps in 2009, with the goal of placing young people in schools around the country to improve students’ knowledge about food and nutrition.53 In 2014-15, there were 182 FoodCorps service members in place at 500 schools in 16 states and the District of Columbia, setting up community garden projects and improving the quality of students’ diets at school and at home. The National Farm to School Network provides information and resources to assist local school districts in bringing more locally-produced foods into school cafeterias for meals, educating students about food choices, and providing menus and recipes for school nutrition staffs.54 In 2012, the USDA Farm to School Census estimated that 23.5 million students benefited from the farm to school efforts across the country (Table 4). Other innovative approaches identified include the Wellness in the Schools initiative and My American Farm computer app, created with funding from the American Farm Bureau Foundation for Agriculture.

### Regulatory Implementation

#### Regulatory action is needed to improve healthy eating habits of students.

**Story et al, University of Minnesota School of Public, 8**

[Mary, Karen M. Kaphinst, University of Minneapolis School of Public Health, Ramona Robinson-O’Brien, University of Minneapolis School of Public Health, Karen Glanz, Emory University Rollins School of Public Health, April 2008, Annual Review of Public Health,“Creating Healthy Food and Eating Environments: Policy and Environmental Approaches,” http://www.annualreviews.org/doi/10.1146/annurev.publhealth.29.020907.090926, accessed: 7/1/17, KF]

A recent federal policy initiative that has implications for improving the school food environment requires school districts participating in the federally reimbursable school meal programs to establish local school wellness policies addressing nutrition and physical activity. Although the school wellness policies only went into effect at the beginning of the 2006–2007 school year, preliminary data show mixed results in terms of the implementation, compliance, and impact of the policies (1).

More support and regulatory action is needed by federal, state, and local authorities to strengthen and improve healthy eating and nutrition education in schools. At the federal level this could not only include stronger regulations for competitive foods in schools, but also expand the USDA fruit and vegetable pilot program to improve fruit and vegetable intake among school children, especially among schools with a high proportion of low-income students. Other efforts to improve the quality of foods in schools could include farm-to-school programs, which link local farmers providing fresh locally grown produce to school food service cafeterias and school gardening programs. There is also a need for classroom nutrition education to complement changes in the school environment to increase students' skills for adopting healthy lifestyles.

#### Effective use of existing regulatory agencies can solve environmental justice.

**Matthew, Rodrigue, & Reeves, Senior Fellow Brookings, Brookings Researcher and Senior Fellow, 16**

[Dayna Bowen, Edward, and Richard, October 19, 2016, *Brookings,* “Time for justice: Tackling race inequalities in health and housing,” https://www.brookings.edu/research/time-for-justice-tackling-race-inequalities-in-health-and-housing/, 7/1/17, KF]

Maintain Strong Agency Leadership Committed to Health Equity

The new president must ensure that political leaders are committed and empowered to fight health inequity to the full extent of the law. This must be true throughout the federal family, and especially so for Dr. Tom Price and Scott Pruitt, the people who will occupy the positions of secretary of health and human services (HHS) and administrator of the Environmental Protection Agency (EPA). Similarly, political leadership in both agencies’ offices of general counsel and offices of civil rights must be individuals charged by the president and demonstrably committed to make the elimination of health disparities a top administration priority.

Make Efficient Use of Interagency Working Groups

Without any additional federal expenditures, the new president can strengthen the use of the Federal Interagency Health Equity Team to develop strategies, technical assistance tools, and accountability measures that will ensure that all federal agencies and departments, as well as all recipients of federal financial assistance, comply with health civil rights statute Section 1557.[29]

Section 1557 and its accompanying regulations provide powerful enforcement tools for the federal government to prohibit discrimination on the basis of race by health programs and activities. However, despite the strong final rule implementing the statute, Section 1557 is underutilized against racial health inequity. Currently, no sample or reported cases involving use of this statute to combat race discrimination in health care appear on the HHS website. The president can use existing interagency working groups to significantly enhance deployment of Section 1557 as a weapon against racial discrimination—whether conscious or unconscious—that produces health disparities.

Fully Implement Executive Order 12898

More than two decades have passed since President Bill Clinton signed the historic Executive Order 12898 on Environmental Justice, yet the order has not been fully implemented. The new president has an opportunity to live up to the promise that in America, “no matter who you are or where you come from, you can pursue your dreams in a safe and just environment.”[30]Improving Title VI civil rights enforcement is the place to start. Currently, the EPA dismisses or rejects over 90 percent of Title VI complaints, takes an average of 350 days to complete jurisdictional reviews,[31] and has never in its history made a formal finding of discrimination. The EPA has never denied or withdrawn financial assistance from a recipient. And the agency’s civil rights office has cases on its Title VI docket that were filed more than 10 years ago.[32] Making the promise of this executive order a reality will help reduce health disparities suffered by black Americans.

In sum, the new president can, by reducing the inequality that separates blacks and whites, not only improve economic growth, social mobility, health, and opportunity for many, but also ensure justice for all Americans.

### Sustained Effort

#### Sustained effort is required to address unhealthy dietary choices.

**Story et al, University of Minnesota School of Public, 08**

[Mary, Karen M. Kaphinst, University of Minneapolis School of Public Health, Ramona Robinson-O’Brien, University of Minneapolis School of Public Health, Karen Glanz, Emory University Rollins School of Public Health, April 2008, *Annual Review of Public Health,* “Creating Healthy Food and Eating Environments: Policy and Environmental Approaches,” http://www.annualreviews.org/doi/10.1146/annurev.publhealth.29.020907.090926, 7/1/17, KF]

Improving dietary and lifestyle patterns and reducing obesity will require a sustained public health effort, which addresses not only individual behaviors but also the environmental context and conditions in which people live and make choices. Individual behavior change is difficult to achieve without addressing the context in which people make decisions. Initial, significant steps are needed to make healthful food choices available, identifiable, and affordable to people of all races and income levels and in all types of geographic locations (e.g., urban, suburban, rural). Our ultimate goals should be to structure neighborhoods, homes, and institutional environments so that healthy behaviors are the optimal defaults.

### Collaboration Key

#### New methods are key - otherwise we merely replicate past problems

\*action now key?

Shinn, Texas A&M University Borlaug Institute for International Agriculture, Senior Scientist and Professor Emeritus, 15

[Dr. Glen C. Shinn, November-December 2015, “A Silver Mirror and a Crystal Ball - Refl ecting on the Past While Looking to the Future,” The Agricultural Education Magazine, pg. 21-22, <https://www.questia.com/library/journal/1P3-3957034891/a-silver-mirror-and-a-crystal-ball-reflecting-on>, accessed 6.30.2017]//TRossow

**Past strategies and methods will not solve present or future educational problems**. In The World is Flat (2007), Thomas Friedman assured “this is not a test, it is a **real emergency**.” Paraphrased, Friedman said the curriculum must provide access to knowledge, but students must take advantage of it. Peter Drucker warned, “**The greatest danger in times of turbulence is not the turbulence – it is to act with yesterday’s logic.”** In summary, the future requires collaboration, deep engagement and higher aspirations, not only from students and parents, but also from agribusiness, policy- makers, educators and communities.

### Coordination Key

#### Curriculum coordination and certification are key to enhancing agriculture education and literacy

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 14, accessed 6-26-17, AFB]

Ideas for Improvement

There are myriad programs underway to provide food and agricultural education or enhance agricultural literacy for young people in the United States, both within and outside formal school settings. However, the lack of coordination, both in terms of curriculum development, program implementation, and monitoring program success, are likely reducing the potential for impact. Better data collection about what works in terms of creating agriculturally literate graduates and inspiring and preparing students for careers in the field will be crucial to enabling the creation of an improved system. In addition, improved understanding of current resourcing as well as programmatic gaps would allow funders to work with educators and other grantees to ensure that collaboration is taking place and duplication of effort is kept to a minimum.

Curriculum Consistency

Teachers have a lot of curricular resources to choose from to help them build their own food and agricultural education program, but there is no system that ranks available resources or provides feedback on what works that would narrow down the best choices for their purposes. One investment that would help in this area would be to expand course offerings in curriculum development and training on how to access and evaluate existing resources, and provide funds for scholarships for more teachers to participate in such instruction, so they would have a firmer basis for determining which material is most useful and how best to convey it to their students. Another tool that might be utilized to good effect in this area is to set up a series of Massive Online Open Courses (MOOC’s) in the area of food and agricultural education, and make them available to both teachers and students.73 Since most elementary and secondary school teachers have an obligation to periodically take courses in their field as part of their continuing education requirements, courses in this area could serve such a purpose.

In 2015, the American Farm Bureau Foundation for Agriculture established a ‘Food & Ag Resource Guide’ which includes tools and resources judged helpful to improving agricultural knowledge. This online guide provides recommended resources by age group aligned to the Pillars of Agricultural Literacy. It relies on users of agricultural education materials to voluntarily submit ratings as well as new resources as they are developed.

The best entries submitted will be recognized annually at the American Farm Bureau Federation Convention.74, 75 It is too early to evaluate the efficacy of the Foundation’s effort, but it is definitely a laudable objective. However, a more extensive system that relies on vetting or review by experts is probably needed in the end.

A related effort would be to develop a nationally recognized certification process for agricultural and food education in secondary schools, a process that is already underway for several other fields in Career and Technical Education. Such an effort would need to be undertaken in consultation with the land-grant universities and agribusiness sector, so that skills developed to achieve certification would also be of value later in each student’s career. Significant work was done in this area by the National Council for Agricultural Education in 2009 in developing a set of career cluster standards for Agriculture, Food and Natural Resources.76

### USDA Key

#### The plan solves, ensuring both a sustainable ag workforce and literate general population - Department of Agriculture control is key

Hillison, Virginia Tech University, Department of Agricultural, Leadership, and Community Professor Emeritus, 15

[Dr. John Hillison, December 2015, The Agricultural Education Magazine, “Our Future as Influenced by Our Past,” pg. 9-10, https://www.questia.com/library/journal/1P3-3957034861/our-future-as-influenced-by-our-past, accessed 6.30.2017]//TRossow

History has taught us that a fundamental purpose of our profession is to make sure we provide well trained employees to the industry we serve - agriculture. Initially we served the farming component of agriculture, but today agriculture is so much broader than farming. It is an industry that provides food, fiber, and fuel. Our profession has the good fortune to have a subject matter that appeals to all ages, all interests, and all ability levels.

With an ever increasing world population and decreasing farmland, it is essential to have the best and brightest entering the field of agriculture. That is an area where our profession needs to change. While manual work will play a role in the future of agriculture it will be human intellect that will solve the biggest future problems. **We need to have a curriculum that attracts both the future manual workers and the school honor students including valedictorians and salutatorians** - students who will obtain bachelor’s and graduate degrees from university colleges of agriculture. Certainly, there are marvelous job opportunities for such students.

With theoretical science typically taught in biology, science, and chemistry classrooms agricultural subject matter can apply such content and make it much more interesting. **Such application should receive science credit**. Licensure for high school teachers should emphasize basic science as well as agricultural subject matter courses. In the meantime team taught courses with, for example, a biology teacher and an agricultural science teacher could serve as a bridge to full implementation. Another future approach could be dual enrollment courses with community colleges. **Every high school agricultural** education department in the future should have at least course that receives science **credit and/or dual enrollment credit**. This approach would take our profession back to the academic part of the curriculum prior to the Smith-Hughes Act.

Another aspect of the pre- Smith-Hughes agricultural education program that could be emphasized more is agricultural literacy. Literacy not only can help develop a more literate population, but it can serve as a recruitment vehicle for middle and high school agricultural education programs. Elementary teachers can bring academic course content to life with interesting agricultural examples. Fortunately, **USDA has a program called Agriculture in the Classroom that accomplishes many of those objectives.** My point for the future would be that agricultural educators should be more willing to embrace the purpose of agricultural literacy.

In the future both programmatic and administrative leadership needs to go back to the historical model of state and national agricultural departments. I see many advantages for going back to the home of USDA. My experience has been that when I have to explain what agricultural education and FFA are to someone, it is a lot harder to gain their support. Often times dealing with Department of Education employees at either the state or national level, other than agricultural education professionals, means a lengthy explanation. However, when working with Department of Agriculture personnel at either the state or national level, it is a short explanation as many were students in an agricultural education program and an FFA member. Typically, **the Department of Agriculture employee has a great respect for what our profession can do for the agricultural industry**. Many agricultural educators believe the best administrative structure for their university department is in a college of agriculture and have many reasons for their choice. Most of those same reasons apply to the leadership needed. Using that background and the effective way USDA worked with early agricultural education, it makes good sense to me to go back to our original administrative structure at both the state and national levels.

The United States Department of Agriculture set an interesting precedent many years ago when it provided funding for the 4-H youth program. **With agricultural education as part of USDA it could become legal for USDA to fund FFA program work and activities in a fashion similar to 4-H with students not having to pay dues** - **every agricultural education student would be an FFA member**. We are proud of the fact that FFA is an integral part of agricultural education. However, there are thousands of agricultural education students who are not members. For them the integral part does not hold. With the help of USDA integral could become a reality for all students.

Few industries change as rapidly as agriculture. Our field of agricultural education must do its best to keep up with those changes. The inertia of standing still will not keep us up-to-date, in fact, it will put us out of business. While it is easier to understand the past than to predict the future, it is up to the professionals in our fi eld to determine our own destiny. The past gives us a blueprint to examine and a great deal of guidance for that future.

### AT – Curriculum Turn

#### No turns – ag literacy is necessary for informed, moderate decisions and open dialogue

Doerfert, Texas Tech University Agricultural Communications Associate Chair & Professor, 11

[Doerfert, D. L., American Association for Agricultural Education, “National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015,” <http://aaaeonline.org/resources/Documents/AAAE%20National%20Research%20Agenda.pdf>, p. 12-3 Accessed 6.28.2017]//TRossow

As fewer people are directly involved in production agriculture, public support of the industry becomes even more important. Agriculturally literate people make personally informed decisions about agricultural related topics such as **food safety, genetic engineering, and pesticides** versus non-pesticide use issues. In contrast, individuals without a basic understanding of all sides of an issue may **react without reason**, possibly frightening themselves and their families. **The resulting damage to the agricultural industry is unrepairable** (Glassman, Elliot, & Knight, 2007; Tisdale 1991). The issues and problems facing agriculture today are important to the general public as well as those employed by the industry. **Food safety, soil conservation, and animal welfare** are examples of issues that directly affect agriculture and are of serious concern to a broad range of citizens (Birkenholz, 1990; Leising, Igo, Heald, Hubert, & Yamamoto, 1998). The complexity and interwoven nature of these issues and problems has increased since the initial agricultural literacy definition in 1988 creating new research needs. For example, the growth of agricultural biotechnologies has also come with problems, especially visible in genetically engineered foods. The controversy over genetically engineered food in Europe and more recently in the U.S. has prompted many agricultural educators and scientists to begin engaging in more **open dialogue with the public** in order to provide education as to the safety and benefits of this new technology (Lundy, et al, 2002). More recently, policy decisions made to increase the scale of bio-energy within the U.S. energy supply has had a ripple effect on grain and livestock supplies and consumer food prices not to mention the use of water and other resources impacted by these production related decisions—all of which is typically misunderstood by the public. The agriculture issues that are coming before legislators and the general public are complex and the decisions made will impact the future of the agriculture industry. While the agricultural education profession continues its efforts to create an agricultural literate society, we need to know if our intervention efforts are targeting **too elementary of a level** to impact these more complex issues. In addition, we need to better understand how to create more effective educational and informational messages that increases the public’s understanding of these complex agriculture issues.

### AT – Circumvention

#### Accountability measures in place now for Perkins

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 12, accessed 6-26-17, AFB]

Defining Success in Food and Agricultural Education

Formal Accountability Measures

Under the Perkins Act, secondary school programs that receive federal funding under the Act’s CTE Basic Grant program must report on how well their students perform with respect to core indicators that include academic achievement (as reflected on results of standardized tests), graduation rates, college placement, and training for nontraditional careers.59 The states receiving the funds have been diligently reporting their core indicator results back to the U.S. Department of Education since the requirements went into effect. In 2014, USDE reported to Congress how the state CTE programs performed in the 2010-11 school year, the most recent year available.60 This report is the 12th such report submitted, required since the most recent reauthorization of the Perkins Act.

That report found that there were 12.05 million secondary school students enrolled in CTE programs in the 2010-2011 school year, a 7.5 percent decrease from the recent high enrollment in 2006-07. Overall U.S. high school enrollment also declined between those two school years, although by a lesser amount, about 3.4 percent.61 In the 2010-11 school year, 287,242 of those students were studying in the agricultural and natural resources cluster, a 15 percent decline from the previous year. The gender composition in the agriculture-natural resources cluster was 67 percent male, 33 percent female.

Among the performance highlights, 87 percent of the states reported that their CTE students had higher secondary graduation rates than for students overall. Forty-four percent of states reported meeting at least 90 percent of their targeted performance levels for their core indicators. The remaining states are required to develop and submit plans to improve their core indicator performance in the area(s) in which they had fallen short.

## Methodology

### Purdue Methodology Good

#### Purdue study incorporated new data from non-traditional urban school settings

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 91-92, Accessed 6/28/17, GDI - JMo)

Previous research regarding agriculture in secondary schools focused on urban agricultural education programs in traditional high school settings. Therefore, the examination of an agricultural education program at a charter school was able to offer insights into the inclusion and development of agricultural education programs in urban non-traditional high schools. Data for this study were collected from a charter high school located in a large Midwestern U.S. city. Purposive sampling was utilized to ensure information-rich responses from a targeted and knowledgeable audience. Multiple forms of data collection allowed in-depth study of participants in order to accumulate data that included rich thick descriptions and explanations relative to the main purpose of the research (Geertz, 1973; Patton, 2002).

Data were collected at a charter school that enrolled students from grades 9-12. At the time of data collection, the student population consisted of 200 students with an ethnicity breakdown of: 60% African American, 35% White, and 5% other. Participants in this study, who were assigned pseudonyms to protect their identity, included the school principal (Mr. Brooks), the agricultural education teacher (Ms. James), and an active member of the school board (Mr. Brown). Data were collected over the course of one semester. At the time of data collection 90 of the 200 students enrolled, or 45%, were participating in at least one of three offered agricultural education courses. Agricultural education courses included an introductory course titled Introduction to Agriculture, Food, and Natural Resources; an Advanced Life Science: Plants and Soils course; and a Horticulture course.

Guided by Mayan (2009) and Patton (2002), data collection included the qualitative techniques of semi-structured individual interviews with tape recordings, participant observations, field notes, and analysis of relevant school documents. During a four-month data collection period, the researcher immersed herself in the charter school environment two to three times per week. Full-day experiences included between class transitions, lunch in the cafeteria, and other day-to- day activities. The researcher took detailed field notes with dated journal entries. Twenty-six in- depth journal entries were used in data analysis. Additionally, the researcher collected artifacts from the school including agricultural education program guides and records; recruitment documents; curriculum guides; agricultural education course syllabi and other relevant materials. The researcher also collected data through interviewing seven students taking agricultural education courses at the charter school. These student interviews were analyzed separately and the results may be published in a later paper; however, they do provide another data source for this study. Through collection of multiple data sources triangulation was utilized which increased project reliability as well as internal and external validity (Bogdan & Biklen, 1998; Denzin & Lincoln, 2003; Hatch, 2002).

#### Our studies are based on phenomenological inquiry - key to observe teacher experience and decrease researcher bias

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 90-91, Accessed 6/28/17, GDI - JMo)

A qualitative research approach enables a researcher to tell a story according to participants own voices (Creswell, 2007), without researcher bias as to what a particular phenomenon means to participants (Moran, 2000; Moustakas, 1994). Phenomenological inquiry provided the theoretical framework that guided this study to allow recognition of the subjective nature of experiences in order to explore participants’ perspectives. Phenomenology provided the platform to explore lived experiences of two administrators and one agriculture teacher as they worked to include agricultural science courses into urban school curricular, and the challenges they faced. Bogdan and Biklen (1998) reported that phenomenological researchers aim to obtain in-depth explanations and understanding of interactions as well as events that are shared among ordinary people, and the essence of those events and interactions through the lens of these individuals. Therefore, explanations and interpretations generated are presented through the lens of the administrators and agriculture teacher relative to personalized beliefs on how inclusion of agricultural science courses into urban school curricular could benefit students, the charter school, and ultimately the urban community in which they were situated.

Essentially, phenomenological inquiry aims to explain participants’ conceptual world (Moustakas, 1994; Van Manen, 1990). This allows the researcher to obtain a deeper understanding of why the administrators/agriculture teacher thought it was important to include agricultural science courses into urban school curricula despite the challenges encountered on a daily basis. Additionally, the use of a phenomenological approach helped the researcher focus on what participants had in common as it relates to their shared views on developing urban agricultural education programs (Creswell, 2007; Moran, 2000; Moustakas, 1994).

### AGree Methodology Good

#### AGree study involved diverse stakeholders and extensive background research and analysis

Atwood, AGree Executive Director, 15

[Deborah M., The AGree Initiative is housed at Meridian Institute, a facilitation and mediation organization whose mission is to help people solve problems, make informed decisions, and find solutions to some of society’s most complex and controversial issues. July 2015, AGree, “Foreward”, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. iii, accessed 6-26-17, AFB]

AGree drives transformative change by connecting and challenging leaders from diverse communities to stimulate policy innovation and develop initiatives that address critical challenges facing the global food and agriculture system. AGree believes we must elevate food and agriculture policy as a national priority.

AGree’s work addresses four broad challenges facing the global food and agriculture system:

• Meet future demand for food;

• Conserve and enhance water, soil, and habitat;

• Improve nutrition and public health; and

• Strengthen farms and communities to improve livelihoods.

We have taken a deliberative, inclusive approach to develop a policy framework and ongoing, complementary initiatives to meet these challenges. To overcome traditional obstacles to change, we engage a broad array of stakeholders whose insights and commitment contribute to meaningful solutions. AGree’s work, building on our research to better understand problems and assess options, aims to stimulate creative ideas and encourage new perspectives while fostering the linkages that are key to catalyzing effective action.

This AGree backgrounder was written by Stephanie Mercier, former Chief Economist of the U.S. Senate Agriculture Committee and currently with the Farm Journal Foundation. The paper traces the history of food and agriculture education in the United States with a focus on elementary and secondary learning opportunities and describes how educational approaches have changed over time. It outlines public and private investments (based on publicly available information) and available curricula and suggests ideas for improvements that would strengthen the delivery of K-12 food and agriculture education and ensure a steady pipeline of students into food- and agriculture-related careers.

The paper was borne from AGree convenings on the Next Generation: Attracting young people to food and agriculture. Our discussions focused on opportunities for building common ground and conditions for increased collaboration, support, and message coherence about why these fields of study are important for the future of our food and agriculture system and our national security. This work was made possible through generous support from the CHS Foundation. We look forward to their continued leadership to explore opportunities for discussion and collaboration around the future of food and agriculture education in the United States.

# \*\*\*\*Agriculture

### Agriculture – 1AC Module

#### Now is key – Expanding agricultural education key to preventing imminent talent shortfalls in farming fields

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 16, accessed 6-26-17, AFB]

Concluding Remarks

Food and agricultural education in the United States has taken steps in recent years to adjust its curriculum to the modern agricultural reality, but most of its energy is currently focused in the rural and non-metropolitan regions of the country. In order to expand the pool of young people who might consider a career in a food and agricultural field, more should be done to teach children in elementary school in urban and suburban settings as well about the basic facts of food and agriculture in a way that holds their attention and interest. If basic knowledge about food and agriculture becomes more widely held, there will be opportunities to hold onto the interest of more of these students as they move through secondary school and into college. There’s an urgent need for better data collection on program performance and funding at the national, state, and local level for food and agricultural education, in order to be able to examine these issues in a more rigorous manner.

Traditional partnerships and programs will continue to play a key role in promoting food and agricultural education across the United States. Alternative mechanisms for promoting food and agricultural education should also be explored, such as through charter schools and innovative food education efforts. By incorporating more agricultural science across a variety of STEM fields, there will be new ways to touch students in every classroom across the country. There’s no time to lose, as the massive baby boom generation in this country begins to enter retirement years, today’s millennials will be the ones who will fill the jobs of tomorrow, in food, agriculture, and agribusiness as well as the rest of the economy.

#### Ag literacy solves extinction – key to global growth and food security for billions

Malloy, Robeson County Center Extension Agent, Agriculture - Field Crops & Jones, Robeson County Center County Extension Support Specialist, Agriculture and FCS, 16

[Mac Malloy and Jessie Jones, 7-25-16, Robeson County Center, “The Importance of Agricultural Literacy,’ <https://robeson.ces.ncsu.edu/2016/07/the-importance-of-agricultural-literacy/>, accessed 6.27.2017]//TRossow

So why the big issue? All citizens need to understand the economic, social, and environmental significance of agriculture. Food production is the basis of all civilization. We need a well-educated public to contribute to the success of a safe and affordable food system that will attempt to feed the expected nine billion people in this world by 2050. Though only a small percentage of our population is actively producing our food, we all have a responsibility as voters that affect agricultural policy related to trade, employment, and environmental issues. We also need policy makers who are agriculturally literate to create responsible regulation that supports such an important industry in our global economy.

U.S. agriculture also plays a major role in supporting other sectors of our economy. According to the American Farm Bureau Federation, one in three U.S. farm acres is planted for export. According to the United States Department of Agriculture (USDA) Economic Research Service, in 2014, each dollar of agricultural exports stimulated another $1.27 in business activity. That means the $150 billion of agricultural exports in the 2014 calendar year produced an additional $190.6 billion in economic activity for a total output of $340.6 billion. Agricultural exports required 1.13 million full-time civilian jobs, which included 808,000 jobs in the nonfarm sector the same year.

Society’s major challenge ahead is determining how to continue to feed a growing population on less land and with less resources. Maybe it’s time we focus more on agricultural education in our school systems to create a more literate public to meet this challenge. The National Academy of Science, Agricultural Education Committee, has stated that agriculture is too important a topic to be taught to only a relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies. Some have suggested all high school graduates need to take at least one agricultural course to gain a basic understanding. I guess it all depends on how important we think agricultural literacy is to allmankind.

**Food insecurity ensures that conflict is uniquely severe and drawn out**

**Simmons, Wilson Center guest contributor, 13**

[Emmy, September 3, 2013, New Security Beat, “Harvesting Peace: Food security, Conflict, and Cooperation”, <https://www.newsecuritybeat.org/2013/09/harvesting-peace-food-security-conflict-cooperation/#.Uth9YaCLDy8%29//JuneC//>, accessed: 6/30/17, SK]

Deaths directly attributable to war appear to be declining, but war and other kinds of conflict continue to take a toll on human health, often through food insecurity. Conflict induces the affected populations to adopt coping strategies that invariably reduce their food consumption and nutrition. Poor nutritional status in individuals of any age makes them more susceptible to illness and death. But the acute food insecurity caused by conflict has especially potent and long-lasting effects on children. Children whose nutrition is compromised by food insecurity before they are two years old suffer irreversible harm to their cognitive and physical capacities. Analysis of the causes of conflict and war has been an area of growing academic interest. Both theoretical work and empirical analyses substantiate the many ways in which food insecurity can trigger, fuel, or sustain conflict. Unanticipated food price rises frequently provide a spark for unrest. Conflict among groups competing to control the natural resources needed for food production can catalyze conflict. Social, political, or economic inequities that affect people’s food security can exacerbate grievances and build momentum toward conflict. Incentives to join or support conflicts and rebellions stem from a number of causes, of which the protection of food security is just one. Food insecurity may also help to sustain conflict. If post-conflict recovery proves difficult and food insecurity remains high, incentives for reigniting conflict may be strengthened. Given the complexity of factors underlying food security, however, we do not yet understand what levels or aspects of food insecurity are most likely, in what circumstances, to directly contribute to or cause conflict. More explicit integration of food security variables into theories of conflict could help inform external interventions aimed at mitigating food insecurity and preventing conflict. The high human and economic costs of conflict and food insecurity already provide substantial incentives for international humanitarian and development organizations to intervene in order to alleviate food insecurity in fragile states and conflict-affected societies. Experience suggests, however, that effective efforts to address food insecurity in these situations may require external actors to reconsider the ways in which they intervene.

## Agricultural Literacy

### Ag Literacy Low

#### Agricultural literacy declining now

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 2-3, accessed 6-26-17, AFB]

Second, most Americans do not understand food and agriculture systems. The shrinking human footprint of agricultural production in the United States over the last century, especially as a share of U.S. population, along with a productive food system, has led to a diminution among the general public of understanding of what goes on in the U.S. agricultural sector and its vital importance to the nation in terms of abundant, affordable, and nutritious food that is safe and secure.

Few Americans equate food and agriculture with national security as periods of broad-based scarcity fade into history. According to USDA data, the share of the U.S. workforce employed in agriculture declined from 41 percent in 1900 to less than 1.5 percent in 2012.3,4 A survey conducted by the U.S. Farmers and Ranchers Alliance in 2011 found that 72 percent of consumers report that they know little or nothing about farming or ranching,5 even though in general Americans have favorable impressions of agriculture and farming – with a 60 percent positive rating in a recent Gallup poll.6 Because of the importance of maintaining a secure food supply for the American public, improving the general understanding of the food and agricultural system, or ‘agricultural literacy’ among both civic leaders and the general public has become a significant objective among supporters of U.S. agriculture in recent years, and an effort has been made to incorporate such a focus within the U.S. food and agricultural education system as well. The importance of this matter prompted the American Farm Bureau Federation to begin developing their Pillars of Agricultural Literacy, a framework to enable continual enhancement of the public’s agricultural literacy, starting in elementary school but persisting through adult interactions.7

#### Ag literacy is depressed now

Holden, Forbes contributor, 17

[Ronald, internally cites a new report in the Journal of Agricultural Education, 6-15-17, Forbes, “Do Not Underestimate The Ignorance Of The American Eater,” <https://www.forbes.com/sites/ronaldholden/2017/06/15/do-not-underestimate-the-ignorance-of-the-american-eater/#7ef6d75c7645>, accessed 6.27.2017]//TRossow

What we call "agricultural literacy" is at a depressingly low point, according to a [scholarly report](http://www.jae-online.org/attachments/article/1575/52.4.1%20Hess%20and%20Trexler.pdf) in the Journal of Agricultural Education. One grade-school respondent, for example, told researchers that "My mommy told me bread comes from an animal. I don't know which animal."

In a front-page story, The Washington Post [reports today](https://www.washingtonpost.com/news/wonk/wp/2017/06/15/seven-percent-of-americans-think-chocolate-milk-comes-from-brown-cows-and-thats-not-even-the-scary-part/) that a high percentage of Americans do not have the most rudimentary understanding of food or agriculture. "Today, many Americans only experience food as an industrial product that doesn’t look much like the original animal or plant," the Post says.

The story reports on an online survey commissioned by the Innovation Center of U.S. Dairy.

A few examples:

* **16 million people** think chocolate milk comes from brown cows
* 40% of California 4th-graders (5th and 6th graders, too) didn't know that hamburger comes from cows
* Orange juice is the nation's most popular "fruit"
* French fries and potato chips are the nation's most popular "vegetables"

Says the Post: "For decades, observers in agriculture, nutrition and education have griped that many Americans are basically agriculturally illiterate. They don’t know where food is grown, how it gets to stores — or even, in the case of chocolate milk, what’s in it."

There's actually a non-profit, FoodCorps, with a mission to bring more agricultural and nutrition education into elementary schools. But it may be a losing battle, according to Cecily Upton, FoodCorps co-founder. “Right now, we’re conditioned to think that if you need food, you go to the store. Nothing in our educational framework teaches kids where food comes from before that point.”

It wasn't that the kids didn't know, apparently; it's that they couldn't explain it in academic terms ““All informants recalled the names of common foods in raw form and most knew foods were grown on farms or in gardens," the researchers concluded. "They did not...possess schema necessary to articulate an understanding of post-production activities nor the agricultural crop origin of common foods.”

### Ag Education Access Low Now

#### Agriculture education integration low now

Enns et al., College of Agricultural Studies Agricultural Education Associate Professor, 16

[Kellie, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 15-16, Date accessed 6-28-17, RK]

The increased popularity of agriculture and agriculture related topics has led to an increasing number of organizations doing agricultural education work. A variety of programs in the U.S. seek to educate or inform youth and future policymakers about agriculture and natural resources. The effectiveness of these programs has been the subject of several publications (Kovar & Ball, 2013; Mercier, 2015; Powell & Agnew, 2011). Programs and curriculum projects exist in formal academic settings (e.g., Agriculture in the Classroom; Food, Land & People; Farm to School; FoodCorps), formal career and technical education settings (school-based or secondary agricultural education programs/FFA), and some in nonformal settings (e.g., 4-H, Boy Scouts, Girl Scouts). However, it is estimated these programs are reaching only 2% (in the case of schoolbased agricultural education programs/FFA) to 12% of the school-age population (in the case of Agriculture in the Classroom) with educational resources and programming (Mercier, 2015). Alternative agricultural education approaches have emerged and gained popularity both locally and nationally, including the Agricultural Council of America (Agricultural Council of America, 2015), Slow Food USA (Slow Food USA, 2015), and community gardening associations (American Community Gardening Association, n.d.).

#### Status quo agriculture training insufficient to face impending food security challenges that threaten millions and undermine political stability worldwide

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 1, accessed 6-26-17, AFB]

Food and agricultural education in the United States has changed over the nation’s history, starting in the 18th century as a means of providing farmers with the basic skills they needed to prosper on their farms. In the 19th and early 20th centuries, traditional agricultural education was focused on increasing production to sustain a growing and increasingly urban and industrial population. Today, the range of issues and subject matters important to agriculture has broadened, and the educational system to provide skilled individuals to fill the needed occupations has scrambled to keep pace. The crucial areas of expertise now encompass not just those trained in production agriculture but also food and nutrition, natural resources, and the know-how to maintain and improve the physical and scientific infrastructure that underlies modern agriculture, including an increased role for information technology with the emergence of “big ag data.” For the U.S. food and agricultural sector to be in a position to compete in the global markets of the 21st century, the food and agricultural education system must be expanded and strengthened to address the challenges and opportunities facing the global food system. The world will likely become a much more politically stable place if we can make a further dent in the number of hungry people, estimated at 805 million people in 2014 by the UN’s Food and Agriculture Organization. This paper examines the evolution of U.S. food and agricultural education over time, its current structure, and how it must adapt to meet the challenges facing the sector.

Modern food and agricultural education takes many forms, ranging from children in grade school classrooms learning from “Agriculture in the Classroom” modules to undergraduate and graduate students enrolled in Colleges of Agriculture at land-grant universities and other schools with agricultural programs (such as Texas Tech and Southern Illinois Universities) to agricultural leadership programs available for adult professionals in farming and agribusiness in 42 states.1 This paper focuses primarily on food and agricultural education provided to students in elementary and secondary schools around the country (K-12), both inside and outside the classroom, and in community college programs. These programs are a means of exposing young people to careers in agriculture, and they are also a critical delivery mechanism to educate the general population about agriculture and food systems. The subjects covered in these educational settings have broadened in recent years to include health and nutrition and natural resource issues. The need for better knowledge in these areas has arisen as the general public has become more conscious of the health impacts of the food they eat and natural resource constraints such as water and arable land.

Today there are two primary reasons to support U.S. food and agricultural education activities for young people. First, we need to build a cadre of next generation farmers and ranchers as well as career seekers interested in food and agriculture. The 2012 Census of Agriculture reports that the average age of principal operators on U.S. farms is 58.3 years of age, with only 8.1 percent of all operators below the age of 35. U.S. agriculture would likely continue to produce abundant amounts of food and fiber if older farmers were not replaced as they retire, but the farm size composition of the sector could become further concentrated. To ensure that the social and economic stabilizing role of family farming is preserved, the U.S. government has for many decades taken steps to provide access to the two most important things a young farmer needs to get started: 1) adequate capital to buy or lease equipment and land to farm, and 2) adequate education so young people and other new entrants will have the know-how to farm. Today’s farmers must have an expanded technological skill set—for example, if they want to maintain their own farm equipment they need to have computer programming skills as well as be handy with a wrench and a screwdriver.

#### Access to agricultural education programs low now

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 5-6, accessed 6-26-17, AFB]

The National Association of Agricultural Educators (NAAE) estimates that 1 million students are currently enrolled in food and agricultural education programs around the country, taught by 12,000 agricultural educators at the secondary and community college level.20 In addition, there are growing numbers of teachers incorporating agriculture in their lesson plans in elementary and middle schools around the country, but outside of the formal agricultural education system. According to the Bureau of the Census, there were 24.9 million students enrolled in grades 7-12 in 2013,21 plus about 6.8 million students enrolled in community colleges, either full-time or part-time.22 In 2010-11, a survey by the U.S. Department of Education indicated that about 1.5 million students were dual-enrolled in high school and community college or college courses.23 Using these figures, it appears that formally enrolled food and agricultural education students make up about 3.3 percent of the total enrollment for secondary and community college educational institutions in the United States. As a point of comparison, about 2.1 percent of individuals in the U.S. population in 2012 lived in farm households.24

Most formal food and agricultural education programs are found in small towns and rural areas across the country. There have been a few breakthroughs in recent decades, however, that are bringing these opportunities to young people in urban settings. One of the earliest efforts was in 1985, when the Chicago Public School District opened the Chicago High School for Agricultural Sciences.25 Now in its 20th year, the school draws students from all over the city, who apply for admission based on results from a standardized aptitude test. The agricultural program includes courses in animal science, agricultural mechanics, food sciences, horticultural and landscape design, and agricultural finance. The school’s total enrollment in 2014-15 was 696 students in 9th through 12th grade. It should be noted that there are also programs conducted in charter schools and private secondary schools that focus on agriculture.

Food and Agricultural Learning Opportunities

Many of these secondary school and community college students are also involved outside of school hours in programs and activities associated with either 4-H clubs or Future Farmers of America (FFA) chapters (described further below), which provide them with further opportunities to expand their knowledge and experience related to agriculture. These organizations have been around for many decades and have been viewed as complementary to formal in-school food and agricultural education programs almost since they were established. The 4-H Youth Development Program is part of USDA’s Cooperative Extension Service and focuses primarily on out-of-school activities (though it does have some in-school programs) for students aged 5 to 19, while FFA chapters run in tight conjunction with food and agricultural education programs in local school districts, with activities conducted both within and outside of school hours.

Both organizations seek to develop agricultural and leadership skills among young people, but the FFA’s efforts are closely linked to food and agricultural education programs. Students in school districts without formal food and agricultural education programs cannot join FFA (although some districts allow students from neighboring districts to take courses and engage in FFA across district lines). Many 4-H members do not pursue formal food and agricultural education study in their schools, making this one distinction between the two programs. These FFA activities are funded primarily from corporate and foundation sources at the national level, while 4-H is funded through a variety of public (both state and USDA) and private sources. There are other large (i.e., millions of participants) out-of-school programs such as Boy and Girl Scouts, the YMCA, and Boys and Girls Clubs of America that do not have strong food and agriculture roots but deliver educational programs, some of them focused on healthy lifestyles and nutrition.

#### Literacy programs work, but need expansion

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 13, accessed 6-26-17, AFB]

In terms of how the system works in terms of agricultural literacy of the general population, an early study on agricultural literacy found that only 30 percent of more than 2,000 Kansas students surveyed in 1986 displayed good knowledge of agriculture.65 A 2013 article in the Journal of Agricultural Education provided a synthesis of recent research into the issue of agricultural literacy.66 Of 49 studies identified within relevant academic journals over a 23-year period (1988- 2011), 10 surveyed teacher populations, 33 surveyed student populations, and 6 surveyed non-teaching adult populations. Of the total universe of studies identified, 23 actually sought to evaluate the agricultural literacy of the target population. Results were mixed—six studies found their participant groups to be agriculturally literate, ten studies found their survey groups to have some knowledge of agriculture, and the remaining six found their participant groups to be agriculturally illiterate. In a separate category, 19 studies tested the effectiveness of literacy programs. These studies generally found that agricultural literacy programs are successful in increasing knowledge of agriculture to targeted populations, but existing programs’ reach are limited. One shortcoming of the synthesis was that the authors made no attempt to evaluate whether the definition of agricultural literacy used in the various studies cited was applied consistently or not. There were no studies linking agricultural education and student matriculation into food and agriculture careers.

#### Agricultural education deprioritized now at elementary level

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 7-8, accessed 6-26-17, AFB]

Today, at the elementary school level, there are relatively few in-school food and agricultural education programs being delivered, as teachers in public elementary schools tend to focus on subject areas covered in state standards and testing. To the extent that younger students are exposed to agricultural and food information, it is often taught in the context of science education, for example as part of biology lessons (e.g., a classroom garden). A 2007 survey of elementary and junior high teachers in eight Illinois counties found that some teachers did not integrate agriculture in their classrooms because they did not view it as appropriate for their situation, because it took time away from preparing students for state proficiency tests, or they did not have access to good instructional resources on the subject.36 Of those who did attempt to incorporate agriculture in their teaching, they cited ‘connectedness’ and ‘authenticity’ as key themes for that decision. Access to better curricula resources and agricultural-related projects and activities were concerns of these teachers as well. This was a small study, but it highlights a number of issues teachers face integrating food and agriculture topics into existing curricula.

Agriculture in the Classroom

The concept of Agriculture in the Classroom was pioneered by an Illinois teacher in 1977, who developed a program to teach students about agriculture’s role in the U.S. economy, and the concept spread quickly to other states.37 In 1981, the widespread interest in this effort prompted the U.S. Secretary of Agriculture to invite representatives of farm groups and educators to Washington, DC, to discuss agricultural literacy. Out of that initial meeting, a task force was formed, which conferred and recommended that USDA serve as the coordinator for a national classroom agricultural literacy effort—hence, the birth of the national Agriculture in the Classroom (AITC) initiative. Each state sets up its own organization, which then addresses agricultural education in its own way—some set up all-volunteer networks, some chose the non-profit route, others hired full-time personnel or assigned state employees to support AITC efforts. In 2010, it was estimated based on a survey of programs in 35 states that nearly 3.9 million students, primarily in elementary schools nationwide, were reached with AITC programs or curriculum during the previous year, either directly by AITC staff or indirectly through teachers trained through AITC programs.38 That amounted to about 12 percent of all students enrolled in elementary and middle schools in that year.39

### More Teacher Training Needed Now

#### Understanding philosophy of the agricultural programs key for prepared agriculture teachers

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Today, over 800,000 students participate in School Based Agricultural Education (SBAE) throughout all 50 states and three territories (The Council, 2012). The SBAE mission of "prepare[ing] students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber and natural resources systems" is still producing successful students today (The Council, 2012, para. 3). SBAE has been primarily concerned with preparing students for agricultural careers and advanced education (Newcomb et al., 2004; Phipps et al., 2008), which has been done through the use of the three-circle model of classroom instruction, SAE programs and the National FFA Organization (Newcomb et al., 2004; Phipps et al., 2008). With this being known of agricultural education and Education Nation, it is vital for agricultural education teacher preparation programs to understand the philosophical similarities between these two programs in order to best prepare preservice agricultural education teachers.

### Ag Worker Shortage Now

#### Shortage of ag specialists now – ag is losing out to core STEM

Thoron et al., University of Florida Agriculture Education and Communication Assistance Professor, 16

[Andrew, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 42, Date accessed 6-28-17, RK]

Currently, a shortage of scientists for agricultural positions exists throughout the United States (U.S.). Employment data from Employment Opportunities for College Graduates in the U.S. Food, Agricultural, and Natural Resources System (CSREES, 2005) projected a deficit of nearly 3,000 agricultural graduates per year for 2005- 2010. The latest report projecting career opportunities for 2010-2015 (NIFA, 2010) projected an even greater deficit. Compounding the issue of recruiting and preparing qualified graduates to enter careers in agricultural sciences is the increasing demand for workers with scientific expertise by numerous career areas. Science, technology, engineering, and math (STEM) occupations are critical to the continued economic competitiveness of the U.S. (Carnevale, Smith, & Melton, 2011). The demand for traditional STEM workers will continue to grow.

Opportunities for educators, industry leaders, and communicators to expose potential employees to the benefits of and skills used in the diverse array of agricultural careers are great, and occur across a broad timeline during an individual’s life, both before and after entering the adult workforce. While many colleges of agriculture have experienced an increase in student enrollment, fewer students maintain their agricultural focus through successful placement in an agriculturally based scientific position upon graduation (Dyer, Lacey, & Osborne, 1996).

#### There is a rising demand of jobs in the ag industry – agricultural education is key

Ewing, Penn State Agricultural Economics Professor, 16

[John, December 2016, The Agricultural Education Magazine, “Preparing our Future Workforce through Agricultural Education”, <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, pg. 2, accessed: 6/28/17, SK]

The success of communities, states, and the nation rely on the workforce that is available to meet the needs of employers. The individuals that make up the work- force need to be prepared with the knowledge, skills, and dispositions that are needed at that time. In a time where we are being challenged to produce enough food and fiber to provide for an ever growing population, an emphasis needs to be placed on educating the workforce for agricultural careers.

Employees ranging from agribusiness personnel to agricultural mechanic technicians to agronomists (among others) are needed to meet the rising production, processing, and sales needs of the agricultural industry. These employees must be trained to enter the workforce so the food and fiber needs of our nation and world are met. These are just a few examples of the career opportunities awaiting our students. We must educate students to compete in a global market, and this should be- gin in the secondary agricultural education program.

#### Agriculture education is critical to ensure food security

Lufkin et al, National Alliance for Partnerships in Equity Executive Director, 9

[Mimi, March 2009, Pennsylvania Department of Education, “Vision for Pennsylvania Agricultural Education,” http://www.education.pa.gov/Documents/K-12/Career%20and%20Technical%20Education/Teacher%20Resources/Agricultural%20Education/A%20Handbooks%20for%20Program%20Planning%20and%20Curriculum%20Development.pdf, p. vii, 6/28/17, KF]

Food and fiber production requires only 2% of the nation's workforce. However, more than 20% of the workforce is employed somewhere in the food and fiber system including plant and animal science, food production, supply, processing, transportation, finance, economics, marketing, leadership, public policy, regulation, human nutrition, recreation, trade, environmental stewardship, agricultural research, natural resource conservation and education. **Agricultural education must be responsive to the needs of this broad industry**. Within the next 35-40 years, world demand for food will double. To leverage future opportunities and meet responsibilities associated with increased population and purchasing power in developing countries, **our nation needs a highly-talented cadre of professionals, technicians and skilled workers in the food system to be competitive**. Since the National Research Council released "Understanding Agriculture - New Directions for Education" in 1988**, the agricultural education community has been looking to the future through a process of strategic planning activities at the national level.**

#### The farm labor crisis is an issue now

Nassif, Western Growers president & CEO, 11

[Tom, 10/4/11, Western Growers, “Hearing on America’s Agricultural Labor Crisis: Enacting a Practical Solution”, <https://www.judiciary.senate.gov/imo/media/doc/11-10-4NassifTestimony.pdf>, p. 2, accessed: 7/1/17, KW]

Not only is agriculture’s role in maintaining a safe and secure food supply vital to our economic recovery, it is critical to the strength of rural America. Western Growers members and their employees are members of the very communities in which they grow, pack, and sell products. In 2009, when the California water crisis forced us to fallow 500,000 acres in the Central Valley, thousands of farms jobs were lost, and rural nonfarm businesses supported by these jobs suffered. Some communities realized unemployment levels of 40 percent.

Today, I’m here to talk about another crisis, our labor crisis. This is not a new challenge for agriculture. We’ve been working to secure a legal workforce for more than 15 years. But in the face of no immigration reform, a diminishing labor supply, threats due to I-9 audits and ICE raids, and now E-Verify legislation emerging at the state and the federal levels, it is clear that U.S. agriculture will be decimated without a workable mechanism Page 3 of 11 to hire the labor we need.

#### An ag educated workforce is key to meet growing demand

Lufkin, et al., National Alliance for Partnerships in Equity Executive Director, 9

[Mimi, March 2009, Pennsylvania Department of Education, “Vision for Pennsylvania Agricultural Education,” http://www.education.pa.gov/Documents/K-12/Career%20and%20Technical%20Education/Teacher%20Resources/Agricultural%20Education/A%20Handbooks%20for%20Program%20Planning%20and%20Curriculum%20Development.pdf, p. vii, accessed: 6/28/17, SK]

Food and fiber production requires only 2% of the nation's workforce. However, more than 20% of the workforce is employed somewhere in the food and fiber system including plant and animal science, food production, supply, processing, transportation, finance, economics, marketing, leadership, public policy, regulation, human nutrition, recreation, trade, environmental stewardship, agricultural research, natural resource conservation and education. Agricultural education must be responsive to the needs of this broad industry. Within the next 35-40 years, world demand for food will double. To leverage future opportunities and meet responsibilities associated with increased population and purchasing power in developing countries, our nation needs a highly-talented cadre of professionals, technicians and skilled workers in the food system to be competitive.

### Specialist Shortage Now

#### Significant shortage of students with agriculture training coming now – plant genetics, climate, and food safety and security will face major shortages of specialists

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 2, accessed 6-26-17, AFB]

The need to facilitate the creation of a continuing supply of students with training to go into the food and agricultural sector applies not only to crop and livestock production, but also related occupations that serve the businesses in the agricultural supply chain and agricultural and food science disciplines. A 2015 study commissioned by USDA’s National Institute of Food and Agriculture (NIFA) found that the U.S. economy will generate more than 57,900 openings for individuals with college degrees in food, renewable energy, and environmental specialties every year between 2015 and 2020.2 The study found that there would be a 41 percent shortfall of U.S. graduates in those fields to meet the demand, especially graduates to work as plant geneticists and plant breeders, climate change analysts, and food safety and security specialists.

### Research Inadequate Now

#### Systematic research data on effectiveness lacking now

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 12-13, accessed 6-26-17, AFB]

Academic Evaluation of Agricultural Education Effectiveness

For professionals in the agricultural education field, it appears that they sometimes find it difficult to decide if they should be classified as an agricultural discipline or an educational one. In part due to the lack of survey or longitudinal data about agricultural education programs at the national or state level, the research into the effectiveness of agricultural education efforts appears to be programmatically and geographically driven. There are a plethora of studies with small sample sizes that examine only a single aspect of the system, such as trying to define the components of a successful SAE 62 or using a cheeseburger in an elementary school classroom setting to test students’ understanding of the U.S. food system (a model used in three states).63 What is not readily available is any overarching analysis of the effectiveness of components of the system (e.g., elementary education) let alone the entire agricultural education system.

There is a considerable body of research about the impact of farm to school activities on school children’s food preferences and knowledge about gardening and healthy eating habits resulting from participation in such programs, but these results do not necessarily apply to the entire food and agricultural education system.64

As of this writing, the Career and Technical Education programs just completed their review of their standards for agriculture, food and natural resources education (AFNR) to ensure that they are as relevant to future careers in food and agriculture as possible. Once disseminated and put in place, these standards should lend clarity and direction to the development of curriculum and over time, it should be easier to evaluate the effectiveness of CTE programs.

## Agriculture Education Good

### Ag Threats Now

#### Agriculture faces a number of threats now

Mulder, Wageningen University, Education and Competence Studies Group, 17

[Martin Mulder (2017) The Journal of Agricultural Education and Extension, “A Five-Component Future Competence (5CFC) Model,” pg. 99-100, <http://www.tandfonline.com/doi/full/10.1080/1389224X.2017.1296533>, accessed 6.30.2017]//TRossow

An important question regarding the study of competence, or professional competence (Mulder 2014) if you will, is what this has to do with agricultural education and extension. To give a short answer to this: in my opinion, **a lot**. Like in e-based production technology or smart office design, in knowledge-intensive agriculture, farm management, logistics in supply chains and networks, electronic marketing, web-based purchasing, climate-neutral construction, sustainable pest control, increased animal welfare, quality control, finance and governance, many developments are going on, some incremental, some disruptive. These developments have various consequences for the professionals working in and for agriculture, at different levels in different specializations, be it in crop farming, animal husbandry or aquaculture. Effects of climate change have to be taken into consideration, as well as goals regarding sustainable development. Researchers, engineers, planners, politicians and the industry have to design solutions for pressing problems, keeping the balance between people, planet and profit-related objectives in mind. The big question here is the same as we were studying in the project on basic skills: which competencies do people need to not only cope with the developments which are taking place, but to also contribute to create solutions for the current and future challenges to feed the global population, to sustain sufficient production with respect for the natural resources, and to warrant access to healthy food for all. Competence studies have to come up with suggestions of competencies people need for this. This does not only apply to the improvement of farming; it is much bigger than that. It certainly includes specifications of what is needed to foster production, to lower costs and maximize margins, but it is also about creating new business models, developing alternative value propositions or crossing boundaries. It may even apply to radical changes of economic activities of farmers who close their business because of the lack of future perspective and the earning power of their present activity. In the Netherlands it is expected that around 1000 dairy farmers will close their business during the course of 2017 because they do not see a viable future in milk production under the conditions of the set EU agricultural policy and the national agreement on phosphate reduction. The question then becomes which competencies are needed to realize this dramatically life-changing transformation in a positive-constructive way.

### Solves Literacy

#### Agricultural curriculum increases agricultural literacy - and bolsters applied science skills

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 93-94, Accessed 6/28/17, GDI - JMo)

C1: Participants stated school agricultural education courses enhanced students’ knowledge and awareness of agriculture. Additionally, they reported these courses heightened student comprehension regarding higher education opportunities and careers in agriculturally related fields. Participants noted that agricultural education courses helped students understand practical applications of science and how science applied to their daily lives. Further, participants emphasized importance of agricultural education courses on the development of well-rounded students. Mr. Brown elaborated on the importance of agricultural education classes to urban school curricula.

Because it’s their everyday life. They eat, they wear it, they talk it. They are engaged in computer science, they are engaged in other modern technologies, but we leave out the Ag science, which not only feeds them but feeds the world [and] comes up with medical solutions. And so it’s nature and what we can do with it that makes the world go round....Let the young people of all diverse backgrounds, so all Americans, all [state residents] in particular let them know about the industry of agriculture, let them know about it early on and then let them know about [State] University and what it offers and then while we are promoting agriculture, or get in the midst we can go ahead and let them become the engineers and the nurses and the lawyers but we have done something, we have given them an appetite to continue to seek secondary education and it is, education is always the key....

Mr. Brooks explained strategies he used to help urban students gain appreciation for the importance of incorporating agricultural education courses into urban school curricula. One strategy in particular explains to students that agriculture is the application of science.

Yes, I talk to them about the importance of a well-rounded education and not to look at it as that agricultural class....They are not going to be out gardening during the day, they are going to be learning and using the practical application of biology and chemistry and understand how it is important to everyday life and most of them get it....They understand it once I explain it to them that way....

[Note Ellipses in original]

### Solves Ag Policy Making

#### Ag literacy is necessary to informed decision making and policies

Kovar, Southwest Minnesota State University Agricultural Education professor, & Ball, University of Missouri Graduate Studies for Agricultural Education and Leadership Director, 13

[Kristin A. & Anna L., Journal of Agricultural Education, Volume 54, Number 1, “Two Decades of Agricultural Literacy Research: A Synthesis of the Literature,” http://www.jae-online.org/attachments/article/1728/54.1.14.Kovar.pdf, p. 167-8, accessed 6.27.2017]//TRossow

“As our global population grows to a projected nine billion people by 2050, **the nonagriculture population has little to no understanding of the complexities involved with sustaining a viable agriculture system**” (Doerfert, 2011, p. 8). With a steady increase in the planet’s population, changes affecting agriculture are occurring such as increased production needs, widespread urbanization, and regulation and policy changes. The National Research Agenda for the American Association of Agricultural Education (AAAE) outlines six key research priority areas. Research priority one is “Public and Policy Maker Understanding of Agriculture and Natural Resources” (Doerfert, 2011). The emphasis placed on understanding agriculture in a modern world through research priority one communicates the need for an agriculturally literate society. Agricultural literacy is defined as an “understanding of the food and fiber system [that] includes its history and current economic, social, and environmental significance to all Americans” (National Research Council (NRC), 1988, p. 1). With fewer people directly involved in production agriculture and the complexity of agricultural issues presented to legislatures, the need for an agriculturally literate society is imperative so that informed individuals are able to make **educated decisions regarding agriculture** (Pope, 1990). The steady rise of urbanization has transferred the future of agriculture to a group of people with an overwhelming lack of support for agricultural issues. Agriculturally literate Americans are **more likely to support policies affecting agriculture than those Americans lacking agricultural literacy** (Ryan & Lockaby, 1996). Controversy in agriculture has continued to increase over the years due to genetically modified crops, animal rights, and food safety issues (Leising, Igo, Heald, Hubert, Yamamoto, 1998). Organizations and special interest groups have attacked the agricultural industry using the guise of creating an “informed public.” An agriculturally literate population is able to see beyond emotional pleas and make informed decisions on these issues. A society with an understanding of agriculture and current economic, social, and environmental impacts could **lessen current challenges facing agriculture through good decision making along with providing the necessary support**. Research efforts in agricultural literacy began after a publication by The National Research Council in September of 1988 entitled Understanding Agriculture—New Directions for Education (1988). This report was the result of a study initiated in 1985 due to concerns about the diminishing profitability of American agriculture and the decrease of agricultural education enrollments in secondary schools. At the request of U.S. Secretaries of Agriculture and Education, the National Research Council established the Committee on Agricultural Education in Secondary Schools to assess the contributions of agricultural instruction on the economic impact of U.S. agricultural production (Frick, Kahler, & Miller, 1991). Upon publication of Understanding Agriculture—New Directions for Education (1988), research on the concept of agricultural literacy began and has continued throughout the last 23 years. Publication of Understanding Agriculture— New Directions for Education (1988) sparked many changes in the management and operation of agricultural education programs in secondary schools. The publication stressed the establishment of programs in urban and suburban settings as well as a broadening of agricultural instruction. It also motivated a change in exclusivity by removing terms such as vocational, straying from traditional boundaries and attracting students of diverse interests. Aligning curriculum with science-based instruction methods and promoting a goal of increased program ethnic diversity was also encouraged (NRC, 1988). Agriculture as a whole has changed drastically since the publication of Understanding Agriculture—New Directions for Education (1988). The agricultural industry went through extremely trying times and financial crises in the 1980s, as evident in the dramatic rise of interest rates peaking over 20 percent, as well as a high debt-to-asset ratio (Boehlje & Hurt, 2008). Financial issues are still a concern in current times, but with agricultural loans at a much lower 4.5 percent and a significantly lower debtto-asset ratio across the industry, agriculture is in a more secure position than it was in the 1980s. Another change is the rise of corporate farming resulting in fewer people involved in production agriculture. As agriculture changed drastically over the years, one would expect to see a change in how society understands agriculture as well. Over the last two decades, the core concept of agricultural literacy, the understanding of agriculture, has stayed the same. However, understanding agriculture in 1988 and understanding agriculture in 2012 are two vastly different concepts. The change in technology alone warrants a new framework in which to examine agricultural literacy. Other changes include organic farming, ethanol production, international trade, buying local, environmental stewardship and climate, genetically modified organisms, as well as many other trends in agriculture. Agricultural educators designed programs to increase agricultural literacy prior to the publication of Understanding Agriculture—New Directions for Education (1988), but society is still considered agriculturally illiterate. If the concepts of agricultural literacy have evolved, but is being assessed through traditional methods, is the understanding of agriculture truly being evaluated?

#### Only the plan facilitates informed policy decisions

Doerfert, Texas Tech University Agricultural Communications Associate Chair & Professor, 11

[Doerfert, D. L. (Ed.), American Association for Agricultural Education , “National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015,” <http://aaaeonline.org/resources/Documents/AAAE%20National%20Research%20Agenda.pdf>, p. 8, Accessed 6.28.2017]//TRossow

Public and Policy Maker Understanding of Agriculture and Natural Resources As our global population grows to a projected nine billion people by 2050, the non-agriculture population has little to no understanding of the complexities involved with sustaining a viable agriculture system. The potential negative impact of an uninformed population on the United States and global agriculture and food systems is great. An informed citizenry, including policy decisions at all levels, will create win-win solutions that ensure the long-term sustainability of agriculture, natural resources, and quality of life in communities across the world. Our areas of scientific focus should include: » Increasing our understanding of related message and curriculum development, delivery method preferences and effectiveness, and the extent of change in audience knowledge, attitudes, perceptions and behaviors after experiencing an educational program or consuming related information and messages. » Demonstrating the impact of agricultural literacy efforts on a variety of stakeholder behaviors including consumer behavior (e.g. K-12 test scores, voting behavior, food consumption behavior). Literacy research efforts must be reciprocal in that members of the agriculture industry must also increase their understanding of various stakeholder group needs and/or behaviors » Determining the potential of emerging social media technologies, message formats, and strategies in realizing a citizenry capable of making agriculture-related informed decisions.

### Solves Agriculture Worker Shortage

#### Expanding access to agricultural literacy in secondary schools is key to meeting growing ag industry demand

Stripling, University of Tennessee Department of Agricultural Leadership, Education and Communications Assistant Professor and Ricketts, Tennessee State University Department of Agricultural and Environmental Sciences Professor, 16

[Christopher, John, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 30, Date accessed 6-28-17, RK]

In a USA Today article, Krogstad (2012) wrote concerning higher education in agriculture: “Enrollment is booming…as students flock to study subjects they feel offer a clear path to a job upon graduation” (para. 1). Education in and about agriculture and related areas is attractive because skills are developed that can solve issues such as global hunger, obesity, food safety, and climate change. The excitement is well-timed, as researchers have noted expected growth in the human population will result in a 50% increase on the demand for food over the next two decades (Hazel & Wood, 2007) and a 70-100% increase in demand by 2050 (Godfray et al., 2010).

As a result, employment opportunities in agriculture-related fields continue to increase. Projections for 2015- 2020 show an increase of more than 5% for graduates with postsecondary degrees, which is an average of 57,900 annual openings (Goecker, Smith, Fernandez, Ali, & Theller, 2015). Furthermore, 35,400 or 61% of the annual openings will be filled with new U.S. graduates – leaving employers to fill the other 39% with nonagricultural graduates (Goecker et al., 2015). In response to this continued trend, the National Research Council (2009) called for colleges and universities to reach out to secondary-school students and teachers and “explore partnerships with youth-focused programs, such as 4-H, National FFA, and scouting programs” (p. 9) to expose students to agriculture and generate interest in agricultural careers. In addition to youth programs, nongovernmental organizations, agricultural employers, and agriculture industry professionals serve a vital role in the workforce supply chain (National Research Council, 2009). Forming partnerships among the aforementioned groups may increase awareness of the multidisciplinary and challenging nature of agriculture and could increase the diversity of students seeking postsecondary degrees and careers in the agricultural sciences (National Research Council, 2009).

#### High school agriculture courses increase the likelihood of pursuing degrees in agriculture – studies prove

Thoron et al., University of Florida Agriculture Education and Communication Assistance Professor, 16

[Andrew, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 42, Date accessed 6-28-17, RK]

Career and technical education (CTE), including agricultural education, focuses heavily on career exploration as well as career and college readiness in order to help students better understand the skill, knowledge, and education expectations of specific careers (DeLuca, Plank, & Estacion, 2006). While no direct link has been established to connect successful secondary school experiences in agricultural education all the way through the human capital pipeline to successful employment in agricultural careers, studies have shown that “students’ course taking during high school plays a critical role in their ability to transition to postsecondary education and pursue a range of postsecondary majors and degree options” (Laird, Chen, Levesque, & Owings, 2006, p. 1). Dyer et al. (1996) found that while the percentage of freshman students with secondary school agricultural education was declining, the percentage of students intending to graduate with a major in agriculture was much higher among students with secondary school agricultural education experience than among those with no previous agricultural education experience. Dyer, Breja, and Wittler (2002) found enrollment in a high school agricultural education program to be one of the most influential factors in whether students completed a degree in a college of agriculture. Enrollment in agriculture courses at the secondary school level has also been found to be correlated with high positive perceptions of agriculture (Smith, 2010).

#### Agriculture knowledge key to meeting growing food production demand

Enns et al., College of Agricultural Studies Agricultural Education Associate Professor, 16

[Kellie, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 14, Date accessed 6-28-17, RK]

Low food costs are the result of a variety of innovations and inventions related to food and fiber production. These innovations and inventions have resulted in larger yields but fewer farmers. This success story has a significant consequence—a society that is disconnected from agricultural production and processing. The current 1% of the U.S. population working on farms is supported by nearly 21 million agricultural sector related U.S. workers, or about 15% of the total U.S. workforce (Goecker, Smith, Smith, & Goetz, 2010). The U.S. agricultural sector annually accounts for 1.6% ($278.4 billion) of the $17.4 trillion U.S. Gross Domestic Product (DGP) (Central Intelligence Agency, 2015). The American agricultural sector will have a tremendous challenge in the decades to come as by 2050 the world’s population is projected to reach 9.7 billion people (United Nations, Department of Economic and Social Affairs, 2015). Estimates indicate agriculture production will need to increase from 50-100% to meet the growing population demand (AGree, 2012) with less land and water—while sustaining the planet. While most Americans are not directly involved in agricultural production, daily purchasing and voting decisions made by individuals and policymakers affect the American agricultural system. If U.S. agriculture is going to continue to meet the needs of the U.S. population and address growing global needs, agriculture must be understood and valued by all.

#### Agricultural education is necessary to the future workforce

Ewing, Pennsylvania State University Agricultural and Extension Education Associate Professor, 16

[John C., Editor of The Agricultural Education Magazine, Nov Dec 2016, The Agricultural Education Magazine, “Preparing our Future Workforce through Agricultural Education,” pg. 2, <https://www.questia.com/library/journal/1P4-1907806536/preparing-our-future-workforce-through-agricultural>, accessed 6.30.2017 ]//TRossow

The success of communities, states, and the nation rely on the workforce that is available to meet the needs of employers. The individuals that make up the workforce need to be prepared with the knowledge, skills, and dispositions that are needed at that time. In a time where we are being challenged to produce enough food and fiber to provide for an ever growing population, **an emphasis needs to be placed on educating the workforce for agricultural careers.**

Employees ranging from agribusiness personnel to agricultural mechanic technicians to agronomists (among others) **are needed to meet the rising production, processing, and sales needs of the agricultural indus**try. These employees must be trained to enter the workforce so the food and fiber needs of our nation and world are met. These are just a few examples of the career opportunities awaiting our students. **We must educate students to compete in a global market, and this should begin in the secondary agricultural education program.**

### Solves Food Security

#### Ag literacy solves extinction – key to global growth and food security

Malloy, Robeson County Center Extension Agent, Agriculture - Field Crops & Jones, Robeson County Center County Extension Support Specialist, Agriculture and FCS, 16

[Mac Malloy and Jessie Jones, 7-25-16, Robeson County Center, “The Importance of Agricultural Literacy,’ <https://robeson.ces.ncsu.edu/2016/07/the-importance-of-agricultural-literacy/>, accessed 6.27.2017]//TRossow

So why the big issue? All citizens need to understand the economic, social, and environmental significance of agriculture. Food production is the basis of all civilization. We need a well-educated public to contribute to the success of a safe and affordable food system that will attempt to feed the expected nine billion people in this world by 2050. Though only a small percentage of our population is actively producing our food, we all have a responsibility as voters that affect agricultural policy related to trade, employment, and environmental issues. We also need policy makers who are agriculturally literate to create responsible regulation that supports such an important industry in our global economy.

U.S. agriculture also plays a major role in supporting other sectors of our economy. According to the American Farm Bureau Federation, one in three U.S. farm acres is planted for export. According to the United States Department of Agriculture (USDA) Economic Research Service, in 2014, each dollar of agricultural exports stimulated another $1.27 in business activity. That means the $150 billion of agricultural exports in the 2014 calendar year produced an additional $190.6 billion in economic activity for a total output of $340.6 billion. Agricultural exports required 1.13 million full-time civilian jobs, which included 808,000 jobs in the nonfarm sector the same year.

Society’s major challenge ahead is determining how to continue to feed a growing population on less land and with less resources. Maybe it’s time we focus more on agricultural education in our school systems to create a more literate public to meet this challenge. The National Academy of Science, Agricultural Education Committee, has stated that agriculture is too important a topic to be taught to only a relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies. Some have suggested all high school graduates need to take at least one agricultural course to gain a basic understanding. I guess it all depends on how important we think agricultural literacy is to allmankind.

#### Ag literacy is essential to food security within ecological limits - solves extinction

Ross, Vermont Agency of Agriculture, Food, and Markets, Secretary, 13

[Chuck Ross is Secretary of the [Vermont Agency of Agriculture, Food, and Markets](http://agriculture.vermont.gov/). Chuck has a history of civic and agricultural leadership in the state, as a farmer, former state legislator, and former State Director for U.S. Senator Patrick Leahy. June 24, 2013, University of Vermont Food Feed, “Agricultural literacy: How VT is leading the way in food system awareness,” <https://learn.uvm.edu/foodsystemsblog/2013/06/24/agricultural-literacy-how-vt-is-leading-the-way-in-food-system-awareness/>, accessed 7.1.2017]//TRossow

But that doesn’t change the fact that agriculture, and the policies that shape our food system, seem to exist someplace outside the mainstream cultural consciousness. How can that be? We all depend upon food – everyone eats. In this way, we are all innately connected to and through our food system. And yet the fact remains: most of us don’t understand the intrinsic connection between the food on our tables, the economy, the ecology, and the farmers who produce it.

I call this phenomenon “agricultural literacy,” or more accurately, illiteracy. As a culture, we have become mostly detached from the source of our food and our understanding of the systems that produce it. Given the population pressures emerging in the 21st century and the importance of our ability to feed ourselves within the ecological limits of the globe, our agriculture illiteracy is a true threat that must be addressed. Certainly, there is a growing movement, led by some very dynamic, progressive thinkers, working to correct this problem. They are a small, but determined minority. Their challenge is great.

As Secretary of Agriculture for the State of Vermont, I consider it my mission to increase agricultural literacy. I am proud to report we are making great strides. It is happening in our public schools, where more than half of our students experience Farm to School programming in their classrooms, cafeterias, and communities. (In fact, Vermont leads the nation in Farm to School initiatives.) It is happening at the point-of-purchase, where more consumers are buying direct from the farm (via CSA shares, farmers’ markets, and farm stands) per capita than any other state in the nation. And it is happening in our hospitals, workplaces, and government institutions, where focused match-making and technical assistance is enabling an increasing number of local producers to secure supplier contracts.

Quite simply, more Vermonters are connecting directly with farmers, which deepens their appreciation for and understanding of agriculture.

“Agricultural literacy” is the ability to think critically about our food system; understand the interconnectedness of food , farming, economy and ecology; appreciate the complex dynamics of agriculture; and recognize how making informed decisions about how and what we eat shapes our working landscapes, the communities in which we live, and the larger world of which we are a part. We need to understand how our agricultural literacy will inform the decisions we will make about the policies and practices we adopt to guide our food system. And it will be this food system upon which we will all depend to feed our growing population and do so within the ecological parameters of our world. Given the stakes involved I urge us all to improve our individual and collective agricultural literacy – our future depends upon it.

#### Plan is necessary to facilitate food security - cultivates a skilled workforce needed for scientific and technological innovation

Doerfert, Texas Tech University, Agricultural Communications Associate Chair & Professor, 11

[Doerfert, D. L. (Ed.) (2011), American Association for Agricultural Education, “National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015,” <http://aaaeonline.org/resources/Documents/AAAE%20National%20Research%20Agenda.pdf>, pg. 19-20, accessed 6.28.2017]//TRossow

With the global population expected to increase to **nine billion by 2050**, food security is of **paramount importance** to countries everywhere. Failure to address food security concerns could cause **political instability in many parts of the world**. Riveria and Alex (2008) connected this global need to a need for change in the development of the agricultural workforce:

Greater commercialization of agricultural systems and increasing trade liberalization dictate the need for better capacity on the part of the agricultural workforce in the 21st century. Global changes in the roles of the public and private sectors and dramatic advances in technology have also strongly affected agricultural workforce development needs. These evolving changes have important policy, institutional, and programmatic implications. (p. 374)

**The need to provide a highly educated, skilled workforce capable of providing solutions to 21st century challenges and issues has never been greater**. The issues that face our society have grown increasingly complex and harder to solve, even with the products of sophisticated scientific discovery and application. In the meantime, our educational system is being challenged by cultural, economic and structural factors that threaten our nation’s standing as a global leader in **scientific and technological innovation**. There is therefore a growing need to develop strategies to create a society of diverse, highly educated professionals and knowledge workers to address major societal challenges and develop innovations that **drive** the engines of **economic growth.**

There is also a commensurate need for relevant, rigorous, and actionable research into the human factors that influence educational preparation, quality teaching and learning outcomes and life-long human capital development of our workforce, especially in discovery science and STEM disciplines. This will require changes in university-level agricultural education.

If we are to be able to recruit and retain students to study in and prepare for careers in agriculture and natural resources related fields, we must be able to better understand the models, strategies, and tactics needed to best prepare, promote, and retain new professionals who demonstrate the requisite content knowledge, technical competence, and cultural awareness, coupled with communication and interpersonal skills. ,mThis will require that adequate numbers of well-prepared, highly effective agricultural educators, communicators, and leaders be made available to meet current and future needs.

Opportunities to Respond The agriculture industry represents a major driver of economic growth and development; it requires a stable, qualified workforce that possesses a diverse range of skill sets suitable for employment in jobs ranging from the on farm setting to positions as Ph.D. scientists in highly sophisticated laboratories. However, attracting the best and the brightest to pursue careers in agriculture remains a challenge. According to the Coalition for a Sustainable Agricultural Workforce (n.d.), major obstacles exist to recruiting students into careers in the agricultural sciences, including budget constraints, student misconceptions and competition for the most talented from the basic sciences and industry.

These challenges also represent our opportunities. The National Academy of Sciences (2009) stated that:

During the next ten years, colleges of agriculture will be challenged to transform their role in higher education and their relationship to the evolving global food and agricultural enterprise. If successful, agriculture colleges will emerge as an important venue for scholars and stakeholders to address some of the most complex and urgent problems facing society. (p. 1)

Our discipline is uniquely positioned for an immediate, positive impact on this need as research outcomes are quickly communicated and **integrated into K-12**, pre-professional, and professional-level **educational opportunities**. Our profession’s knowledge base is rich with cognitive, affective, psychomotor and experiential research and practical understandings. Collectively, we have a foundation towards a comprehensive theory of human learning. This includes retraining existing and developing new human capital in agriculture as part of a lifelong learning system.

Our specializations in teacher education, agricultural communication, leadership development, and extension education are grounded in the applied research tradition of solving problems, and our knowledge bases focus on understanding the dimensions of human and social capital in educational and organizational settings. The research endeavors of those in the agricultural education profession are focused on discovering, testing and refining those very models, strategies, and tactics that will be needed to create a sufficient scientific and professional workforce that can effectively address current and future challenges.

### Food Insecurity Impact – Conflict Magnifier

**Food insecurity ensures that conflict is uniquely severe and drawn out**

**Simmons, Wilson Center guest contributor, 13**

[Emmy, September 3, 2013, New Security Beat, “Harvesting Peace: Food security, Conflict, and Cooperation”, <https://www.newsecuritybeat.org/2013/09/harvesting-peace-food-security-conflict-cooperation/#.Uth9YaCLDy8%29//JuneC//>, accessed: 6/30/17, SK]

Deaths directly attributable to war appear to be declining, but war and other kinds of conflict continue to take a toll on human health, often through food insecurity. Conflict induces the affected populations to adopt coping strategies that invariably reduce their food consumption and nutrition. Poor nutritional status in individuals of any age makes them more susceptible to illness and death. But the acute food insecurity caused by conflict has especially potent and long-lasting effects on children. Children whose nutrition is compromised by food insecurity before they are two years old suffer irreversible harm to their cognitive and physical capacities. Analysis of the causes of conflict and war has been an area of growing academic interest. Both theoretical work and empirical analyses substantiate the many ways in which food insecurity can trigger, fuel, or sustain conflict. Unanticipated food price rises frequently provide a spark for unrest. Conflict among groups competing to control the natural resources needed for food production can catalyze conflict. Social, political, or economic inequities that affect people’s food security can exacerbate grievances and build momentum toward conflict. Incentives to join or support conflicts and rebellions stem from a number of causes, of which the protection of food security is just one. Food insecurity may also help to sustain conflict. If post-conflict recovery proves difficult and food insecurity remains high, incentives for reigniting conflict may be strengthened. Given the complexity of factors underlying food security, however, we do not yet understand what levels or aspects of food insecurity are most likely, in what circumstances, to directly contribute to or cause conflict. More explicit integration of food security variables into theories of conflict could help inform external interventions aimed at mitigating food insecurity and preventing conflict. The high human and economic costs of conflict and food insecurity already provide substantial incentives for international humanitarian and development organizations to intervene in order to alleviate food insecurity in fragile states and conflict-affected societies. Experience suggests, however, that effective efforts to address food insecurity in these situations may require external actors to reconsider the ways in which they intervene.

#### Food insecurity causes war

Koren, University of Minnesota Political Science PhD Candidate, & Bagozzi, Delaware University Political Science Assistant Professor, 16

[Ore Koren is a PhD candidate at the University of Minnesota in Political Science and a former Jennings Randolph Fellow at the United States Institute of Peace. October 2016, Benjamin E. Bagozzi is an Assistant Professor of Political Science & International Relations at the University of Delaware. [Food Security](https://link.springer.com/journal/12571), “From global to local, food insecurity is associated with contemporary armed conflicts,” Volume 8, [Issue 5](https://link.springer.com/journal/12571/8/5/page/1), pp 999–1010, on Springer, accessed 6.30.2017]//TRossow

This study adopts an economic perspective on food security to explain this variation in the concentration of social conflict. From the demand side, violent conflict is **most likely** to revolve primarily around access to food sources. When food insecurity produces higher demands for food, these demands will **directly compel** groups and individuals to seek out and fight over existing food resources, rather than leading these actors to pursue and fight over geographic areas that lack any (or have very little) agricultural resources. Thus, access to croplands and food is a necessary condition for food insecurity-induced conflict, which is confirmed in the cropland analyses presented here. From the supply side, and within those areas that do already offer access to agriculture and/or food, conflict is most likely to occur in regions that offer lower levels of food availability, or insufficient food supplies. This is because lower food availability (or supplies) in these contexts directly implies higher levels of resource scarcity, which can engender social grievances, and ultimately, social and political conflict (Brinkman and Hendrix 2011; Hendrix and Brinkman 2013). More broadly, **several causal mechanisms** could plausibly link food security and social conflict.

For one, conflict in regions with higher food access and lower availability might arise as a principal outcome of food insecurity. This approach is most directly in tune with the body of research concerned with the resource scarcity-based security implications of climate change (e.g. Miguel et al. 2004; Burke et al. 2009; O’Loughlin et al. 2012), as well as with broader studies of conflict dynamics and food security in both rural and urban contexts (Brinkman and Hendrix 2011; Hendrix and Brinkman 2013; Messer and Cohen 2006). From this perspective, individuals and groups actively fight with one another due to food insecurity-induced grievances, which may manifest in groups’ attempts to **overthrow existing political structures**, or in these actors’ efforts to more directly seize and control available (but scarce) agricultural resources in an effort to better guarantee long-term food security for their constituents. If future global projections for population growth, consumption, and climate change hold true, then these dynamics suggest that **incidences of violent conflict over food scarcity and food insecurity may increase** as individuals and groups fight over a continuously shrinking pool of resources, including food.

A second mechanism involves the existence of logistic support in conflict-prone regions, or lack thereof. Throughout history and well into the nineteenth century, armies living off the land have been a regular characteristic of warfare. The utilization of motorized transport vehicles and airlifts has significantly reduced the need of modern militaries to rely on local populations for support, at least among modernized, highly technological militaries (Kress 2002, 12–13). However, given the bureaucratic and economic capabilities required to maintain such systems, the majority of **state and non-state armed groups** in the developing world are still unlikely to be supported by well-developed logistic supply chains (Henk and Rupiya 2001). Taking into account the consistent relationship between economic welfare and conflict (Hegre and Sambanis 2006; Fearon and Laitin 2003), **unsupported warring groups** on all sides of a conflict may **move into regions that offer more access to cropland** in order to forage and pillage to support themselves, which in turn produces **higher incidences of hostilities**, especially if there is not much food per person available within these fertile regions. Hence, violent conflict in this case is not the direct result of food insecurity, but rather is shaped by food insecurity concerns.

The identified relationships between food security and conflict are **robust across numerous alternative model specifications**, and imply an **independent effect** of food insecurity in shaping conflict dynamics and conflict risk. Especially when considered alongside current, and projected, climatic and political-economic conditions, this linkage suggests that countries could see an increase in localized conflict worldwide in the coming years. However, this anticipated trend should be considered with caution for several key reasons.

#### Food shortages cause war – consensus of literature and our study is best

Koren, University of Minnesota Political Science PhD Candidate & Bagozzi, Delaware University Political Science Assistant Professor, 16

[Ore Koren is a PhD candidate at the University of Minnesota in Political Science and a former Jennings Randolph Fellow at the United States Institute of Peace. October 2016, Benjamin E. Bagozzi is an Assistant Professor of Political Science & International Relations at the University of Delaware. [Food Security](https://link.springer.com/journal/12571), “From global to local, food insecurity is associated with contemporary armed conflicts,” Volume 8, [Issue 5](https://link.springer.com/journal/12571/8/5/page/1), pp 999–1010, on Springer, accessed 6.30.2017]//TRossow

A **growing number of studies** of environmental stressors and social conflict posit that **future wars will be fought over diminishing resources** (Miguel et al. 2004; Burke et al. 2009; O’Loughlin et al. 2012; Scheffran et al. 2012). Building on insights from these studies, as well as other suggestive accounts (e.g. Brinkman and Hendrix 2011; Hendrix and Brinkman 2013; Messer and Cohen 2006; Prunier 2008), the present study demonstrates empirically, **for the first time**, the existence of a systemic relationship between conflict on the one hand, and food (in) security on the other, both globally and locally. Specifically, highly disaggregated cropland-based measures of food insecurity are shown to produce a significant effect on the incidence of **inter and intra-state armed conflict** **worldwide**.

Unlike the majority of previous studies, which rely primarily on country-level indicators (Miguel et al. 2004; Burke et al. 2009; Scheffran et al. 2012; Buhaug 2010) or focus specifically on sub-Saharan Africa (Miguel et al. 2004; Burke et al. 2009; O’Loughlin et al. 2012; Buhaug 2010; Fjelde and Hultman 2014), the present approach uses geographic factors to estimate the regional sub-state distribution of conflict globally. Two agricultural output measures, the percent of cropland in a given region and the amount of cropland per capita within agricultural regions, are used to proxy for the demand and supply aspects of food security, respectively (Barrett 2010). Using logistic regression (i.e., logit) models, these measures are then paired with a large number of political, economic, and climatic indicators in order to estimate the direct effects of food security on violent conflict. Evidence suggests that conflict occurs in areas with higher access to, but lower availability of, food resources. Together these findings imply that food insecurity produces an **independent effect** on contemporary social and political conflict.

Theoretical motivation

While relatively little research directly addresses the relationship between food insecurity and conflict specifically, **numerous studies** have implied that such a relationship exists. For instance, in their analysis of the relationship between climate variability and conflict in Sub-Saharan Africa, Burke et al. found that B[t]emperature variables are strongly related to conflict incidence over our historical panel^ (2009, 20,670. See also Miguel et al. 2004; Koubi et al. 2012). They further hypothesize that, B[t]emperature can affect agricultural yields both through increases in crop evapotranspiration (and hence heightened water stress in the absence of irrigation) and through accelerated crop development...reducing African staple crop yields by 10 %–30 % per °C of warming^ (ibid. 20,672). Somewhat more cautiously, O’Loughlin et al. conclude that, B[o]ur study and other studies question the evidence that climatic variability is uniformly driving up the risk of conflict in sub-Saharan Africa,^ while also noting that Bthe positive association between instability and temperature may result from the harmful effects of high temperatures on food products such as maize^ (2012, 18,347). While these conclusions were supported by subsequent studies (Raleigh and Kniveton 2012; Hendrix and Salehyan 2012; Hsiang and Meng 2014), other scholars question the validity of these findings and show that the incidence of conflict is primarily related to political and economic conditions (e.g. Buhaug 2010). In common with all these studies, however, is the insight that a major mechanism by which climate change increases the likelihood of conflict is through its effects on food supplies.

### Solves Economy

#### Investment in agriculture bolsters the economy

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 15, accessed 6-26-17, AFB]

If the global agricultural system is going to meet the needs of the global population of 9 billion by 2050, investments in agricultural research and extension are going to have to play a strong role in that effort. Recent studies on U.S. economic competitiveness have brought a renewed focus on improving the U.S. educational system and doing a better job of attracting young people to technical and scientific training in the so-called STEM disciplines. The U.S. agricultural sector needs to do a better job of making the case that these two sets of demands are in fact linked, that the U.S. economy will prosper with strong productivity gains in both the agricultural and industrial sectors with better trained professionals, and that work must begin in elementary and secondary schooling and include food-related as well as agriculture-related topics. Some parts of U.S. agriculture have embraced the notion that agricultural and food education needs to be embedded in the STEM effort, but that viewpoint is not universally held.

### Solves Jobs

#### Agricultural education leads to personal growth, career success and good self-perception

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Membership and participation in the FFA has been shown to have many benefits to students. Talbert and Balschweid (2004) found that FFA members statistically rated agricultural education and history and social studies as more important than non-members. The significantly higher rankings of these topics may contribute to the students' personal growth and subsequent career success. In another study, students and graduates who had FFA membership or were in high school agriculture education classes rated higher in the cooperative/helpful and pleasant/friendly/cheerful categories on the Affective Work Competencies Inventory than non-members or those who were not in agriculture classes (Benson, 1982). This study demonstrates the affect that FFA has had on these members' career success and leadership qualities. Not only do supervisors see the benefits, FFA members do too. Carter and Neason (1984) compared the self-perceptions of personal development of FFA members who had high and low participation using the Personal Development Index. Members with high levels of participation rated themselves statistically higher than low participation members on leadership, orientation to agricultural occupations, citizenship and cooperation (Carter and Neason, 1984). Members who were categorized as having high involvement also had overall higher self-perceptions of personal development (Carter and Neason, 1984). Carter and Neason (1984) demonstrated that high FFA participation could be linked to feelings of self-efficacy in leadership and traits connected to development of the whole person.

[Note FFA = Future Farmers of America]

#### Agriculture curriculum good – allows for student planning and job training

LaRose, University of Florida Agricultural Education doctoral graduate student, 16

(Sarah, 3/14/16, The Agricultural Education Magazine. “Teach Local: Incorportating the Local Food Movement into Agricultural Education Curriculum.” ProQuest, P.23 , Accessed 6/30/17, GDI - JMo)

Local Food Curriculum

The curriculum was construct- ed based off the feedback from advisory committee members, SAE employers, agricultural organizations throughout the state, as well as previously existing syllabi from community colleges, junior colleges, and two-year associ- ate’s degree programs. Initially, a nine-week sophomore class was written, followed by one year of a two year alternating junior/senior class.

Unit content for each of the courses are as follows:

Sophomore Class (9 weeks) Junior/Senior Class (1 year)

January-February 2016

• What is Local?

• Soil Science

• Crop Production

• Harvest, Processing, & Preservation

• Hydroponic Food Production

• Garden & Greenhouse Maintenance

• Introduction to Local Food

• Production Methods

• Food Quality & Safety

• Winterization of Outdoor Facilities

• Hydroponics

• Garden Planning & Preparation

• Spring Maintenance

• Principles of Composting

• Facility Planning & Design

Students are engaged in a variety of activities involved with planning, planting, maintaining, and harvesting produce in both the hydroponic greenhouse and the school garden. They also participate in field trips to area farms and businesses, deliver produce to the town’s food bank, assess food labels at the grocery store, and design their own farms and food safety protocols in accordance to Good Agricultural Practices (GAP). Perhaps one of my favor- ite things to do with students as a part of this curriculum was teach- ing them how to use the food they grew by cooking together! Usingin-season vegetables we grew as a class, we made vegetable pizza and a side salad, sometimes ac- companied by bruschetta or sau- téed Swiss chard. Allowing students to complete the full farm to table process provided them with a more holistic view of food production, as well as helping to emphasize the need for producers engaged in direct-to-consumer sales to be able to make cooking recom- mendations for their products to consumers.

#### Agricultural literacy provides a host of benefits – which can help with job opportunities in the future

Ewing, Penn State Agricultural Economics Professor, 16

[John, December 2016, The Agricultural Education Magazine, “Preparing our Future Workforce through Agricultural Education”, <http://www.naae.org/profdevelopment/magazine/current_issue/Nov_Dec_2016.pdf>, pg. 2, accessed: 6/28/17, SK]

We can all agree that students learn technical skills through their agricultural education program, but they also have opportunities to practice and enhance communication, time management, team work, and leadership skills. Employers want to know that students are being prepared with skills that will benefit their company. Teachers that are able to partner with local agricultural businesses are often afforded the opportunity to grow their program, while providing access to potential future employees to the business. Through these partnerships there is an amazing opportunity for teachers to learn the most up-to-date information that can benefit their students, immediately.

### Solves Education

#### Agriculture education good for academic achievement – multiple studies prove

Thoron et al., University of Florida Agriculture Education and Communication Assistance Professor, 16

[Andrew, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 43, Date accessed 6-28-17, RK]

Agricultural education in middle and high school incorporates numerous factors that require a unique set of skills aside from the typical educational factors that are associated with student academic success. Management and advisement of a comprehensive student leadership organization (National FFA Organization) that develops leadership skills and career development applications through competitive events, classroom and laboratory facilities management, Supervised Agricultural Experiences (where students engage in authentic experiential learning), and, in many states, industry certification are all components of school-based agricultural education.

Factors attributing to student academic success have been identified through teaching methodologies such as inquiry based instruction where Thoron and Myers (2011, 2012a, 2012b) found students outperformed peers on subject matter exams, argumentation skill, and scientific reasoning when compared to a more traditional approach to teaching during a fourteen-week study. The authors called for studies of longer duration in the profession and replication. Other studies (Stripling & Roberts, 2014) have investigated the math ability of students enrolled in teacher preparation programs and thus the preservice teachers’ self-efficacy (Stripling & Roberts, 2013) in teaching math concepts in an agricultural context. Further investigations attributing agriscience education to academic success are pivotal to the future of school-based agriculture in the public schools. In addition to academic success in the classroom, there remains a value in indicating further development for students beyond the secondary-school. Impact of industry certifications, students’ ability to obtain an associate degree while in high school linked to career success, due to school-based agricultural education, provide little guidance to the profession above the perception level.

### Solves Critical Thinking

#### Problem based learning and constructivism key to School Based Agricultural Education - increases critical thinking

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Teaching Methods/Approaches

SBAE has a tradition of utilizing teaching methods that support problem-based learning (Phipps et al., 2008). Teaching methods/approaches that have been categorized within problem-based learning include problem-solving, inquiry-based learning and experiential learning (Eggen and Kauchak, 2001). Teaching methods within the constructivist theory allow instructors to provide students with educational experiences that allow learners to construct their own knowledge in a way that encourages critical thinking and development of their own thoughts and opinions (Fosnot, 1996). The central tenet of constructivism posited that the learner creates personal knowledge and meaning based on their personal experiences (Steffe and Gale, 1995). Constructivism is divided into a continuum, which includes cognitive constructivism, social constructivism and radical constructivism (Doolittle and Camp, 1999). According to Doolittle and Camp (1999), Career and Technical Education aligns neatly with cognitive constructivism and adheres to the central tenets that knowledge is actively constructed and that cognition is a process that is continually evolving (Von Glasersfeld, 1984, 1998).

[Note: SBAE = School Based Agricultural Education]

#### SBAEs problem solving curriculum increases understanding and critical thinking - allows students to thrive in society

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

The problem-solving approach has also been used extensively in SBAE (Boone, 1990; Phipps et al., 2008) due to Dewey's (1938) educational philosophy that emphasized the importance of an experience in order to entice students to think critically about the issue at hand. According to Phipps et al. (2008), the problemsolving approach that has been used in SBAE consists of the scientific method and allows the student to develop critical thinking skills that help the student to thrive in a complex society. Boone (1990) posited that the problem-solving approach allows students to utilize the scientific method in a way that allows the student to critically think through a problem, test probable solutions and access results. The researcher found that "the problem solving approach to teaching increases the level of student retention of agricultural knowledge learned during an instructional unit" (p. 25). A study conducted by Dyer and Osborne (1996) found that problem-solving approach is more effective in strengthening the problem solving capabilities of students than the subject matter approach. The problem-solving approach has been widely accepted by SBAE and has been considered one of the best methods of teaching agriculture (Phipps and Osborne, 1988).

[Note: SBAE = School Based Agricultural Education]

#### SBAE experiments with personal experience reflection

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

Additionally, SBAE has utilized Kolb's (1984) model of experiential learning as a conceptual framework for providing students with an authentic learning experience for many years (Phipps et al., 2008). Kolb's comprehension of experiential learning consists of a concrete experience, reflective observation, abstract conceptualization and active experimentation. The curriculum within SBAE programs allows instructors to provide an experience for the student that aligns with the curriculum (Phipps et al., 2008). According to Phipps et al. (2008), the instructor would focus on personal reflection in order for the student to think about the experience and break the reflection apart in an effort to make sense of the experience. The abstract conceptualization stage would then allow the student to create rules and generalizations regarding the experience and the exemplified concept (Kolb, 1984). The final stage allows for the student to test the generalizations they created (Kolb, 1984). An experiential learning philosophy aligns with the learning theory of constructivism and has been commonly used in the SBAE classroom (Roberts, 2006).

[Note: SBAE = School Based Agricultural Education]

### Solves Farming Stereotypes

#### Agricultural education reduces farming stereotypes

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 95, Accessed 6/28/17, GDI - JMo)

SC1: Participants indicated urban students have a range of stereotypes relative to higher education in agriculture and careers in agriculture. However, participants believe the inclusion of agricultural education courses throughout high school can play a key role in breaking negative stereotypes. “I think it gets these urban kids a way to see what agriculture is and maybe what it isn’t....I think they all picture a farmer in coveralls riding on a tractor but that’s not what agriculture really is today” (Mr. Brooks). Participants noted urban students tended to view agriculture as just growing corn, not looking further to see career opportunities for themselves in agriculture. Ms. James noted her students’ agricultural stereotypes and lack of agricultural knowledge could be impediments to instruction. However, she views these challenges as teaching opportunities.

You know there is a big stereotype with agriculture. So, the things I do in class I try to break those stereotypes and with me being excited about it and me having that agricultural background I can pull from those experiences and I have personal stories that they can relate to or try to get them to relate to even if they haven’t seen....They just think it’s farming and corn and that’s about it ....When I ask them so what’s the agriculture that we have around the school, you know there is a nursery just on the other side of the parking lot behind the school, and they didn’t consider that as agriculture but landscaping is a huge industry in agriculture so I mean they are just unaware of what agriculture is....I even had a student who didn’t even understand that an apple came from a tree so we went over that most of the foods that we eat come from agriculture. And, farmers don’t just farm corn because that’s what they see around the city here because there are small farm fields in the city here with corn and soybeans so they see that but they just don’t understand that all the stuff that goes into it all the various industries that are wrapped up in agriculture....

Mr. Brooks provided additional rationale for teaching agriculture to increase student knowledge and refute agricultural stereotypes.

What kids know about food is...where do you get milk... from the grocery store ... they come here and they say well I don’t want to take an agricultural class and I say yes you do...and here is why. This could be your future, and it’s a great job and it’s high paying and in high demand and it’s important...not only is it important to people in the United States, it’s important to people around the world.

#### Political divides between urban and rural folk exist - Trump exacerbates it

DelReal, Washington Post reporter, and Clement, Washington Post polling manager, 17

(Jose A. and Scott, 6/17/16, The Washington Post, “Rural divide.” <https://www.washingtonpost.com/graphics/2017/national/rural-america/?utm_term=.7dad3c6823e3>, Accessed 7/1/17, GDI - JMo)

The political divide between rural and urban America is more cultural than it is economic, rooted in rural residents’ deep misgivings about the nation’s rapidly changing demographics, their sense that Christianity is under siege and their perception that the federal government caters most to the needs of people in big cities, according to a wide-ranging poll that examines cultural attitudes across the United States.

The Washington Post-Kaiser Family Foundation survey of nearly 1,700 Americans — including more than 1,000 adults living in rural areas and small towns — finds deep-seated kinship in rural America, coupled with a stark sense of estrangement from people who live in urban areas. Nearly 7 in 10 rural residents say their values differ from those of people who live in big cities, including about 4 in 10 who say their values are “very different.”

That divide is felt more extensively in rural America than in cities: About half of urban residents say their values differ from rural people, with less than 20 percent of urbanites saying rural values are “very different.”

Alongside a strong rural social identity, the survey shows that disagreements between rural and urban America ultimately center on fairness: Who wins and loses in the new American economy, who deserves the most help in society and whether the federal government shows preferential treatment to certain types of people. President Trump’s contentious, anti-immigrant rhetoric, for example, touched on many of the frustrations felt most acutely by rural Americans.

The Post-Kaiser survey focused on rural and small-town areas that are home to nearly one-quarter of the U.S. population. These range from counties that fall outside metropolitan areas such as Brunswick, Va. (population 16,243) to counties near population centers with up to 250,000 residents such as Augusta, Va. (population 74,997), close to Charlottesville and the University of Virginia. Urban residents live in counties that are part of major cities with populations of at least 1 million, while suburban counties include all those in between.

The results highlight the growing political divisions between rural and urban Americans. While urban counties favored Hillary Clinton by 32 percentage points in the 2016 election, rural and small-town voters backed Trump by a 26-point margin, significantly wider than GOP nominee Mitt Romney’s 16 points four years earlier.

But popular explanations of the rural-urban divide appear to overstate the influence of declining economic outcomes in driving rural America’s support for Trump. The survey responses, along with follow-up interviews and focus groups in rural Ohio, bring into view a portrait of a split that is tied more to social identity than to economic experience.

“Being from a rural area, everyone looks out for each other,” said Ryan Lawson, who grew up in northern Wisconsin. “People, in my experience, in cities are not as compassionate toward their neighbor as people in rural parts.”

# \*\*\*\*STEM

### STEM – 1AC Module

#### Integration of agriculture with STEM programming underdeveloped

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 11-12, accessed 6-26-17, AFB]

STEM

In recent years, there have been some scattered efforts to connect agricultural education with Science, Technology, Engineering and Math (STEM) disciplines and the broader STEM movement that links student learning to integrated projects that address real world challenges. There is a sense that the real world nature of food and agriculture lends itself to this learning model and that agriculture education should capitalize on the STEM focus in education. But based on an assessment of publicly available programs and resources, this seemingly natural connection has yet to be fully realized.

NAAE provides agricultural educators a process and products that integrate STEM education through their CASE Curriculum. CASE includes specific content pathways that cut across STEM disciplines to allow educators to connect agriculture and science through instruction, exploration, and activities. CASE is supported through professional development and NAAE’s Communities of Practice.55

STEMconnector was established in 2011 by a consortium of companies, non-profits, and professional societies to try to provide a central clearing house for institutions and efforts involved in enhancing STEM education in the United States.56 One of their projects, the Food and Ag Council, consisting of top officials from the public and private sectors in agriculture, released a report at the 2014 World Food Prize events in Iowa in October 2014 that highlighted some of the employment opportunities that will be available in the sector over the next decade or so.57 That report focused on the Millennial Generation that is now in college, but recommends that the movement to interest young people in agricultural science disciplines start long before that decision is made. There is a limited selection of STEM resources available on the NAITCO website58 and in a handful of states, such as Georgia, Oregon, and Minnesota.

#### Integrating agricultural education makes STEM education more effective and bolsters vital critical thinking skills

Elliott, Metropolitan Nashville Public Schools, Director of STEM, 16

(Kristopher, 8/25/2016, The American Farm Bureau Foundation for Agriculture, “Is Ag the Answer to STEM?”, [http://www.agfoundation.org/news/is-ag-the-answer-to-stem, Accessed](http://www.agfoundation.org/news/is-ag-the-answer-to-stem,%20Accessed) 6/28/17, VB)

There is no doubt that STEM has become a hot topic in education. Teaching science and math with a silo approach does not reflect the real world, and often falls short of giving students the ability to problem solve as critical thinkers; a vital skill set business and industry are becoming more and more vocal about. Moreover, the interest in STEM has started to materialize in the form of grants, private funding opportunities and block funding to many schools and districts across the country.

With all of this interest, it can seem like a no brainer to move toward more purposeful STEM instruction, but this is easier said than done. If you’ve ever done a search for STEM curriculum you will quickly find that the problem is not a lack of information. It is actually quite the opposite; your browser will be full of lessons, resources and activities, often to the point it becomes overwhelming. Additionally, cherry picking cool lessons without a comprehensive approach to STEM instruction can cause confusion among students - they need to know where it all fits together in a way that connects to their own lives.

Agriculture may be the answer.

One thing is for certain, in order to survive, your students need food, fiber, and shelter - all of which are provided by agriculture. Surprisingly though, most students don't seem to make that connection, and furthermore, many teachers don’t recognize how agriculture can be a useful context to teach STEM. But without an agricultural background, how do teachers use this context as a teaching tool? How does an urban educator connect students with agriculture when many of them are generations removed from the farm and live far from production areas? The answer is pretty simple actually: Know the resources available to you. Organizations like the American Farm Bureau Foundation, Agriculture in the Classroom Organization, and Beef Checkoff, offer numerous resources for teachers to incorporate agriculture and STEM concepts into the classroom. For example, when discussing genetics with students, teachers can explore how purposeful selection of breeding stock in beef animals has helped produce leaner animals with more efficient feed conversion ratios. Additionally, science, engineering, and technology has produced equipment that can sort sperm cells in order to produce female offspring, which are much more valuable to beef breeders. And if ethical concerns arise in such discussions, the use of socioscientific issues can help guide discussion of how ethics keep up with our scientific and technological developments.

The technological advancements in agriculture, particularly with regard to sustainability, GPS, and computers, are staggering. For example, computers and software can help farmers more precisely apply fertilizers, leading to less waste and potential runoff. Modern tractors drive themselves, can call the service technician when they need maintenance, and even give their exact location so the technician will have precise directions. With all of this in mind, teachers will find just a few clicks can help them locate lessons rooted in agriculture that have standards based scientific, mathematical, technological and engineering applications. Agriculture is a great option for teachers to engage students in STEM concepts in a way that directly and indirectly impact their lives.

#### Effective STEM is key to cyber security

Levy, Jack Kent Cooke Foundation, executive director, & Plucker, University of Connecticut Neag School of Education professor, 15

[Harold O. Levy, Jonathan A. Plucker, 6-5-2015, US News & World Report, "Brains, Not Brawn," <https://www.usnews.com/news/the-report/articles/2015/06/05/lack-of-stem-students-is-bad-for-national-security>, accessed 7-3-17, TR]

The country's defensive capabilities often depend on brains, not brawn. Development of nuclear weaponry is but one example. And the biggest contemporary threat – one that could surface at any time and on an unfathomable scale – is the likelihood of a massive cyberattack. Study after study warns that our dependence on advanced technology in almost every aspect of communication, commerce and transportation makes us highly vulnerable to the armies of hackers in countries that wish us harm.

[SEE: Political Cartoons on the Economy]

Recent mini-attacks make clear the scope of the threat: It ranges from China's compromising our banks, critical pipelines and military to North Korea's recent disruption of Sony Pictures. Nor have we been able to bring the hackers to justice using traditional means. The Department of Justice actually indicted three members of the Chinese military for hacking. There have been recent hints that the hackers who stole data from JP Morgan Chase affecting tens of millions households were about to be extradited.

Yet too few students choose to study engineering, physics, computer science and mathematics, all necessary areas to shore up our cyberdefenses. One traditional solution for our shallow talent pool has been to import talent, but this strategy is showing considerable strain. Even when we still use this strategy – for example, by issuing H-1B visas (85,000 this year) or encouraging foreign university students (just shy of 900,000) to stay in the country upon graduation – it does not improve our national security: Government, defense, and aerospace companies can't hire foreign citizens for jobs requiring a domestic security clearance, yet increasing numbers of jobs in these fields require such clearances. It is literally impossible for us to "talent import" our way to a well-defended nation. As long as national security clearance is required for data warriors (and we think it should be), an army of mercenaries can't defend us from a cyberattack.

The way to start to deepen the American talent pool is to acknowledge that, for far too long, American education policy has primarily focused on basic proficiency, not academic excellence. The U.S. produces advanced students at a much lower rate than other developed countries, according to international assessments. The graduate programs in engineering and the hard sciences in our elite colleges are dominated by foreign students; government subsidies for these departments, properly understood, should be classified as a form of foreign aid. If it's true that "bright students can take care of themselves," then our bright students are doing a particularly poor job of it.

Meanwhile, we are overlooking a major source of home-grown talent. Thousands of innovative minds are sitting on the sidelines; they are the nation's high-ability, low-income children. Because we do not provide basic support programs, far too few of them are attending selective universities, earning advanced degrees or acquiring security clearances.

There is a measurable difference among lower-income versus higher-income students who reach advanced levels of academic performance – an "excellence gap." For example, 2 percent of low-income students scored at the highest level on a recent national math test in fourth grade, compared with 13 percent of higher-income students. High-ability, low-income students have difficulty pulling themselves up by their bootstraps, and often they backslide as they plod – largely ignored – through our schools. If they aren't given the support they need, we've lost them for good.

The lost potential is staggering. Even small improvements in the excellence gap will yield many more high-performing students who can form the next generation of innovators, leaders and home-grown cybersecurity scientists. Closing the excellence gap in math by just half would mean an additional 85,000 high-performing students entering high school each year. Put another way, over 1 million students in grades K-12 today could be moved from proficiency to excellence, flooding our society and economy with world-class thinkers, some of whom could help improve our cybersecurity.

#### Cultivating critical thinking is particularly key to cybersecurity

McAllister, Carnegie Mellon University, Software Engineering Institute, Senior Analyst, 16

(Jay, 2/15/16, Software Engineering Institute, “Cyber Intelligence and Critical Thinking”, <https://insights.sei.cmu.edu/sei_blog/2016/02/cyber-intelligence-and-critical-thinking.html>, Accessed 6/28/17, VB)

The importance of applying critical thinking to cyber intelligence cannot be overstated. In our work with organizations, we have noticed that when a new threat arises, instead of holistically assessing it, organizations often simply request the latest, greatest analytic tool or contract out the work to third-party intelligence providers. As a former intelligence analyst--prior to joining the SEI, I served as a counterintelligence and counterterrorism analyst for the Naval Criminal Investigative Service (NCIS)--I know from experience that the operational tempo required for intelligence analysts to keep pace with the ever-changing cyber environment is overwhelming at best. While technology and external resources offer value, analysts also need to critically assess the information they receive.

In 2013, the Defense Science Board echoed a similar sentiment. In their report, Resilient Military Systems and the Advanced Cyber Threat they included the following among their recommendations to improve DoD systems' resilience: "Refocus intelligence collection and analysis to understand adversarial cyber capabilities, plans and intentions, and to enable counterstrategies."

Foundations of Our Work

Our work in cyber intelligence started in 2012 with a request from the government to assess the state of the practice of cyber intelligence. Our work on that initial project involved an examination of the cyber intelligence practices of 30 organizations (6 from government and 24 from industry), specifically their strategic approaches to cyber intelligence. Our work focused on identifying the methodologies, processes, tools and training that shaped how these organizations assessed and analyzed cyber threats. As detailed in an earlier blog post, our work on this project resulted in an implementation framework that captured best practices.

When this work concluded, several participant organizations approached the ETC about leading an effort that would research and develop technical solutions and analytical practices to help people make better judgments and quicker decisions with cyber intelligence. As a result, ETC launched the Cyber Intelligence Research Consortium.

The first year of this consortium focused primarily on continuing our research in cyber intelligence, as well as identifying best practices and challenges. Nearly four years after our initial research began, we have noted clear examples of a strategic shift among participant organizations with respect to cyber intelligence. They are investing resources in hiring intelligence analysts from a pool of vetted and qualified experts, and they are investing significant resources in acquiring tools and tradecraft. However, they are not yet making effective use of the intelligence provided by these resources.

In both government and industry, organizational resilience in the wake of an attack relies on an analyst's ability to holistically assess a threat. The remainder of this post proposes a three-step approach for holistically approaching a cyber threat.

Three Steps to Holistically Assess Cyber Threats

First and foremost, applying critical thinking--which brings together all the skills shown in the "conceptual framework" above--to cyber threats improves an analyst's ability to accurately evaluate and estimate a threat's potential to impact and expose its target. My ETC colleagues and I propose a three-step approach to holistically assess cyber threats:

Establish a baseline of how the threat will be analyzed. This step involves outlining the approach so that the analyst uses all the skills represented in the conceptual framework. Since the framework is non-linear, the components can be approached in whatever order makes sense.

Leverage creative brainstorming. When facing a potential cyber threat, analysts don't have the luxury of time to stare into space and wait for an "ah ha" moment. Creative brainstorming techniques such as those found in human-centered design accelerate the time it takes to get to an "ah ha" moment. To enhance an analyst's creative brainstorming skills, I recommend looking at recent brainstorming research including that by Luma Institute, specifically their 36 techniques for creative brainstorming and practice them daily.

Perform the holistic threat assessment. The assessment evaluates the threat from the three perspectives shown in the figures below (these charts are available as fillable templates):

The three steps outlined in this approach enable analysts to avoid intelligence tunnel vision and seek to understand all causes and effects of relevant threats, which can significantly improve the efficiency and effectiveness of cyber intelligence efforts.

#### Cyberattacks are increasing now – conflict escalation is becoming uniquely likely

Lindsay et. al 15 (Lindsay, Jon R., Tai Ming Cheung, and Derek S. Reveron. China and Cybersecurity: Espionage, Strategy, and Politics in the Digital Domain. Print., Jon R. Lindsay is an assistant research scientist at the University of California Institute on Global Conflict and Cooperation and an assistant adjunct professor at the University of California, San Diego School of International Relations and Pacific Studies)

Cyber war, compared with conventional wars, is rather inexpensive; it can be initiated from anywhere and does not require large amounts of troops and weapons, but only a computer and Internet access. The “cyber conflicts” and “cyberwars” in which they can grow are among the greatest challenges of today and tomorrow. Because of the nature and speed of destruction may be affected thousands of targets across the planet. The cyberwar phenomenon itself is not discussed widely and availably for comparison and in this case even the Cold War would prove “an era of publicity and openness”. Therefore, the investigation and detection of problems related to the use of cyberspace as a platform for keeping secrets strife is more than obsolete. In the scientific literature it is accepted that for the first time the concept of “information war” was used in the publication by Thomas Rhona back in 1976 [1]. Although the fact that the exact boundaries of the “cyber war” phenomenon have not yet been identified and are contested in research circles a more general working definition can be formulated as a “war waged in cyberspace, using information and communication technologies in order to destruct ICT probable opponent” [2]. According to the security expert of the US government Richard Clarke in his book “Cyber Warfare” [3], “cyber war” – this is the action of a nation state intrusion into computers or networks of other national state in order to achieve the objectives of loss or destruction. The British magazine “The Economist” describes cyber war as a “fifth field of the war, after land, sea, air and space” [4]. Assuming that “cyberspace” is a conceptual and physical reality, the escalation of conflicts in it to higher levels, leads to serious losses in almost all spheres of public life and allows us to introduce the concept of “cyber war”. Information environment creates new possibilities for military impact. It changes in a very high degree the preparation as well as the actual conduct of modern war. “New technologies have made it possible to increase the precision of weapons, to achieve an exceptional degree of complexity of military offensive and defensive systems, to use ultra-modern, including spacecraft means of intelligence, to improve significantly, to the utmost degree the coordination of warring parties on the battlefield. Information from a supportive, tactical, operational maximum resource has turned into a resource of strategic importance” [5, 6]. Among the main objectives of fighting in the first phases of the war is already the achieving of information superiority: “To win wars today, one must first win the information war. Today the ability to collect, share, process and store information is the most important determinant of military power” [7]. The intensive introduction of new electronic technologies increases to utmost degree the combat capabilities of conventional armaments and especially of the military equipment. This is the original cause that today military experts consider ICT as an extremely effective weapon, which is also the priority target for destruction because of the same quality, and assess cyberspace as a convenient area for the deployment of military action, like land and sea, air and space. As noted by a former general in the Armed Forces of the United States “These communication and information technologies that connect major economic, physical and social assets have been adopted and adapted by the military and paramilitary organizations, 262 Military Art and Science REVISTA ACADEMIEI FORĥELOR TERESTRE NR. 3 (79)/2015 thus bringing about revolutionary changes in warfare altering the way for planning, organizing and conducting combat operations. These quality changes include and at the same time increase the opportunities for intelligence, surveillance and evaluation, and for command and control of forces. They help optimizing the transport of forces and means, ensuring the accuracy of navigation using intellectual-saturated highly precise weapons and using «The Network» as an environment, with the assistance of which and between the limits of which are conducted military operations” [8]. New information technologies allow multiple increase speed in processing large amounts of data, which eases making complex operational decisions and essentially creates new tactical methods of armed struggle. They sharply increase the combat potential of electronic systems, which turns them into a new type of information weapons intended to defeat both the military and the civilian infrastructure of the enemy by damaging or destruction of its computer networks. Using the cyber environment, the opponent may deploy information weapons (e.g. tools for data collection and analytical processing, stations for radio-electronic combat, impulse and electromagnetic weapons, etc.) and use it in a defensive or offensive operation together with traditional weapons. According to some expert data the invisible weapon is capable to end the conflict before the start of physical combat, because the escalation of information confrontation could lead to disaster for one of the opposing sides. In this sense it can be claimed that the possession of a high technology information weapon provides outstanding benefits and if not today, then in the foreseeable future will successfully compete even with nuclear weapons. These two weapons will become a powerful factor for political pressure and threat. Information weapon gradually becomes one of the main components of the military potential of modern states and today many countries, especially the highly developed (the USA, China, the Russian Federation and many others) consistently and persistently prepare for keeping information wars. To this aim also not so technologically advanced countries as they strive to acquire options for keeping information wars. It is quite possible because the information weapon has certain characteristics that make its spread fast and difficult to control. It has relatively low prices and this makes it quite accessible to various malevolent entities. It can be developed, built, implemented and even used hidden to the general public from various aggressive regimes which raise it in rank of a too dangerous global problem.

#### Cyber attacks cause critical infrastructure failure and nuclear war

**Tilford, Graduate US Army Airborne School, 12**

[Robert, Graduate US Army Airborne School, Ft. Benning, Georgia, Examiner, "Cyber attackers could shut down the electric grid for the entire east coast", 7-12-12, Examiner, <http://web.archive.org/web/20120812000707/http://www.examiner.com/article/cyber-attackers-could-easily-shut-down-the-electric-grid-for-the-entire-east-coa>, accessed 7-3-17, AFB]

To make matters worse **a cyber attack** that **can take out a civilian** power **grid**, for example could **also** cripple **the** U.S. **military**.

The senator notes that is that **the same** power **grids** that **supply** cities and towns, stores and gas stations, cell towers and heart monitors also power "**every military base in our country**."

"**Although bases would** be prepared to **weather a short** power **outage** with backup diesel generators, **within hours**, not days, fuel **supplies** would **run out**", he said.

Which means military **c**ommand **and c**ontrol centers **could go dark**.

**Radar systems that detect air threats** to our country **would shut Down completely**.

"Communication between commanders and their troops would also go silent. And **many weapons systems would be left without** either fuel or electric **power**", said Senator Grassley.

"So in a few short hours or days, the mightiest military in the world would be left scrambling to maintain base functions", he said.

We contacted the **Pentagon and officials confirmed the threat** of a cyber attack is something very real.

Top national security officials—**including the Chairman of the Joint Chiefs,** the Director of the National Security Agency, the Secretary of Defense, **and the CIA Director**— have said, "preventing a cyber attack and improving the nation~’s electric grids is among the most urgent priorities of our country" (source: Congressional Record).

So **how serious is the Pentagon** taking all this?

**Enough to start**, or end **a war over it**, for sure (see video: Pentagon declares war on cyber attacks http://www.youtube.com/watch?v=\_kVQrp\_D0kY%26feature=relmfu ). **A cyber attack today** against the US **could** very **well be seen as an "Act of War"** and could be **met with** a "**full scale"** US military response.

That could include the use of "**nuclear weapons**", if authorized by the President.

[Note – The senator = Senator Chuck Grassley, R-IA]

### Ag Shortage in STEM Now

#### There is a shortage of agricultural students in STEM now

Bloom, Curriculum for Agricultural Education Science Education Plant Pathway Coordinator & Eddy, agricultural education teacher at Southeast Polk High School in Pleasant Hill, Iowa, 16

(Melanie and Matthew, 5/16/16, The Agricultural Education Magazine,” Securing STEM Dollars for CASE and Agricultural Education.” ProQuest, P. 25, Accessed 6/30/17, GDI JMo)

The following points were used to underscore the relation- ship between agricultural educa- tion and STEM education.

* “The greatest challenge that confronts our generation is to feed a rapidly growing global population that will rise from seven billion to nine billion by 2050.” (STEM Food & Ag Council Report, 2014).
* “An average of 35,400 new U.S. graduates with expertise in food, agriculture, renew- able natural resources, or the environment are expected to fill 61% of the expected 57,900 average annual open- ings.” (Goecker et al, 2015).
* Agriculture has been hobbled in this challenge by a lack of quali ed candidates. “We are not producing nearly enough of these professionals to meet industry demand – which continues to grow year over year.” (STEM Food & Ag Council Report, 2014).
* “Agriculture career fields are chronically short of quali- fied candidates for their open positions - thousands of can- didates short,” (STEM Food & Ag Council Report, 2014) which doesn’t take into ac- count retirements.
* “Answering the call requires us to develop a human capital pipeline that will invigorate America’s scientific, techno- logical and business leader- ship in food and agriculture so that we can lead the way to global food security.” (STEM Food & Ag Council Report, 2014).

[Note: CASE = Curriculum for Agricultural Science Education]

### STEM Shortage Now

#### STEM shortage now

**Swanson, the chairman and CEO of a defense contractor company called Raytheon, Kelly, the Editor and Chief Content Officer of U.S. News & World Report, 14**

[William and Brian, 4/23/14, U.S. NEWS & WORLD REPORT, “STEM Proficiency: A Key Driver of Innovation, Economic Growth and National Security”, <https://www.usnews.com/news/stem-index/articles/2014/04/23/stem-proficiency-a-key-driver-of-innovation-economic-growth-and-national-security>, accessed 6/30/17, JBC]

STEM: what a terrible acronym. It’s one of those awkward labels that become accepted shorthand for a wonky policy topic because no one can figure out a better way to say it. But don’t let clunkiness obscure significance. STEM is also an under appreciated, and troubling, component of the U.S. economy. The real meaning behind “STEM” is the mismatch between supply and demand in a key part of the country’s labor pipeline. The demand for the many jobs requiring STEM skills—science, technology, engineering and math—is outstripping the supply, and the problem will only get worse.

That’s what we found when we crunched the numbers in the first-ever STEM Index, a basket of data measuring the state of STEM jobs and education since 2000. We wanted to impose some metrics on a much-discussed but ill-defined subject that has become a concern for most major industries in the U.S. STEM proficiency is a key driver of innovation, economic growth and ultimately national security. For instance, some of the most coveted and scarce skills today are in the fields of cybersecurity.

But STEM is not just about tech companies. It’s not just about people who wear lab coats. STEM skills are needed in the many millions of jobs that will have to be filled in sectors such as energy, manufacturing, food production and perhaps most significantly, health care. What industry does not need more workers with science and math know-how? And not just at the high end. Having STEM skills could mean making it into the middle class, or not.

Going back to studies like the seminal “Rising Above the Gathering Storm” report of 2005, the problem has been a focus of much attention. But we wanted to add some new rigor by creating a unique set of data that looked at how the U.S. has fared in tackling this supply-demand challenge. We plotted dozens of statistics that measured student test performance, aptitude, and interest against job demand (read the full methodology). The result is a 14-year average that tells an important part of the STEM story, with limits. Our new benchmark, the U.S. News/Raytheon STEM Index, is a starting point that’s meant to lead to deeper discussions, and ultimately solutions. And of course any broad-based graph can only tell you so much; the analyses behind the component parts are ultimately the most revealing.

What the numbers tell us is that the country has made little progress on a problem we’ve seen coming for a long time. Despite growing job demand, the pipeline of talent is weak and will remain that way for at least a decade if nothing changes. There are some recent glimmers of hope, reflected in an uptick over the past two years, but they are coming from a select part of the population. Our top-line data, supported by other studies, shows that some portion of white males, along with Americans of Asian descent, are increasingly drawn to STEM subjects, while those who represent the bulk of the future labor pool—women, Latinos and African-Americans—are showing disproportionately little interest.

The increased demand for STEM skills is evident despite a key shortcoming in the STEM Index: our need to rely on federal government data. Using the sometimes out-of-date definitions of what is a STEM job, the Index still charts a 30 percent growth, from 12.8 million in 2000 to 16.8 million in 2013. More granular estimates put actual jobs requiring STEM skills at as much as 50 percent of the job market. We’ll be refining that and other data for next year’s edition.

Among the biggest problems surfaced in the STEM Index:

Between 2000 and 2013, an average of 37.6 percent of high school males reported having interest in at least one of the STEM disciplines, vs. 14.8 percent of females.

In 2013, the average SAT math score for white students was 534, compared to 461 for Hispanic students and 429 for black students. The average ACT science scores were 22 for whites, 18.8 for Hispanic students and 16.9 for black students.

As high school students’ interest in STEM has waned, their scores on international assessments like PISA have also dropped. In 2000, the average U.S. PISA math score was 493. In 2012, that score dropped to 481. Relative to other developed countries, we remain near the back of the pack.

STEM may be a simple label, but the problem it speaks for is deeply complex. Why do fourth-grade girls sour on math? Teacher prep programs ignore science training? University curriculums wash out too many talented students? The solutions require the interaction of industry, academia, government and non-profits.

There is work being done in all these areas, but the evidence suggests it is not enough. Better awareness and more-realistic assessments are important next steps. This new STEM Index is a start.

### STEM Integration Low Now

#### STEM connection underdeveloped

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 11-12, accessed 6-26-17, AFB]

STEM

In recent years, there have been some scattered efforts to connect agricultural education with Science, Technology, Engineering and Math (STEM) disciplines and the broader STEM movement that links student learning to integrated projects that address real world challenges. There is a sense that the real world nature of food and agriculture lends itself to this learning model and that agriculture education should capitalize on the STEM focus in education. But based on an assessment of publicly available programs and resources, this seemingly natural connection has yet to be fully realized.

NAAE provides agricultural educators a process and products that integrate STEM education through their CASE Curriculum. CASE includes specific content pathways that cut across STEM disciplines to allow educators to connect agriculture and science through instruction, exploration, and activities. CASE is supported through professional development and NAAE’s Communities of Practice.55

STEMconnector was established in 2011 by a consortium of companies, non-profits, and professional societies to try to provide a central clearing house for institutions and efforts involved in enhancing STEM education in the United States.56 One of their projects, the Food and Ag Council, consisting of top officials from the public and private sectors in agriculture, released a report at the 2014 World Food Prize events in Iowa in October 2014 that highlighted some of the employment opportunities that will be available in the sector over the next decade or so.57 That report focused on the Millennial Generation that is now in college, but recommends that the movement to interest young people in agricultural science disciplines start long before that decision is made. There is a limited selection of STEM resources available on the NAITCO website58 and in a handful of states, such as Georgia, Oregon, and Minnesota.

### Ag Key to Effective STEM

#### Integrating agricultural education makes STEM education more effective and bolsters vital critical thinking skills

Elliott, Metropolitan Nashville Public Schools, Director of STEM, 16

(Kristopher, 8/25/2016, The American Farm Bureau Foundation for Agriculture, “Is Ag the Answer to STEM?”, [http://www.agfoundation.org/news/is-ag-the-answer-to-stem, Accessed](http://www.agfoundation.org/news/is-ag-the-answer-to-stem,%20Accessed) 6/28/17, VB)

There is no doubt that STEM has become a hot topic in education. Teaching science and math with a silo approach does not reflect the real world, and often falls short of giving students the ability to problem solve as critical thinkers; a vital skill set business and industry are becoming more and more vocal about. Moreover, the interest in STEM has started to materialize in the form of grants, private funding opportunities and block funding to many schools and districts across the country.

With all of this interest, it can seem like a no brainer to move toward more purposeful STEM instruction, but this is easier said than done. If you’ve ever done a search for STEM curriculum you will quickly find that the problem is not a lack of information. It is actually quite the opposite; your browser will be full of lessons, resources and activities, often to the point it becomes overwhelming. Additionally, cherry picking cool lessons without a comprehensive approach to STEM instruction can cause confusion among students - they need to know where it all fits together in a way that connects to their own lives.

Agriculture may be the answer.

One thing is for certain, in order to survive, your students need food, fiber, and shelter - all of which are provided by agriculture. Surprisingly though, most students don't seem to make that connection, and furthermore, many teachers don’t recognize how agriculture can be a useful context to teach STEM. But without an agricultural background, how do teachers use this context as a teaching tool? How does an urban educator connect students with agriculture when many of them are generations removed from the farm and live far from production areas? The answer is pretty simple actually: Know the resources available to you. Organizations like the American Farm Bureau Foundation, Agriculture in the Classroom Organization, and Beef Checkoff, offer numerous resources for teachers to incorporate agriculture and STEM concepts into the classroom. For example, when discussing genetics with students, teachers can explore how purposeful selection of breeding stock in beef animals has helped produce leaner animals with more efficient feed conversion ratios. Additionally, science, engineering, and technology has produced equipment that can sort sperm cells in order to produce female offspring, which are much more valuable to beef breeders. And if ethical concerns arise in such discussions, the use of socioscientific issues can help guide discussion of how ethics keep up with our scientific and technological developments.

The technological advancements in agriculture, particularly with regard to sustainability, GPS, and computers, are staggering. For example, computers and software can help farmers more precisely apply fertilizers, leading to less waste and potential runoff. Modern tractors drive themselves, can call the service technician when they need maintenance, and even give their exact location so the technician will have precise directions. With all of this in mind, teachers will find just a few clicks can help them locate lessons rooted in agriculture that have standards based scientific, mathematical, technological and engineering applications. Agriculture is a great option for teachers to engage students in STEM concepts in a way that directly and indirectly impact their lives.

#### Integration with STEM allows US agriculture to solve food shortages

Blythe, West Virginia University Agricultural and Extension Education and Center for Excellence in STEM Education Assistant Professor, 15

(Jessica, March/April 2015, Agricultural Education Magazine, “Can the BUZZ around STEM Education Help Answer Agriculture’s Global Challenge?”, Volume: 87, Number 5, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume87/Mar-Apr_2015.pdf>, p. 4 Accessed 6/30/17, VB)

It has been identified as one of the world’s greatest challenges: How can the agricultural industry feed an already hungry global population which is estimated to jump from seven to nine billion by 2050? (STEM Food and Agriculture Council, 2014). This challenge must be met by agriculturalists who can develop new innovative ideas to meet the demand, while conserving our land and water which are essential to agricultural practices.

The importance of agricultural education has never been more evident. It is essential to cultivate a generation of students who have the drive and desire, as well as the knowledge and skills, to pursue answers to the questions that will arise out of this challenge.

It seems that wherever there is a discussion of education nowadays, STEM (Science, Technology, Engineering and Math) drops into the conversation. The buzz around STEM education has become a focus for legislation, funding, and public debate in the various realms of education.

Some see STEM education as the answer to ensure a competent and qualified workforce which will strengthen the American economy. Others are concerned that we as a society are putting too much educational focus on STEM initiatives. Does the focus on STEM education stifle the creative thinking and artistic development of our youth? Are students preparing for jobs in STEM that may not actually exist in the future? No matter your perspectives of STEM, few would negate the positive thread of focused critical thinking and problem solving skills which are evident in the classrooms of each STEM discipline.

It seems that much of the buzz being generated around STEM are the new or improved methods of teaching STEM concepts. These are things that we as agricultural educators have been doing for decades. Problem-based learning: Check. Students getting career experiences outside of schools: Check. Creating close connections between programs and local industries: Check. Giving assignments a ‘real-life’ context: Check. Focus on college and career readiness: Check.

Educators in non-ag areas are surprised at what is taught in our agricultural curriculums. The idea that we teach science, math, and reading concepts (sometimes all in the same lesson) in our classrooms is often met with disbelief. Emphasizing STEM in agricultural education isn’t about changing what we teach or drastically how we teach, but about increasing our communication with other realms of education and using a common language to describe what happens in our programs. Having educators from other content areas become familiar with how agricultural education works will only help to strength our programs and build support within all school communities.

The emphasis on science in agricultural education has been a part of educational reform since the US industrial revolution and it is time to also emphasize the other individual STEM disciplines as well. Continuing to emphasizing STEM education initiatives within our existing agricultural education frameworks can provide that next generation of agriculturalists who are able to make strong connections between the STEM disciplines and the agricultural industries. The goal of preparing young minds with a broad range of scientific and engineering skills, with the technological and mathematical ability to manage the large scale programs can help the agricultural industry meet the challenges.

#### Ag education reinforces STEM literacy – especially in applied science

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 94, Accessed 6/28/17, GDI - JMo)

C2: Participants emphasized science and technology as a curriculum and school focus highlighting how agricultural science courses enhanced this focus. Participants saw agricultural science courses as integral to the students’ understanding of science and technology along with awareness of higher education opportunities and careers in these fields. They also saw these efforts influencing how the broader community viewed agriculture. Mr. Brooks noted the relationship between agriculture and the school focus.

I would really like to see my students take biology, chemistry and both ALS [Advanced Life Science] courses through the rest of their years...I want them to have four years of science. I want them to have Project Lead the Way courses that have to do with bioengineering, biotechnology and those things and then that whole Ag pathway...from fundamentals down to the ALS courses...and agribusiness could be one of those courses as well... but I think that gives you well-rounded students. Are all of them going to be happy with that pathway in agriculture? Maybe not...but again that’s the focus of our school...that’s what drives what we do... so that’s the framework that we are kinda following.

Mr. Brown noted the school’s vision was to assist all students with success in science and technology, regardless of background. He noted the school had “a vision to give lower middle class students and students of diverse backgrounds an opportunity to succeed in the education arena, by assisting them with the sciences and technology, which is what diverse students are lacking.” Mr. Brown further spoke about how agricultural education courses complement the technology focus providing possible solutions to manufacturing and social issues. He stated, “I suggest to you that we take agriculture and we put it right next to the computer and perhaps some of our job manufacturing issues will be resolved, it will resolve some of those social factors, but as everything does, it starts with the education.” Mr. Brooks emphasized the importance for urban students to obtain a solid agricultural background, as residents of urban communities tend to lack awareness and knowledge regarding agricultural education and careers. He noted, “The east-side of Fern Grove and the urbanness [sic] of it all and to have that strong agricultural background. I want people to say wow they really are doing something in Cornwall County and especially on the east-side of Fern Grove.”

### Ag Education Solves STEM Learning

#### Agricultural education requires STEM

**Myers, University of Florida of Agricultural Education and Communication professor, and Stubbs, University of Florida, Agricultural Education and Communication graduate assistant, 15**

[Brian and Eric, 2015, The American Association for Agriculture Education, Journal of Agricultural Education, “Multiple Case Study of STEM in School-based Agricultural Education”, <http://files.eric.ed.gov/fulltext/EJ1122767.pdf>, accessed 6/30/17, JBC]

Agricultural careers of the future will require more knowledge and skills related to science, technology, engineering, and mathematics (STEM) (Association of Public and Land-Grant Universities [APLU], 2009; Committee on Prospering in the Global Economy of the 21st Century, 2007; National Research Council, 2009). STEM will be critical to ensuring an adequate food supply, economic well-being, public and environmental health, security, new industries, and an improved standard of living in developing countries. Agricultural education has used inherently interdisciplinary contexts and involved each of the four STEM subjects. This can help address the stagnation of student achievement in STEM (APLU, 2009; National Research Council, 2009). Agriculture has also faced the difficult problem of a growing population combined with environmental limits. With population projections at over 9 billion for 2050, food production must significantly increase at the same time it is shrinking its environmental footprint (Foley et al., 2011). Furthermore, The National Research Council (2009) pointed out society’s major challenges, including energy security, national security, human health, and climate change — are closely tied to the global food and agriculture enterprise. Academic institutions with programs in agriculture are in a perfect position to foster the next generation of leaders and professionals needed to address these challenges. (p. 1) Therefore, agricultural education should help create a 21st century workforce able to address social, economic, and environmental challenges through STEM. The National Research Council (2009) went as far as suggesting STEM be changed to science, technology, engineering, agriculture, and mathematics (STEAM). Despite the calls for increasing integration of STEM into agricultural curricula, a research gap has made it difficult to address through policy and teacher preparation. Myers and Dyer (2004) noted “studies are needed to identify the best methods teacher educators can employ to prepare teachers for this expanded role” (p. 50).

#### Science in agriculture increases understanding of science – teacher and student results prove

Ulmer, Texas Tech University teacher educator, and Witt, Texas Tech University Agricultural Education, doctoral student, 11

(Dr. Jonathan and Phillip, September/October 2011, The Agricultural Education Magazine, “Integrating Science Instruction into Pre-Service Teacher Education.” ProQuest, Accessed 6/30/17, GDI - JMo)

In a recent speech to the American Association for Agricultural Education, Dr. Kirby Barrick clarified a recommendation from Understanding Agriculture: New Directions for Education (1988). Dr. Barrick stated, we were not to teach agriculture as a science, but to emphasize the science in agriculture. Organizations like the American Association for the Advancement of Sciences recommend schools should be connecting what students are learning in the classroom to the working world (American Association for Advancement of Science, 1993). Programs like agricultural education have an avenue to complete that connection. The Carl D. Perkins Education Act (109th U.S. Congress, 2006) directs career and technical programs to teach students with content that aligns with core academic standards. In agricultural education, the connections to science and mathematics are strong. Perkins specifically calls for "competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills" (p 4). Thompson (2001) found that administrators' perceptions of increasing science knowledge through integration in agriculture are positive. Over 76% of principals surveyed thought that students would have a better understanding of science if the science was integrated into agriculture instruction. Additionally, over 70% thought that students would be better prepared in science if they were to complete an integrated classroom. Science teachers had similar results, over 63% agree that students would have a better understanding of science if they were to complete a science integrated agriculture classroom (Warnick, Thompson, & Gummer, 2004).

#### Agriscience increases test scores - now is a unique time to further integrate science into agriculture - preservice teachers have experienced the push for science integration

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

SBAE has included science as a part of its curriculum since the advent of agriculture classes in the public school (True, 1929). Agriculture has been shown to be an appropriate context for science integration (Thoron et al., 2011). Increased emphasis on standardized testing has prompted SBAE to focus on science integration in an effort to enhance students' science knowledge, which would be accessed through standardized tests (Ricketts et al., 2006). A study by Ricketts et al. (2006) supported previous research that found students enrolled in agriscience courses scored higher on standardized science tests than students that were not enrolled in agriscience courses (Enderlin and Osborne, 1991; Mabie and Baker, 1996; Conroy and Walker, 1998; Chiasson and Burnett, 2001). Agriscience courses play an important role in increasing students' scientific ability by providing a context for scientific concepts and application (Ricketts et al., 2006). SBAE currently has teachers that believe it is important to continue adding science concepts into the agriscience curriculum (Thoron and Myers, 2009). However, the need for continued science integration is inherent with in-service and pre-service teachers (Thoron and Myers, 2009). According to Thoron and Myers (2009) SBAE is currently at a unique point in its evolution. The current generations of preservice teachers have experienced the push for science integration when they were secondary students (Thoron and Myers, 2009). This experience has helped to create agriscience teachers that understand the importance and significance of continued science integration into SBAE (Thoron and Myers, 2009).

[Note: SBAE = School Based Agricultural Education]

### Ag Education Key to STEM Retention

#### Agriculture education leads students to pursue careers in agriculture or STEM

Henry, Purdue University Office of Multicultural Programs graduate research assistant, et al, 14

(Kesha A., Brian Allen Talbert, Purdue University College of Agriculture Department of Youth Development and Agricultural Education Professor, Pamala V. Morris, Purdue University College of Agriculture Assistant Dean/Director of the Office of Multicultural Programs, 2014, Journal of Agricultural Education, “Agricultural Education in an Urban Charter School: Perspectives and Challenges.” Volume 55 issue 2, <http://files.eric.ed.gov/fulltext/EJ1122353.pdf>, p. 94-95, Accessed 6/28/17, GDI - JMo)

After participants highlighted the critical role agricultural education courses play in enhancing the school’s science and technology focus, they expressed interest in growing the program by increasing the number of agricultural education courses offered. Participants also discussed robustness of the current science program and ways in which agricultural science courses contributed to their unique urban agricultural education program. Participants further expressed interest in developing students who seek colleges of agriculture to pursue careers in agriculture such as agricultural engineering or other related areas in the Science, Technology, Engineering and Mathematics (STEM) fields. Mr. Brooks noted how agriculture could lead to STEM-related careers.

#### Agricultural education leads to workplace readiness in STEM

Rubenstein, University of Georgia College of Agricultural & and environmental Sciences Assistant Professor of Agricultural Leadership education and communication, et al, 16

(E.D., N.W. Conner, University of Nebraska-Lincoln assistant professor Agricultural Leadership education and communication, S.D. Hurst, Agriculture Teacher Osceola Middle School, and A.C. Thoron, University of Florida Institute of food and Agricultural studies Assistant Professor of Agricultural Education and Communication, September 2016, North American Colleges and Teachers of Agriculture Journal, “A Philosophical Examination of School-based Agricultural Education and NBC's Education Nation.” ProQuest, Volume 60, Issue 3, Accessed 6/30/17, GDI - JMo)

In addition to SBAE's focus on academic integration, SBAE fulfills a vocational role that provides technical skills to students that may be applied to the agricultural workplace (Dailey et al., 2001). By providing a plethora of agricultural courses, SBAE has been able to provide students with the opportunity to learn and enhance many workplace skills that may be transferred to different types of careers (Dailey et al., 2001). According to Education Nation (2012b), schools should provide students with a solid education in STEM, which will allow the student to be equipped with the appropriate knowledge and skills to obtain employment, apprenticeships and admittance into community colleges, vocational schools, or four-year degree programs.

[Note: SBAE = School Based Agricultural Education]

### Integration Good – Laundry List

#### Integrating ag into STEM is imperative – multiple internal link to existential risks

\*food, econ, environment, warming

Stubbs, University of Florida Department of Agricultural Education and Communication Graduate Assistant, and Myers, University of Florida Department of Agricultural Education and Communication Agricultural Education Professor, 15

[Eric A. Stubbs, Graduate Assistant in the Department of Agricultural Education and Communication at the University of Florida, and Brian E. Myers, Professor of Agricultural Education in the Department of Agricultural Education and Communication at the University of Florida. Journal of Agricultural Education, pg. 188-189, Volume 56, Issue 2, “Multiple Case Study of STEM in School-based Agricultural Education”, http://files.eric.ed.gov/fulltext/EJ1122767.pdf, p. 188-189, accessed 6.8.2017]//TRossow

Agricultural careers of the future will require more knowledge and skills related to science, technology, engineering, and mathematics (STEM) (Association of Public and Land-Grant Universities [APLU], 2009; Committee on Prospering in the Global Economy of the 21st Century, 2007; National Research Council, 2009). STEM will be critical to ensuring an **adequate food** supply, economic well-being, public and environmental health, security, new industries, and an improved standard of living in developing countries. Agricultural education has used inherently interdisciplinary contexts and involved each of the four STEM subjects. This can help address the stagnation of student achievement in STEM (APLU, 2009; National Research Council, 2009). Agriculture has also faced the difficult problem of a growing population combined with environmental limits. With population projections at over 9 billion for 2050, food production must significantly increase at the same time it is shrinking its environmental footprint (Foley et al., 2011). Furthermore, The National Research Council (2009) pointed out society’s major challenges, including energy security, national security, human health, and climate change — are closely tied to the global food and agriculture enterprise. Academic institutions with programs in agriculture are in a perfect position to foster the next generation of leaders and professionals needed to address these challenges. (p. 1) Therefore, agricultural education should help create a 21st century workforce able to address social, economic, and environmental challenges through STEM. The National Research Council (2009) went as far as suggesting STEM be changed to science, technology, engineering, agriculture, and mathematics (STEAM). Despite the calls for increasing integration of STEM into agricultural curricula, a research gap has made it difficult to address through policy and teacher preparation. Myers and Dyer (2004) noted “studies are needed to identify the best methods teacher educators can employ to prepare teachers for this expanded role” (p. 50). Federal policies have targeted increasing teacher efficacy and student achievement in STEM to better prepare students for a job market that requires sophisticated knowledge and skills. Concerns motivating STEM policy have included “achievement gaps between various demographic groups, U.S. student performance on international mathematics and science tests, foreign student enrollments in U.S. institutions of higher education, global STEM education attainment, U.S. STEM teacher quality, and the U.S. STEM labor supply” (Gonzalez & Kuenzi, 2012, p. 4). An overview of STEM education research by Brown (2012) concluded “more research is needed in both descriptive classroom applications for practicing teachers and in rigorous qualitative/quantitative research projects” (p. 10). Gonzalez and Kuenzi (2012) also connected increasing student achievement in STEM with positive socioeconomic outcomes. A key part of the philosophy of STEM education, much like agricultural education, has been an emphasis on connecting content knowledge, STEM knowledge, real-world issues, and problem solving skills (Ejiwale, 2012). Interestingly, agricultural education has employed many of the same teaching methods research has suggested for STEM education. When teaching STEM, Ejiwale (2012) noted the special importance of engaging students in “motivational activities that integrate the curriculum to promote hands-on and other related experiences that would be needed to help solve problems as they relate to their environments” (p. 91). Therefore, agricultural and STEM education have been a natural combination. Indeed, school-based agricultural education (SBAE) has been so diverse the philosophy of agricultural education has emphasized the process of learning by doing over the specific content learned (Phipps & Osborne, 1988). The explicit integration of science was first called for by the National Research Council in 1988. This drove the development of agriscience curricula, led to agriculture classes that provided science credits, and inspired studies showing how an agricultural context can improve science learning (Conroy, Dailey, & Shelley-Tolbert, 2000). Coolman (1992) noted engineering presents possibilities for solving problems, while agriculture provides a quickly increasing number of problems related to production and processing. More recently, the March-April 2013 edition of The Agricultural Education Magazine’s theme was using agriculture to teach STEM. As with science, significant research into mathematics in school-based agricultural education (SBAE) has also been completed (Miller & Gliem, 1994; Stripling & Roberts, 2012; Young, Edwards, & Leising, 2008). However, less research has addressed integrating technology and engineering. This has been a problem of STEM education research and action in general (Coppola & Malyn-Smith, 2006). Career and technical education (CTE), including SBAE, has been pushed to embrace the federal emphasis on STEM. “Agricultural education within the high school environment is becoming heavily looked upon by administrators as a way to bring relative meaning to core academic content that often seems to be a vast wilderness to so many students” (Haug, 2011, p. 7). Documenting and escalating the STEM content taught within agricultural classes may help administrators, politicians, and the public realize their value. This study has sought to contribute to the field by collecting qualitative data on how three typical SBAE programs taught STEM knowledge and skills as well as teacher and student perceptions of STEM within SBAE. In doing so, several of the aforementioned issues and knowledge gaps were addressed.

### Integration Key to Ag Innovation

#### STEM integration leads to agricultural advances – New tech, engineering, and math practices key to future of the Industry

Boone, West Virginia University Agricultural and Extension Education Professor, 15

(Harry, March/April 2015, Agricultural Education Magazine, “The Role of STEM Education in 21st Century Agricultural Education”, Volume: 87, Number 5, <http://www.naae.org/profdevelopment/magazine/archive_issues/Volume87/Mar-Apr_2015.pdf>, p. 2 Accessed 6/30/17, VB)

Dr. Blythe has the opportunity to demonstrate to her colleagues, and the academic community at large, the large amount of STEM topics that are covered in the traditional agricultural education curriculum. From an insider’s point of view, we take for granted the large amount of science, technology, engineering and math that the average agricultural education teacher includes in his/her curriculum. While agricultural education has always included significant STEM components, the amount of STEM has increased with the implementation of the CASE curriculum. We not only teach the concepts, we also teach the application of the concepts. I would argue that the application of the concepts not only increases the student’s knowledge of the subjects but increases the long-term retention of the information.

At the time agricultural education in the United States was in its infancy, the agriculture industry was considerably different than it is today. Around the turn of the twentieth century, approximately fifty percent of the population was involved in production agriculture. Today that number has dropped to two percent. The two percent that are involved in production agriculture produce 41.9% of the world’s corn production, 33% of the world’s soybean production, 20.6% of the world’s beef and veal production and 17% of the world’s milk production. U.S. farmers exports 24% of all agricultural products sold in the world.

How did the United States grow into such a world power in agriculture production? In this author’s opinion this achievement has been made possible through the advancement of STEM concepts. Science has given us better varieties, superior yields, more efficient fertilizers, and advanced techniques. Technology has given us better marketing techniques, more efficient communication, better systems of dealing with the weather, computers, etc. Engineers has produced bigger and better equipment and advanced technologies such as farming with Global Positioning Systems. The use of math is central to the entire agricultural production process.

It is impossible for me to tell you what will happen in the next twenty five to fifty years. Back in the early eighties I knew that the personal computer was going to have an impact, however, I could not predicted the way computers would change our lives. What will be the next “personal computer,” “wireless communication,” or “satellite position system” that impacts the agriculture industry? You can bet it will combine a knowledge of the agriculture industry with one or more science, technology, engineering and math areas.

#### STEM is important to agricultural research

Rada, Minnesota FFA Association Leadership Development Coordinator, 15

[Lavyne, March/April 2015, The Agricultural Education Magazine, “STEM Education Beyond the Classroom”, Volume 87, No. 5, p. 10-11, KW]

As a former agricultural educator, I know the desire to connect classroom experiences to SAE and FFA so students are able to gain hands-on career skills and understand the relevance of classroom content. The AgriScience Fair was one way I was able to see the science concepts taught in a class being applied as the students designed and completed a research experience. Students also used a variety of technology and engineering principles to design the experiment, gather data, and display their results to the audience. The data gathered was then analyzed using math principles so it could either support or disprove the student’s hypothesis. This is just one example of how agricultural education students are applying STEM concepts in FFA, but AgriScience research projects were also one of my favorite ways as a teacher to incorporate inquiry based thinking and allow students to demonstrate their understanding of a topic and the scientific method. Career development events (CDEs) in FFA also have many examples of how STEM concepts are reinforced. Whether it is Agricultural Technology and Mechanical Systems, Food Science and Technology, Milk Quality and Products, Meats Evaluation and Technology or Floriculture, science, technology, engineering and math are used in all of these CDEs and more! Members in the Agricultural Communications event are asked to use a variety of technology to share key messages with an audience on radio, television, print, or on a website. Likewise, Agricultural Technology and Mechanical Systems competitors use technology, engineering and math throughout the event to solve problems related to machinery, electrical systems, construction, and much more. Members in the Nursery/Landscape event apply engineering and math skills as they calculate the needs to execute a landscape plan while maintaining a profit. Members in the Veterinary Science event apply a variety of biology and chemistry scientific principles as they prepare to work with a variety of animals while also applying mathematical concepts including conversions, dose calculations, and invoices. These are just a few examples of how FFA is continuing to provide relevant experiences to members as they apply STEM concepts with Career Development Events. The SAE program is another way for students to apply STEM concepts. Some entrepreneurship SAEs allows students to engineer a product to sell or provide a service while another expands a student’s ability to apply math principles to tracking the income and expenses of their business. One student’s placement SAE applies the science concepts they learned while they work for the local greenhouse and identifies the nutritional deficiency appearing on the plants while another student uses the drone technology to scout and diagnose threats in a corn field. A student with a research SAE is analyzing the effects of organic and inorganic crops on the local watershed while another student is researching the opinions in his community about genetically modified-organisms being labeled on food packaging. A student with an exploratory SAE is researching and completing a job shadow at General Mills with a food scientist learning about how new food products are developed and marketed while another student explores the options for renewable energy sources for her high school. All of these students have experiential learning experiences related to STEM concepts.

#### The future of farming depends on agricultural technology innovations – increasing ag literacy is key to generate enough tech talent

Martinez, et al., Digital Next Founder, 16

[Jacob, Jenni Vietch-Olson, Yethzell Diaz, November 1, 2016, The Agricultural Education Magazine, “The Convergence of Agriculture, Technology and Education, https://www.questia.com/library/journal/1P4-1907806523/the-convergence-of-agriculture-technology-and-education, pg. 22, accessed: 6/28/17, SK]

The future of farming depends on the development of innovative AgTech solutions, but the United States is not generating enough tech talent to fill the needs of the industry. Therefore, the industry must offer competitive salaries to entice recent graduates to work locally. Additionally, community stakeholders, including employers and secondary agriculture education teachers, must prepare young workers with the skills they need to address current agricultural industry needs and drive the direction of local AgTech industry in the future. As we continue to explore ways to build the future Ag- Tech industry, an essential element for sustained workforce development is the inclusion of a local, tech-empowered workforce. Thus, in 2014, we launched the Digital NEST (Nurturing Entrepreneurial Skills with Technology) to build skilled and relevant workforce for our increasingly interconnected world.

### Ag Innovation – Extinction Impact

#### STEM is crucial to advances in agriculture and resource management – the future of humanity depends on it

Spielmaker, National Agricultural Literacy Curriculum Matrix Project Director, 13

[Debra, 2013, Creative Commons Copyleft, “National Agricultural Literacy Outcomes”, <https://www.agclassroom.org/get/doc/NALObooklet.pdf>, p. 10, 6/30/17 KW]

According to most historians, the development of agriculture resulted in the beginning of civilization. Agricultural development has relied on evolving scientific understandings, engineering processes, and the application of both to develop innovative technologies to save labor and increase yields. In the early 1900s, 50% of the U.S. population lived in rural areas, and 30% made their living on the farm (U.S. Department of Agriculture, 2014). Technological advancements of the last century have resulted in a nation where just over 1% (Central Intelligence Agency, 2013) of the population make their living on farms and ranches. It may seem that we no longer need to consider agricultural careers as important or relevant; however, it takes 21 million workers, or about 15% of the U.S. population, to support farm and ranch production, processing, and marketing (Goecker, Smith, Smith, & Goetz, 2010). The fact that 1% of the population produces for the other 99% is a real achievement! What has happened to cause this change in 100 years? Science, technology, engineering and mathematical understandings to address labor, and solve production and environmental problems.

The science and technologies applied to agriculture and food rival the science and technologies applied to medicine. Agriculture is the “other” major health science—applying science, engineering, technology, and mathematics to improve the health of plants and animals, of people, and our environment. The fields of mechanical engineering, microbiology, genetics, and chemistry have their origins intrinsically linked with agriculture and food, and while we have fewer people working on farms, the 21 million workers that support agricultural production include scientists, engineers, and entrepreneurs.

Our quality of life is dependent upon the continued development and appropriate use of science and engineering to provide an abundance of safe, healthy, nutritious food, fibers, and the fuels necessary to sustain the needs of a growing world population. At the same time, we need to sustain the natural resource base of this planet—on which all life depends! While yields and labor-saving technologies remain important, future agricultural scientists and engineers will need to solve additional problems that will lead to a more sustainable agricultural system that feeds a growing population. Theme 4, understanding the science, engineering, technology, and mathematics of agriculture, food, and natural resources is crucial for the future of all humanity.

### Solvency – Curriculum

#### Integration with STEM is key to effective workers – national curriculum key

**DiBenedetto**, University of Florida Agricultural Education and Communication, Ph.D. Candidate/Graduate Assistant, 15

(Catherine, March/ April 2015, The Agricultural Education Magazine, “AGSTEM Interdisciplinary Collaboration: Building Bridges from Subject to Subject to Enhance College and Career Readiness”, Volume: 87, Number 5, http://www.naae.org/profdevelopment/magazine/archive\_issues/Volume87/Mar-Apr\_2015.pdf, p. 5-6 Accessed 6/30/17, VB)

Interdisciplinary learning experiences can assist in bridging the gap between knowledge acquisitions from subject to subject and transfer application into real world experiences. As teachers design their daily lesson plans, do they consider how the skills and concepts they teach relate to what their students are learning in other subjects? Do administrators encourage and provide time for interdisciplinary collaboration among teachers in their schools?

If the common goal of the school is to prepare students to be college and career ready, how are teachers, administrators, parents, industry leaders, and the local community working together to support this goal? Evidence suggests that students are not prepared to enter the 21st century workplace (NRC, 2000). Teachers and industry leaders have voiced concern for college and career preparedness of students as they graduate high school and enter college and/or careers. Teachers indicate that nearly 40% of their students will need remedial training to successfully enter college or a career (MetLife, 2011). Industry leaders indicate that students are not prepared to enter the workforce (Carnevale, Smith, & Melton, 2011). Skills including problem solving, critical thinking, communication, teamwork, initiative, self-direction, and grit/perseverance are required for students to be successful in the 21st century workplace (Duckworth, Peterson, Matthews, & Kelly, 2007). As teachers, how can we support the needs of our students while preparing them to be college and career ready?

Science, technology, engineering, and math (STEM) has become a critical component to discussions in education and industry. STEM integration is not a new concept. Educating our students in STEM subjects has become fundamental to providing them with a foundation for successful employment in the 21st century. If the school system works together, positive outcomes will follow for all 6 The Agricultural Education Magazine involved. Reflect for a moment on the African proverb “it takes a village to raise a child.” It takes the efforts of several teachers within a school system to prepare a student to be college and career ready. The STEM initiative has provided rich prospects for collaboration among teachers. Interdisciplinary collaboration can assist in developing social responsibility and attaining common goals.

#### CASE provides a model for science integration into agricultural education

Ulmer, Texas Tech University teacher educator, and Witt, Texas Tech University Agricultural Education, doctoral student, 11

(Dr. Jonathan and Phillip, September/October 2011, The Agricultural Education Magazine, “Integrating Science Instruction into Pre-Service Teacher Education.” ProQuest, Accessed 6/30/17, GDI - JMo)

Teachers across the country have taken countless credit hours of class that were scientific in nature, whether they were agriculture or core courses. But how do we emphasize the science in the high school agriculture classroom? Many models of content integration have been explored, some teachers rely on their knowledge from college, some cooperate with the biology teachers, and others teach agriculture and let the science speak for itself. Content integration has been around in some programs for many years. Medicine Valley High School in Curtis, Nebraska was working to highlight the science in the agriculture in the late 1990s with activities like electrophoresis and tissue culturing.

Recently an increasing number of states are recognizing the value of agriculture as a science. New policy in Texas allows specific advanced agriculture classes to be credited for one of the four required courses in science or mathematics. The most recent development on content integration from the National Council for Agricultural Education is the Curriculum for Agricultural Science Education (CASE).

The goals of CASE are widespread, but its primary objective is improving student performance in math and science by creating a context for student learning through agricultural education courses. Those at CASE strive to ensure quality teaching by providing extensive training for teachers who choose to use the curriculum in their program. The CASE Institute is the professional development component of CASE that provides 80 hours of instruction for each of the courses that have been developed. This component is required of all teachers to provide teachers important background related to the pedagogy used in the CASE curricula and the opportunity to practice various lessons in preparation for classroom instruction (CASE, 2010).

[Note: CASE = Curriculum for Agricultural Science Education]

### Solvency – Teacher Training

#### Teacher development uniquely increases student achievement in STEM

Stripling, University of Tennessee Department of Agricultural Leadership, Education and Communications Assistant Professor and Ricketts, Tennessee State University Department of Agricultural and Environmental Sciences Professor, 16

[Christopher, John, 2016, American Association for Agricultural Education, AMERICAN ASSOCIATION FOR AGRICULTURAL EDUCATION NATIONAL RESEARCH AGENDA 2016-2020, http://aaaeonline.org/resources/Documents/AAAE\_National\_Research\_Agenda\_2016-2020.pdf, page 32, Date accessed 6-28-17, RK]

Evidence is starting to emerge on effective practices for science, technology, engineering, and mathematics (STEM) integration in school-based agricultural education as well; however, the literature and scope of current works are limited in this field too. The Math-in-CTE model (Stone, Alfeld, Pearson, Lewis, & Jensen, 2006) has shown promise for enhancing the mathematics found within the school-based curriculum, while not diminishing technical skills (Parr, Edwards, & Leising, 2006, 2008; Young, Edwards, & Leising, 2009). Early research has also shown promise for incorporating the Math-in-CTE model into preservice agricultural teacher education (Stripling & Roberts, 2013, 2014). Furthermore, inquirybased instruction and the use of Vee maps appear to positively impact science student achievement (Thoron & Myers, 2010, 2011, 2012). Thoron and Myers suggested when school-based teachers are provided professional development related to the aforementioned strategies and given guidance and feedback on their instruction, science student achievement is advanced. Outside of school-based agricultural education, instructional strategies such as the WISE Seed Discussions, 5E Model, and Learning by Design show promise for improving science achievement and 21st century skills (National Research Council, 2010). The effectiveness of these strategies and other science education strategies should be explored in school-based, postsecondary, and nonformal agricultural education as a means for developing a scientific and professional agricultural workforce.

Note – CTE = Career and Technical Education

### Solvency – Funding

#### Increased federal funding is the first step to integration

Chumbley, West Virginia University Agricultural and Extension Education and Center for Excellence in STEM Education Assistant Professor, 15

(Steven, March/ April 2015, Agricultural Education Magazine, “Taking Advantage of the STEM in Agriscience”, Volume: 87, Number 5, p. 13, ProQuest, Accessed 7/1/17, VB)

An obstacle to STEM integration agriculture science teachers often run into is having enough resources to offer innovative, problem based STEM activities to their students. One way to obtain these resources is through grants and strategic partnerships. As part of the 2015 budget, the Department of Education has set out over $110 million for STEM Innovative Networks. This program will award grants to school districts in partnership with colleges and other regional partners to transform STEM teaching and learning by accelerating the adoption of practices in P-12 education that help to increase the number students who seek out and are well prepared for postsecondary education and careers in STEM fields.

Teachers are encouraged to seek out funding from their school district in support of initiatives to integrate STEM in the agriculture classroom. There are a number of outside sources that teachers can look to as well to seek funding. One such resource is the company STEMfinity (www. stemfinity.com). They offer project based learning STEM curriculum along with grants and grant writing support. I know several agriculture science teachers who have been successful receiving grants that they found through websites like www. stemgrants.com.

As agriculture educators, we are used to developing partnerships and relationships with community and business leaders. I would encourage teachers to take this entrepreneurial spirit when developing resources for STEM integration. Teachers can partner with local universities, museums and industry to increase students learning of technology. Guest lectures from these various partnerships can add to students understanding and interest in STEM within agriculture. Invite a local dealer to bring some of their newest products in and explain to students the advancements in technology and their impact on precision agriculture. To help students better understand the science behind GMOs, invite a local seed rep to discuss this topic and how they benefit production agriculture.

# \*\*\*\*Renewables

### Renewables – 1AC Module

#### The world is nearing the point of no return on climate – the Earth will become Venus

Neuman, NPR, 7-3-17

[Scott, 7-3-17, NPR, “Stephen Hawking: Trump Pushing Earth's Climate 'Over The Brink'”, <http://www.npr.org/sections/thetwo-way/2017/07/03/535377270/stephen-hawking-trump-pushing-earths-climate-over-the-brink>, accessed 7-4-17, AFB]

The world's best-known living physicist, Stephen Hawking, says that President Trump's decision to pull out of the Paris climate change accord could lead humanity to a tipping point, "turning the Earth into Venus."

The Cambridge professor and renowned cosmologist made the remarks in an interview with the BBC that aired Sunday.

"We are close to the tipping point where global warming becomes irreversible," Hawking told the BBC. "Trump's action could push the Earth over the brink, to become like Venus, with a temperature of 250 degrees, and raining sulphuric acid."

Hawking, who is best known for his discoveries about black holes, called climate change "one of the great dangers we face, and it's one we can prevent if we act now.

"By denying the evidence for climate change, and pulling out of the Paris Climate Agreement, Donald Trump will cause avoidable environmental damage to our beautiful planet, endangering the natural world, for us and our children," Hawking told the BBC.

#### Increasing renewable energy in the US can solve climate change

Zervos, Professor at the National Technical University of Athens, 07

[Arthouros Zervos, January 24, 2007, Renewable Energy World, Increasing Renewable Energy in U.S. Can Solve Global Warming, <http://www.renewableenergyworld.com/articles/2007/01/increasing-renewable-energy-in-u-s-can-solve-global-warming-47208.html>]

Landmark analysis released by Greenpeace USA, European Renewable Energy Council (EREC) and other climate and energy advocates shows that the United States can indeed address global warming without relying on nuclear power or so-called "clean coal" -- as some in the ongoing energy debate claim. The new report, "Energy Revolution: A Blueprint for Solving Global Warming" details a worldwide energy scenario where nearly 80% of U.S. electricity can be produced by renewable energy sources; where carbon dioxide emissions can be reduced 50% globally and 72% in the U.S. without resorting to an increase in dangerous nuclear power or new coal technologies; and where America's oil use can be cut by more than 50% by 2050 by using much more efficient cars and trucks (potentially plug-in hybrids), increased use of biofuels and a greater reliance on electricity for transportation. The 92-page report, commissioned by the German Aerospace Center, used input on all technologies of the renewable energy industry, including wind turbines, solar photovoltaic panels, biomass power plants, solar thermal collectors, and biofuels, all of which "are rapidly becoming mainstream."

#### Ag literacy is key to effective renewables deployment

Doerfert, Texas Tech University Agricultural Communications Associate Chair & Professor, 11

[Doerfert, D. L. (Ed.) (2011). American Association for Agricultural Education, “National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015,” <http://aaaeonline.org/resources/Documents/AAAE%20National%20Research%20Agenda.pdf>, pg. 11-12, Accessed 6.28.2017]//TRossow

In the year 2010, the earth’s human population almost reached seven billion. This growing population is experiencing changes in demographics, increased urbanization, increased worldwide agricultural production needs, and changes in agricultural trade policies. In the midst of these changes, the world population is still dependent upon an agricultural system that will provide them with food and clothing as well as an increasing variety of other products (including energy) designed to enhance their living environment. The foundation to this important economic, political, and life-sustaining system is still the farm. However, less than two percent of the U.S. population lives on a farm—a stark contrast to 30% in 1920 and 15% in 1950 (National Research Council, 1988). Technological and economic advances have led to reductions in the number of farms and rural community population and a comparable increase in average farm size. One of the consequences of these shifts is that the majority of today’s elementary school children are at least two generations away from first-hand knowledge of agriculture (American Farm Bureau Federation, 2002; Farm Bureau Federation, 1983). The result is a profound revelation that the future of American agriculture rests in the hands of ninety-eight percent of the United States population who do not reside on a farm and may have little to no understanding of agriculture. Beyond the farm, American agriculture is a broad-based, growing industry that employs people in virtually every community in the nation, plays a vital role in the history of the nation and the food and fiber system, and contributes to our nation’s economy and national security. Unfortunately, this ability to produce food and materials for human usage is a system that the average American takes for granted. This seemingly ambivalent attitude combined with the population shift from rural communities to more urbanized areas has weakened the real success story of American agriculture (Jepsen, Pastor, & Elliot, 2007; Pope, 1990). Arguably, an understanding of agriculture’s history and current economic, social, and environmental significance, both domestically and internationally, is important for all Americans. Supporting this argument is the increasing influence of special interest groups involved in issues such as animal rights, pesticide usage, soil and water conservation, and other environmental concerns as they seek to gain the media’s and public’s attention— often through emotional pleas or capitalizing on negative events in agriculture to better position their cause. As such, it becomes increasingly imperative that the general public understands the history and current challenges of agriculture and how it affects each person’s life on a daily basis (Law, 1990; Sharp, Foster, & Elliot, 2007). In 1988, the National Research Council defined agricultural literacy as the goal of “education about agriculture.” Agriculturally literate people are defined as those who have some knowledge of food and fiber production, processing, marketing, and the practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas, and parks (National Research Council, 1988). Vital to the continued success of the U.S. agriculture industry and the nation as a whole, is a well-informed, literate society that has the capability to make informed decisions about agriculture (Igo & Frick, 1999; Ryan & Lockaby, 1996). Bekker et al. (1999) defined an informed decision as one where a reasoned choice is made by a reasonable individual using relevant information about the advantages and disadvantages of all the possible courses of action, in accord with the individual’s beliefs. For agriculture, this relevant information must include some knowledge of food and fiber production, processing, and domestic and international marketing, as well as agriculture’s role in renewable energy, natural resource management, community resiliency, human nutrition, food safety, and other bio-based products and processes. To achieve this end, consumers and policy makers must have access to information that is critical for informed decision making about agriculture, food, and natural resources. There exists a general belief among K-16 educators, as well as scientists, that people must be scientifically and agriculturally literate in order to make wise and informed economic and political decisions about the use of renewable resources (Cardwell, 1994; Glassman, Elliot, & Knight, 2007). Though functional agricultural literacy does not imply a high scientific level of understanding about agriculture, it does consist of minimal knowledge levels which take into account an understanding of basic agricultural methods, the basic vocabulary of agricultural terms, and the ability to understand the impact of agriculture on society (Frick & Spotanski, 1990). Yet, the problem of agricultural illiteracy remains widespread, having serious ramifications in the arenas of public policy development, development of personnel to serve the broad agricultural industry, and in the education of people from kindergarten through adult levels (Russell, McCracken, & Miller, 1990; Wals, 2010).

### Renewables Solve Climate

#### Renewable energy key to solving climate change

Long, Western Energy Legal Director, 16

[Noah, 7/26/17, The Natural Resources Defense Council, “Renewable Energy Is Key to Fighting Climate Change”, <https://www.nrdc.org/experts/noah-long/renewable-energy-key-fighting-climate-change>, 7/3/17, KW]

Renewable energy is one of the most effective tools we have in the fight against climate change, and there is every reason to believe it will succeed. A recent New York Times column seems to imply that renewable energy investments set back efforts to address climate change—nothing could be further from the truth. What’s more, renewable technologies can increasingly save customers money as they displace emissions from fossil fuels.

### Climate – Extinction

**Warming is real, anthropogenic, and causes extinction**

**Schiffman, The Atlantic, Environmental Writer, 13**

[Richard, September 27, 2013, The Atlantic, “What Leading Scientists Want You to Know About Today’s Frightening Climate Report, <http://www.theatlantic.com/technology/archive/2013/09/leading-scientists-weigh-in-on-the-mother-of-all-climate-reports/280045/>, accessed: 6/30/17, SK]

The polar icecaps are melting faster than we thought they would; seas are rising faster than we thought they would; extreme weather events are increasing**.** Have a nice day! That’s a less than scientifically rigorous summary of the findings of the Fifth Intergovernmental Panel on Climate Change (IPCC) report released this morning in Stockholm. Appearing exhausted after a nearly two sleepless days fine-tuning the language of the report, co-chair Thomas Stocker called climate change “the greatest challenge of our time,"adding that “each of the last three decades has been successively warmer than the past,” and that this trend is likely to continue into the foreseeable future**.** Pledging further action to cut carbon dioxide (CO2) emissions, U.S. Secretary of State John Kerry said, "This isn’t a run of the mill report to be dumped in a filing cabinet. This isn’t a political document produced by politicians... It’s science."And that science needs to be communicated to the public, loudly and clearly. I canvassed leading climate researchers for their take on the findings of the vastly influential IPCC report. What headline would they put on the news? What do they hope people hear about this report? When I asked him for his headline, Michael Mann, the Director of the Earth Systems Science Center at Penn State (a former IPCC author himself) suggested: "Jury In: Climate Change Real, Caused by Us, and a Threat We Must Deal With***."*** Ted Scambos, a glaciologist and head scientist of the National Snow and Ice Data Center (NSIDC) based in Boulder would lead with: "IPCC 2013, Similar Forecasts, Better Certainty." While the report, which is issued every six to seven years, offers no radically new or alarming news, Scambos told me, it puts an exclamation point on what we already know, and refines our evolving understanding of global warming. The IPCC**,** the indisputable rock star of UN documents, serves as the basis for global climate negotiations, like the ones that took place in Kyoto, Rio, and, more recently, Copenhagen. (The next big international climate meeting is scheduled for 2015 in Paris.) It is also arguably the most elaborately vetted and exhaustively researched scientific paper in existence. Founded in 1988 by the United Nations and the World Meteorological Organization, the IPCC represents the distilled wisdom of over 600 climate researchers in 32 countries on changes in the Earth’s atmosphere, ice and seas. It endeavors to answer the late New York mayor Ed Koch’s famous question “How am I doing?” for all of us. The answer, which won’t surprise anyone who has been following the climate change story, is not very well at all. It is now 95 percent likely that human spewed heat-trapping gases — rather than natural variability — are the main cause of climate change, according to today’s report. In 2007 the IPCC’s confidence level was 90 percent, and in 2001 it was 66 percent, and just over 50 percent in 1995. What’s more, things are getting worse more quickly than almost anyone thought would happen a few years back. “If you look at the early IPCC predictions back from 1990 and what has taken place since, climate change is proceeding faster than we expected,” Mann told me by email. Mann helped develop the famous hockey-stick graph, which Al Gore used in his film “An Inconvenient Truth” to dramatize the sharp rise in temperatures in recent times. Mann cites the decline of Arctic sea ice to explain : “Given the current trajectory, we're on track for ice-free summer conditions in the Arctic in a matter of a decade or two... There is a similar story with the continental ice sheets, which are losing ice — and contributing to sea level rise — at a faster rate than the [earlier IPCC] models had predicted.” But there is a lot that we still don’t understand. Reuters noted in a sneak preview of IPCC draft which was leaked in August that, while the broad global trends are clear, climate scientists were “finding it harder than expected to predict the impact in specific regions in coming decades.” From year to year, the world’s hotspots are not consistent, but move erraticallyaround the globe**.** The same has been true of heat waves, mega-storms and catastrophic floods, like the recent ones that ravaged the Colorado Front Range. There is broad agreement that climate change is increasing the severity of extreme weather events**,** but we’re not yet able to predict where and when these will show up. “It is like watching a pot boil,” Danish astrophysicist and climate scientist Peter Thejll told me. “We understand why it boils but cannot predict where the next bubble will be.” There is also uncertainty about an apparent slowdown over the last decade in the rate of air temperature increase. While some critics claim that global warming has “stalled**,”** others point out that, when rising ocean temperatures are factored in, the Earth is actually gaining heat faster than previously anticipated. “Temperatures measured over the short term are just one parameter,” said Dr Tim Barnett of the Scripps Institute of Oceanography in an interview. “There are far more critical things going on; the acidification of the ocean is happening a lot faster than anybody thought that it would, it’s sucking up more CO2, plankton, the basic food chain of the planet, are dying, it’s such a hugely important signal. Why aren’t people using that as a measure of what is going on?” Barnett thinks that recent increases in volcanic activity, which spews smog-forming aerosols into the air that deflect solar radiation and cool the atmosphere, might help account for the temporary slowing of global temperature rise**.** But he says we shouldn’t let short term fluctuations cause us to lose sight of the big picture. The dispute over temperatures underscores just how formidable the IPCC’s task of modeling the complexity of climate change is. Issued in three parts (the next two installments are due out in the spring), the full version of the IPCC will end up several times the length of Leo Tolstoy’s epic War and Peace. Yet every last word of the U.N. document needs to be signed off on by all of the nations on earth. “I do not know of any other area of any complexity and importance at all where there is unanimous agreement... and the statements so strong,” Mike MacCracken, Chief Scientist for Climate Change Programs, Climate Institute in Washington, D.C. told me in an email. “What IPCC has achieved is remarkable (and why it merited the Nobel Peace Prize granted in 2007).” Not surprisingly, the IPCC’s conclusions tend to be “conservative by design,**”** Ken Caldeira, an atmospheric scientist with the Carnegie Institution’s Department of Global Ecology told me: “The IPCC is not supposed to represent the controversial forefront of climate science. It is supposed to represents what nearly all scientists agree on, and it does that quite effectively**.”** Nevertheless, even these understated findings are inevitably controversial. Roger Pielke Jr., the Director of the Center for Science and Technology Policy Research at the University of Colorado, Boulder suggested a headline that focuses on the cat fight that today’s report is sure to revive: "Fresh Red Meat Offered Up in the Climate Debate, Activists and Skeptics Continue Fighting Over It." Pielke should know. A critic of Al Gore, who has called his own detractors "climate McCarthyists," Pielke has been a lightning rod for the political controversy which continues to swirl around the question of global warming, and what, if anything, we should do about it. The public’s skepticism of climate change took a dive after Hurricane Sandy. Fifty-four percent of Americans are now saying that the effects of global warming have already begun. But 41 percent surveyed in the same Gallup poll believe news about global warming is generally exaggerated, and there is a smaller but highly passionate minority that continues to believe the whole thing is a hoax. Formost climate experts, however, the battle is long over — at least when it comes to the science. What remains in dispute is not whether climate change is happening, but how fast things are going to get worse. There are some possibilities that are deliberately left out of the IPCC projections, because we simply don’t have enough data yet to model them. Jason Box, a visiting scholar at the Byrd Polar Research Center told me in an email interview that: “The scary elephant in the closetis terrestrial and oceanic methane release triggered by warming.” The IPCC projections don’t include the possibility — some scientists say likelihood — that huge quantities of methane (a greenhouse gas thirty times as potent as CO2) will eventually be released from thawing permafrost and undersea methane hydrate reserves. Box said that the threshhold “when humans lose control of potential management of the problem, may be sooner than expected.” Box, whose work has been instrumental in documenting the rapid deterioration of the Greenland ice sheet, also believes that the latest IPCC predictions (of a maximum just under three foot ocean rise by the end of the century) mayturn out to be wildly optimistic, if the Greenland ice sheet breaks up. “We are heading into uncharted territory**”** he said. **“**We are creating a different climate than the Earth has ever seen.**”** The head of the IPCC, Rajendra Pachauri, speaks for the scientific consensus when he says that time is fast running out to avoid the catastrophic collapse of the natural systems on which human life depends***.*** What he recently told a group of climate scientist could be the most chilling headline of all for the U.N. report: ***"***We have five minutes before midnight."

### Climate – Conflict Multiplier

#### Climate change causes extinction - turns economy and global security

Brzezinski, Former National Security Advisor, Professor of American Foreign Policy at Johns Hopkins and PhD from Harvard, 12

[Zbigniew Brzezinski, 12, Basic Books, Strategic Vision: America and the Crisis of Global Power, <http://www.otvoroci.com/uploads/3/8/0/5/38053843/strategic_vision__america_and_the_crisis_of_global_power.pdf>, Accessed 7-1-17, RK]

Global climate change is the final component of the environmental commons and the one with the greatest potential geopolitical impact. Scientists and policy makers alike have projected catastrophic consequences for mankind and the planet if the world average temperature rises by more than two degrees over the next century. Plant and animal species could grow extinct at a rapid pace, largescale ecosystems could collapse, human migration could increase to untenable levels, and global economic development could be categorically reversed. Changes in geography, forced migration, and global economic contraction layered on top of the perennial regional security challenges could create a geopolitical reality of unmanageable complexity and conflict, especially in the densely populated and politically unstable areas of Asia such as the Northeast and South. Furthermore, any legitimate action inhibiting global climate change will require unprecedented levels of self-sacrifice and international cooperation. The United States does consider climate change a serious concern, but its lack of both long-term strategy and political commitment, evidenced in its refusal to ratify the Kyoto Protocol of 1997 and the repeated defeat of climate-change legislation in Congress, deters other countries from participating in a global agreement.

# \*\*\*\*Small Farms

### Small Farms – 1AC Module

#### Preservation of small farming crucial to preventing multiple catastrophic impacts – hunger, poverty, environmental collapse, climate change

Quintana, World Rural Forum scientific coordinator, 14

[[Conchi Quintana](mailto:%20cquintana@ruralforum.net) is scientific coordinator at the World Rural Forum, based in Arkaute, Spain. April 17, 2014, Association of Science-Technology Centers, “FAMILY FARMING: FEEDING THE WORLD, CARING FOR THE EARTH,” <http://www.astc.org/astc-dimensions/family-farming-feeding-the-world-caring-for-the-earth/>, accessed 6.27.2017]//TRossow

Benefits of family farming

FAO defines family farming as a “form of organizing crop and forest production as well as fishery, livestock raising, and aquaculture, which is managed and directed by a family, which mainly depends on family labor of both women and men. The family and the holding are linked, co-evolve, and combine economic, environmental, reproductive, social, and cultural functions.”

Family farming is found in all continents but overwhelmingly in developing nations. It fulfills a number of functions fundamental to the welfare of all humanity:

• Family farming feeds the world. Seventy percent of the world’s food products are produced by family farmers, whose activities are therefore crucial to combating hunger and malnutrition. In addition, small farms are often more productive than large industrial agricultural operations in terms of output per unit of land and energy use.

• Family farming generates well being. Forty percent of the world’s households depend on family farming for their livelihood. Of the 3 billion rural inhabitants in developing countries, 2.5 billion belong to families working in agriculture. It is important to note that women account for almost half of developing nations’ agricultural labor resources.

• Agriculture combats poverty. Gross domestic product (GDP) **growth originating in agriculture reduces poverty twice as much as equivalent GDP growth in other sectors**, according to the World Bank. Agricultural and rural growth also benefit the urban poor by creating more wealth and jobs while offering more and cheaper food.

• **Family farming protects biod**iversity **and the environmen**t. Family farming is a source of genetic diversity that uses seed varieties and livestock breeds well adapted to various environments. It also promotes the use of agroecological and traditional techniques, thus supporting the healthy functioning of ecosystems. Family farming is recognized as more resilient to the impacts of climate change due a wealth of knowledge on coping with natural disasters, amassed over many centuries. Moreover, it contributes to maintaining the population in rural areas and preserving historic cultural values. However, we must acknowledge that not all family farming methods are free from negative impacts, and we must continue to raise farmers’ awareness in this respect.

Goals for 2014

IYFF-2014 is not an end in itself. It is a key link in a process that aims to achieve the recognition of family farming and its potential to be the leading actor in its own development.

That said, the priority goal of IYFF-2014 is to promote within every nation truly active policies on behalf of the sustainable development of agricultural systems based on family units. Given the diversity of family farming systems and their different contexts, this goal comprises a series of concrete objectives:

• Recognize farmers and Indigenous organizations as the essential interlocutors of public authorities. This is crucial to ensure that agricultural policies take into account the real needs of these actors.

• Increase public investment in infrastructures and services in rural areas.

• Directly support rural women through investment, credit, land titling, etc.

• Increase rural employment, particularly for youth.

• Promote agricultural research.

• Establish training programs and build capacity.

• Develop social awareness about the importance of family farming in order to strengthen links between urban and rural society. (Science centers and museums can play an important role in addressing this last objective in particular.)

Family farming must be a key factor in the UN’s [Zero Hunger Challenge](http://www.un.org/en/zerohunger/#&panel1-1) as well as in the current formation of the UN post-2015 [Sustainable Development Goals](http://sustainabledevelopment.un.org/index.php?menu=1300).

Moving to action

To achieve a sustainable future, family farming needs the involvement and commitment of all agents—farming organizations, research centers, science centers and museums, **educational institutions**, the media, development agencies, and public authorities.

Science centers and museums that serve audiences outside of rural areas have a particularly important educational role to play. It is crucial for people living in urban and suburban areas to understand and recognize the importance and functions of family farming so that they can join the call for measures to strengthen this form of agriculture. In this way we all can contribute to reducing the vulnerability of the food system in a world where, despite progress in production levels, nearly 900 million people suffer from hunger and malnutrition. Paradoxically, the majority of such people live in the rural areas of developing nations.

IYFF-2014 national committees around the world are leading activities related to public education, advocacy, and training. We invite science centers and museums to contact their national committees and get involved. To learn more, click [here](http://www.familyfarmingcampaign.net/archivos/comunicacion/_poster_cientificoen.pdf) or contact WRF’s [José Osaba](mailto:%20osabajose@gmail.com).

In addition, science centers and museums may wish to participate in the World Meeting on Family Farming and Research, to be held in Montpellier, France, in June. The meeting is being organized by WRF and three organizations engaged in agricultural research: Agropolis Fondation, CGIAR, and CIRAD. To learn more, contact [José Osaba.](mailto:%20osabajose@gmail.com) IYFF-2014 is also holding an [international photo competition.](http://extra.agriculturesnetwork.org/survey/photocompetition/)

The celebration of IYFF-2014 offers 365 opportunities for each and every one of us to support the world’s family farmers in the interest of combating poverty, achieving food security, and attaining a vibrant rural society, based on respect for the environment and biodiversity.

#### Teaching the next generation is key to sustaining farms

Plumer, Washington Post, 12

[Brad, 10/2/12, Washington Post, “After a 70-year drop, small farms make a (small) comeback”, https://www.washingtonpost.com/news/wonk/wp/2012/10/02/after-a-70-year-drop-farming-makes-a-small-comeback/?utm\_term=.4251e1f85335, accessed 7-1-17, p. 1, KW]

For decades, the number of farmers has been shrinking as a share of the population, and agriculture has often been seen as a backbreaking profession with little prestige. But the last Agricultural Census in 2007 showed a 4 percent increase in the number of farms, the first increase since 1920, and some college graduates are joining in the return to the land.

Jordan Schmidt, a crew manager here at Hearty Roots, studied environmental science at Wesleyan. Ms. Schmidt, 27, did not have so much as a garden growing up, but in college, she said, she worked at a student-run farm and fell in love with agriculture. So she gave up on research science and moved onto a farm in Pennsylvania after graduating. This is her third season at Hearty Roots.

True, this appears to be a largely voluntary move — a smattering of college graduates who find farm life more appealing than, say, a cubicle job. Yet some experts think we could well see an even bigger shift toward farming in the coming years. Sharon Astyk, author of "A Nation of Farmers," points out that the U.S. agricultural sector is facing demographic pressures that will create a huge demand for younger farmers in the coming years:

Let us say that we will need only 2% of the US population to become farmers. But since the vast majority of farmers are facing retirement within the next two decades, and under 35 farmers are such a tiny percentage, that means we will need to train 30-50 times as many young farmers in the next two decades as we have been doing. The numbers could be substantially higher. But where would even those small numbers of farmers come from? Even if the younger farmers were to have a lot of kids and encourage them to stay on the farm, that doesn’t resolve the problem.

So where do they come from? This is a new problem for human society – while we’ve always had some people take up agriculture as a new profession (and when that happened, say, during the settlement of the US west, there were always extremely high failure rates and ecological costs), the vast majority of those who did the work and stayed at it grew up on farms. We have never before in human history (except perhaps when we developed agriculture, and that didn’t happen all at once) had to teach an entire generation of non-farmers to farm. But that’s the problem we face.

#### The plan solves – Status quo agriculture training insufficient to face impending ensure the next generation of farmers are ready to face the agriculture challenges threaten millions and undermine political stability worldwide

Mercier, former Senate Agriculture Committee Chief Economist & Farm Journal Foundation Director of Policy and Advocacy, 15

[Stephanie, July 2015, AGree, “Food and Agricultural Education in the United States”, <http://www.foodandagpolicy.org/sites/default/files/AGree_Food%20and%20Ag%20Ed%20in%20the%20US_0.pdf>, p. 1, accessed 6-26-17, AFB]

Food and agricultural education in the United States has changed over the nation’s history, starting in the 18th century as a means of providing farmers with the basic skills they needed to prosper on their farms. In the 19th and early 20th centuries, traditional agricultural education was focused on increasing production to sustain a growing and increasingly urban and industrial population. Today, the range of issues and subject matters important to agriculture has broadened, and the educational system to provide skilled individuals to fill the needed occupations has scrambled to keep pace. The crucial areas of expertise now encompass not just those trained in production agriculture but also food and nutrition, natural resources, and the know-how to maintain and improve the physical and scientific infrastructure that underlies modern agriculture, including an increased role for information technology with the emergence of “big ag data.” For the U.S. food and agricultural sector to be in a position to compete in the global markets of the 21st century, the food and agricultural education system must be expanded and strengthened to address the challenges and opportunities facing the global food system. The world will likely become a much more politically stable place if we can make a further dent in the number of hungry people, estimated at 805 million people in 2014 by the UN’s Food and Agriculture Organization. This paper examines the evolution of U.S. food and agricultural education over time, its current structure, and how it must adapt to meet the challenges facing the sector.

Modern food and agricultural education takes many forms, ranging from children in grade school classrooms learning from “Agriculture in the Classroom” modules to undergraduate and graduate students enrolled in Colleges of Agriculture at land-grant universities and other schools with agricultural programs (such as Texas Tech and Southern Illinois Universities) to agricultural leadership programs available for adult professionals in farming and agribusiness in 42 states.1 This paper focuses primarily on food and agricultural education provided to students in elementary and secondary schools around the country (K-12), both inside and outside the classroom, and in community college programs. These programs are a means of exposing young people to careers in agriculture, and they are also a critical delivery mechanism to educate the general population about agriculture and food systems. The subjects covered in these educational settings have broadened in recent years to include health and nutrition and natural resource issues. The need for better knowledge in these areas has arisen as the general public has become more conscious of the health impacts of the food they eat and natural resource constraints such as water and arable land.

Today there are two primary reasons to support U.S. food and agricultural education activities for young people. First, we need to build a cadre of next generation farmers and ranchers as well as career seekers interested in food and agriculture. The 2012 Census of Agriculture reports that the average age of principal operators on U.S. farms is 58.3 years of age, with only 8.1 percent of all operators below the age of 35. U.S. agriculture would likely continue to produce abundant amounts of food and fiber if older farmers were not replaced as they retire, but the farm size composition of the sector could become further concentrated. To ensure that the social and economic stabilizing role of family farming is preserved, the U.S. government has for many decades taken steps to provide access to the two most important things a young farmer needs to get started: 1) adequate capital to buy or lease equipment and land to farm, and 2) adequate education so young people and other new entrants will have the know-how to farm. Today’s farmers must have an expanded technological skill set—for example, if they want to maintain their own farm equipment they need to have computer programming skills as well as be handy with a wrench and a screwdriver.

### Farm Consolidation Now

#### Farm sector is consolidating now – beginning farmers from now-farming backgrounds are needed

Ruhf, Land for Good co-director, 12

[Katherine, Summer 2012, Small Farms Digest, Volume 15, pg. 5-6, “How will the Next Generation of Farmers Acquire the Land to Farm or Ranch?” <https://nifa.usda.gov/sites/default/files/sfd_s12.pdf> accessed 7.1.2017]//TRossow

How will the next generation of farmers acquire the land to farm or ranch? This question is arguably among the most pressing challenges now facing U.S. Agriculture. We know that **nearly half of US farmers are age 54 or older.** Approximately 70% of US farmland will change hands in the next two decades. But how will this transfer occur, and will farm seekers be able to access the land they need?

As a partial consequence our aging farmer population, **farm ownership is becoming increasingly concentrated** among older farmers and older farm landlords. At the same time, fewer exiting farmers have identified successors. In one Iowa study, only one third of respondents reported having identified a successor. This is both a challenge and an opportunity – **particularly for beginning farmers from non-farming backgrounds** who do not have family farms to stay on, go back to or inherit.

Inheritance has historically been the most common way to acquire a farm in the United States. For decades, the assumption was that only through inheritance or access to land through family ties was it possible for the average farmer to have a farm. However, this traditional succession model of farmland transfer—passing a farm from an older generation to a younger one within the same family through purchase, gift, or inheritance— accounted for only about half of farmland acquisitions in the early 1990s. A Wisconsin study showed only 20% of beginning dairy farmers entered farming by taking over a family operation.

In many cases, exiting farm owners cannot afford to pass the farm to the next generation in a way that will ensure that it is farmed. And, as more young people leave the family farm, there are fewer farming heirs to take over the farm. When they do, it is often burdened with debt. Plus, the next generation is likely to want to farm differently than their parents, which may require additional investment for new infrastructure or new enterprise development. If there is no farming heir, the family is burdened with several concerns. They must find a way to keep the land in farming, if that is their wish, while providing for heirs and adequately financing their own retirement.

Thus, traditional methods of farm succession and transfer -- passing the farm to the next generation -- are no longer adequate to address contemporary legal and financial complexities. If the family farm succession pattern is shrinking, and so many more farms are vulnerable to transition as our farmers exit from farming, alternative paths to farm access will be increasingly important.

### Farmer Shortage Now

#### Small farms can succeed – there’s currently a lack of young people involved

McAleer, National Institute of Food and Agriculture, 12

[Patricia, Summer 2012, Small Farms Digest, Volume 15, pg. 2-4, “Getting Started in Farming” <https://nifa.usda.gov/sites/default/files/sfd_s12.pdf> accessed 7.1.2017]//TRossow

Many people are considering farming or ranching as a new occupation these days, and for various reasons. Some plan to enjoy their retirement in a rural setting, perhaps increasing their satisfaction by growing a few crops or tending a few animals. Others hope to become more traditional farmers, supporting their families through production agriculture. Some of them are young, perhaps with little or no farming background. Others may have waited and saved for years to afford this opportunity. Whatever motivation, no one takes the decision lightly. Like any other new business venture, starting a farm or ranch involves a great deal of thought and planning. This edition of the Small Farm Digest lays out key issues that must be considered, identifying challenges and offering examples of how these challenges can be met.

If you are interested in becoming a farmer or rancher, you are certainly not alone. A 2007 agricultural survey estimated that of the approximately 3 million U.S. agricultural operators1, more than 650,000 were beginning farmers or ranchers (BFRs). This is a diverse group. It is often assumed that BFRs are young, but recent data show only about 16% of them are under 35, compared to 1% of established farmers and ranchers (EFRs.) 50% are between 35-50, 22% are between 50 and 64, and 12% are 65 or older.

Most BFR’s are men, but women are more likely to be principal operators on beginning operations than on established ones (15% versus 9%.) Pennsylvania State University professor Rachel Unger notes that despite ‘significant barriers to success for new and beginning women farmers, the number of female principal operators in the U.S. increased almost 30% between 2002 and 2007.’ Recent data show little difference in racial or ethnic backgrounds between BFRs and EFRs, but more detailed information may be available from the 2012 Ag. Census.

As with any new venture, beginning farms and ranches tend to be smaller than established operations (174 acres on average compared to 461 acres for EFRs) but there is wide variation across the country. Most BFR operations are less productive and profitable than more established ones. For example, in 2010 family farms with gross sales of $10,000 to $249,999 (i.e. excluding the smallest operations) accounted for 17% of the value of U.S. agricultural production while all BFR operations were responsible for 10% of the value of production by family farms.

This is not surprising. It may take several years to generate a significant harvest (think of tree crops) and in 2010 nearly 32% of Beginning Farms were ‘without production.’ Also, as noted above, many BFRs focus on rural retirement with little interest in farming or ranching for profit.

How likely are you to succeed as a BFR? A 2007 ARMS Survey analysis of linked Census data showed that 45% of farms and ranches started between 1978 and 1982 survived the first 5-9 years. 19% were still in business by 1997. The failure rate is comparable to that of other new businesses. Analysis also showed that the longer an operation is in business, the greater the chance that it will survive. More information is in the ERS report: Understanding U.S. Farm Exits.

There are various reasons why new enterprises fail, but finding good land is a key challenge. Unlike established operators, many BFRs buy most of the land they operate, and carry a heavy load of debt. Kathy Ruhf’s article, How Will the Next Generation of Farmers Acquire Land to Farm or Ranch, discusses the availability and high cost of land, and lays out sound alternatives to land purchase. In Starting a Small Farm, Rachel Pollock describes how leasing very small urban plots often helps establish immigrant farmers.

Some BFRs do acquire land within the family, by inheritance or by working with existing family members. Professor Duffy’s article, Inheriting a Farm, not only clarifies issues related to inheritance but is also a useful guide on what to look for when any piece of land is being considered for a farm or ranch. Similarly, in On the Home Farm he gives a thorough discussion of issues that must be considered when family members or any group of operators decide to farm or ranch together.

Significant capital is essential when starting a new farm or ranch, not only to find land but for other investments such as farm machinery, and as a steady supply of operating capital. Few new operations generate much cash in the early years, however, and many BFRs use their off-farm income to subsidize the farm or ranch, hoping it will eventually become profitable enough to be their sole source of income. Professor Duffy’s article PartTime or Small Farms discusses this approach in some detail. He also raises a concern that young BFRs may skimp on health insurance in the interim.

The **2008 Farm Bill** introduced or expanded several opportunities to help BFRs. In particular, USDA’s Farm Service Agency offers considerable support. James Radintz’ article explains the kinds of loans available, addresses eligibility, and clarifies steps BFRs must follow. See also the article on U.S. Farm Bill Resources and Programs for Beginning Farmers by S. Ritchie and S. Sureshwaran in Choices Magazine.

Individual Development Accounts also help BFRs save and increase their own savings. Molly Bloom’s article on California Farmlink’s 20 years of experience shows how these accounts work and how effective they can be.

\* BFRs = beginning farmers or ranchers

\*EFRs = established farmers or ranchers

### Ag Education Solves Small Farms

#### Agriscience programs allow for shifts in small scale farms

LaRose, University of Florida Agricultural Education doctoral graduate student, 2016

(Sarah, 3/14/16, The Agricultural Education Magazine. “Teach Local: Incorporating the Local Food Movement into Agricultural Education Curriculum.” ProQuest, P.22-23 , Accessed 6/30/17, GDI - JMo)

Responding to the Changing Agricultural Economy

While I worked as an agricul- ture education instructor at the Ellis Clark Regional Agriscience and Technology Program at Nonnewaug High School in Woodbury, Connecticut, I noticed an increasing number of farms in the area had revised their production methods, products, services, and marketing strategies in order to capitalize on local markets. In particular, fruit and vegetable production was be- coming a more common practice of area farms, with many converting from exclusive dairy produc- tion to small-scale diversified crop operations. More and more of the SAE projects that I was visiting focused on direct-to-consumer sales of produce such as farmers’ market sales and Community Sup-ported Agriculture (CSA) business models, and some program graduates were the employers of these students. Nonnewaug’s agricultural education program began in 1920, originally focusing on educating young men return- ing to work on their parents’ dairy farms. In subsequent years, it has grown to provide a wide range of programming offerings in animal science, ornamental horticulture, natural resources, and agricultural mechanics, but the last time hat curriculum offerings focused on fruit and vegetable production was over thirty years ago!

In response to the growing industry trend towards localized food sales, I created and implemented a Local Food Production curriculum within the agriscience program beginning in the fall of 2012. The course has grown from a single unit within the scope of a sophomore livestock production class, to an independent sopho- more class, to now an indepen- dent junior/senior course offering in addition to a sophomore class. During this time our school constructed a hydroponic green- house and I obtained a National FFA Food For All Grant to begin a school garden. Both the garden and the greenhouse now supply produce to the town’s food bank along with the school’s culinary arts classes, school cafeteria, and most recently a few different restaurants. As a result, new community partners have been brought on board to support the programming offered by the agriscience program.

### Small Farms Good – Laundry List

#### Small farms are the most effective way to reduce poverty and improve food security

DoCompo, research associate at the Chicago Council on Global Affair’s Global Food and Agriculture Program, 17

[Isabel DoCampo joined the Council's Global Food and Agriculture Program in 2015 and currently serves as a research associate. February 1, 2017, Chicago Council on Global Affairs, “A Food-Secure Future: The Promise and Power of Agricultural Development,” <https://www.thechicagocouncil.org/blog/global-food-thought/food-secure-future-promise-and-power-agricultural-development>, accessed 6.28.2017]//TRossow

Poverty and Hunger on the Decline

In the fight to end **global poverty and hunger**, **no effort has proved more effective than the promotion of small-scale agriculture as a development tool**. Agricultural development works—not only because the world’s poorest and hungriest are most often small farmers, but because of the **amplifying impacts** of rural poverty alleviation on nutrition, health, education, and community development.

Over the past two and a half decades, the world has seen impressive reductions in hunger and poverty. Between 1990 and 2015, the number of people living in extreme poverty—on less than $1.90 a day—[decreased by **more than 1 billion**](http://www.un.org/millenniumgoals/poverty.shtml), even as populations grew significantly. The number of undernourished decreased by [over **200 million**](http://www.fao.org/3/a-i4646e/index.html). And, these gains have been even more pronounced in low-income countries, with these regions seeing [75 and 50 percent reductions](http://www.un.org/millenniumgoals/poverty.shtml) in numbers of poor and hungry people, respectively.

With nearly [80 percent](http://www.worldbank.org/en/topic/agriculture/overview) of the world’s poor reliant on farming for income, it comes as no surprise that agricultural development has driven much of this advancement. Agricultural development efforts include a variety of activities: promoting access to finance, inputs, and new technologies, training on optimal agricultural techniques, encouraging the full participation of women throughout the sector, facilitating market access, and building research and government capacity, among others.

Together, these activities generate significant impact: **growth in the agricultural sector is**[**up to four times**](http://www.worldbank.org/en/topic/agriculture/overview)**more effective in raising incomes among the poorest people as compared to other sectors**. As efforts to expand the output, market reach, sustainability, and resilience of agriculture in low-income regions have taken shape, so too have effective pathways out of poverty. As families expand their agricultural production, they earn greater incomes—allowing them to access more diverse and nutritious diets, pay for school fees and healthcare, and invest in their business or communities.

#### Multiple benefits to small farms – diversity, environment, economic equity, food security

Rosset, Institute for Food and Development Policy Executive Director, 99

[Peter, September 1999, Transnational Institute, “The Multiple Functions and Benefits of Small Farm Agriculture in the Context of Global Trade Negotiations”, <http://www.agter.org/bdf/_docs/rosset_foodfirst_pb4_en.pdf>, p. 2-3, accessed: 6/27/17, KW]

What the USDA calls the public value of small farms includes:

a. Diversity: Small farms embody a diversity of ownership, of cropping systems, of landscapes, of biological organization, culture and traditions. A varied farm structure contributes to biodiversity, a diverse and esthetically pleasing rural landscape, and open space.

b. Environmental benefits: Responsible management of the natural resources of soil, water, and wildlife on the 60 percent of all U.S. farms less than 180 acres in size, produces significant environmental benefits for society. Investment in the viability of these operations will yield dividends in the stewardship of the nation's natural resources.

c. Empowerment and community responsibility: Decentralized land ownership produces more equitable economic opportunity for people in rural areas, as well as greater social capital. This can provide a greater sense of personal responsibility and feeling of control over one's life, characteristics that are not as readily available to factory line workers. Land owners who rely on local businesses and services for their needs are more likely to have a stake in the well-being of the community and the well-being of its citizens. In turn, local land owners are more likely to be held accountable for any negative actions that harm the community.

d. Places for families: Family farms can be nurturing places for children to grow up and acquire values. The skills of farming are passed from one generation to another under family ownership structures. When farm children do not continue to farm, farming knowledge, skills and experience are lost.

e. Personal connection to food: Most consumers have little connection to agriculture and food production. As a consequence, they have little connection with nature, and lack an appreciation for farming as cultivation of the earth for the production of food that sustains us. Through farmers' markets, community supported agriculture, and the direct marketing strategies of small farmers, consumers are beginning to connect with the people growing their food, and with food itself as a product of a farmer's cooperation with nature.

f. Economic foundations: In various states and regions of the U.S., small farms are vital to the economy.

The USDA Commission on Small Farms concludes with a powerful call to change the policies that have favored large, corporate-style farms for so very long, with hideous costs to rural communities and the environment.

### Small Farms Good – Biodiversity

#### Industrial farms are collapsing biodiversity now - only a shift towards family farming solves

\*multiple warrants - monocultures, pesticides, diets

\*A2 - industrial farms key to food

Kravitz, Food journalist, 16

[Melissa, writer in New York City who writes about food and culture for First We Feast, Thrillist, Elite Daily, Edible, and other publications, internally cites American Farmland Trust, a Washington, D.C.-based nonprofit that promotes environmentally sound farming practices, Severine von Tscharner Fleming, founder of the [Greenhorns](http://www.thegreenhorns.net/category/about/aboutus/), a non-profit group working to support a new generation of young farmers, a 2012 United Nations [report,](http://www.un.org/esa/dsd/dsd_sd21st/21_pdf/agriculture_and_food_the_future_of_sustainability_web.pdf) "Food and Agriculture: The Future of Sustainability, and the US Department of Agriculture.”, 10-12-16, Alternet, “The Many Ways Farmer's Markets and Small Family Farms Are Essential to Our Future,” <http://www.alternet.org/food/why-farmers-markets-are-critical-food-security-environment-and-public-health>, accessed 6.27.2017]//TRossow

**Ending food insecurity** may be as easy as supporting your local farmers market. In advance of [World Food Day](http://www.fao.org/world-food-day/2016/home/en/)on October 16, American Farmland Trust, a Washington, D.C.-based nonprofit that promotes environmentally sound farming practices, named its [top farmers markets](http://markets.farmland.org/) in the nation, many of which are based in warmer southern states like Florida and Virginia. But no matter what region you live in, farmers markets and small farms are essential to community health.

“**Small family farms** have been shown to be the **most effective**, per acre, at **ecological stewardship, biodiversity and production of nutrition**,” said Severine von Tscharner Fleming, founder of the [Greenhorns](http://www.thegreenhorns.net/category/about/aboutus/), a non-profit group working to support a new generation of young farmers. “Small family farms employ more workers, supporting the local economy and rural prosperity … and can adapt and change with the market demands or shifts in climate," she argues.

Rather than **massive monoculture farms**, which may vend millions of pounds of corn to be turned into animal feed or sugary cereal, smaller farms grow a variety of products—and it’s in the farmers’ best interest to treat their land sustainably (i.e., not decimate the soil with **toxic pesticides** and fertilizers), as well as treat their animals with respect and compassion.

While factory farms may produce a higher quantity of food, the "more is better" logic is not particularly relevant to our public health concerns—or our economy. “The current ‘more production’ orientation is so outdated and unresponsive to our current needs that it is causing its own problems, particularly for our environment and natural resources,” according to a 2012 United Nations [report,](http://www.un.org/esa/dsd/dsd_sd21st/21_pdf/agriculture_and_food_the_future_of_sustainability_web.pdf) "Food and Agriculture: The Future of Sustainability." The report suggests a significant investment in small- and medium-sized farms to improve the overall health and viability of our food system worldwide.

By not using massive industrial farming and irrigation equipment, small farms better maintain the quality of our soil, air and water, which, from a public health standpoint, is pretty essential to our daily well-being. In contrast, explained von Tscharner Fleming, "large scale agribusiness landscapes not only degrade soil and water quality in the short term, reducing the biological health of the soil ecosystem, but also make them much more vulnerable to **disease** and **drought**, to **crisis and collapse."**

Moreover, small farmers can have closer connections to particular needs of a community and "have an investment in community health," said Juliet Sims,  program manager at the Prevention Institute, a community health nonprofit based in Oakland, California. "We see support for small and mid-size farmers to engage in sustainable food production as a critical component of a sustainable food system that allows us to be food secure in the future."

The USDA’s most recent [Scientific Report of the Dietary Guidelines Advisory](https://health.gov/dietaryguidelines/2015-scientific-report/pdfs/scientific-report-of-the-2015-dietary-guidelines-advisory-committee.pdf)committee emphasizes the importance of fresh, unprocessed whole foods in American diets. "A diet higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in calories and animal-based foods is more health-promoting and is associated with less environmental impact than is the current U.S. diet,” the report states.

The key to reducing greenhouse gases and improving our overall health with better food options? You guessed it: **Small farms**. In its 100-plus pages of research, the USDA reiterates the importance of local agriculture to improve long-term food security. “Access to sufficient, nutritious, and safe food is an essential element of food security,” the report states. “A sustainable diet ensures this access for both the current population and future.”

And this isn’t just a research theory—supporting local agriculture works.

“Farmers markets and farm stands can really improve the diets of community members who are food insecure,” Sims said. For example, in 2015 the California Nutrition Incentives Act created financial incentives for [CalFresh](http://marketmatch.org/) (the equivalent of SNAP benefits) to match dollars spent on produce at farmers markets. Every CalFresh dollar spent on produce earns a matching dollar to spend on produce, which has “dramatically increased people’s intake of fruits and vegetables, often produced more sustainably and locally,” Sims explained. In Davis, the Market Match program has increased farmers market purchases [by almost 300 percent](http://www.sacbee.com/opinion/editorials/article81451527.html), building the local economy while simultaneously improving the health of the community.

Those not part of CalFresh or SNAP programs can support local agriculture by shopping at farmers markets, or subscribing to CSAs and local farm cooperatives. Even people in urban settings can get in on small farm purchasing, with services like FreshDirect delivering CSA boxes directly to New York City stoops. Sites like [Overstock](https://www.overstock.com/Farmers-Market/44/store.html) have also started delivering locally grown produce, and countless local initiatives by region bring the farmers market online and make it easier than ever to support local farms.

"We need to protect our remaining small farms, as teaching facilities, as places for ecological education and recreation, as **reserves of biodiversity and rare animal breeds**, as functional farm systems as a buffer against urban growth,” said von Tscharner Fleming.

#### Small farms are key to biodiversity

Nowakowski, former National Geographic graphics reporter, 16

[Kelsey, 11/10/16, National Geographic, “On Tiny Island Farms, Biodiversity Is a Way of Life”, <http://www.nationalgeographic.com/people-and-culture/food/the-plate/2016/11/on-a-tiny-island--farmers-promote-biodiversity/>, accessed: 7/1/17, KW]

Growing a variety of plants like the Jamaican farmers do contributes to food security by maintaining agricultural biological diversity—known as agrobiodiversity for short. Protecting that diversity is becoming more difficult, though, since most of the world’s cultivated land is dedicated to growing the handful of staples we eat. According to the Food and Agriculture Organization, [75 percent of the world’s food comes from only 12 plant species](http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf).

“In rural Jamaica, small farms blend in with the forests. In that variety lays the protection of biodiversity. The farmers know that to keep the soil healthy and food production up, they need the wild trees and native shrubs,” says study co-author [Ina Vandebroek of the New York Botanical Garden](http://www.nybg.org/science/scientist_profile.php?id_scientist=83).

Agrobiodiversity can ensure there are many food source options in case something goes wrong with one. The Irish Potato famine of the mid 1850s, which was caused by a blight that devastated the island’s main food source, is the classic example of something going wrong. More recent examples abound: Bananas are cloned (See [The Miracle of the Modern Banana](http://www.nationalgeographic.com/people-and-culture/food/the-plate/2016/08/the-miracle-of-bananas/)), as is agave, leaving both vulnerable to pests or viruses.

#### Small farms sustain biodiversity

Rosset, Institute for Food and Development Policy Executive Director, 99

[Peter, September 1999, Transnational Institute, “The Multiple Functions and Benefits of Small Farm Agriculture in the Context of Global Trade Negotiations”, <http://www.agter.org/bdf/_docs/rosset_foodfirst_pb4_en.pdf>, p. 14, 6/27/17, KW]

Many small farm agroecosystems in the Third World are located on a wide variety of slopes, aspects, microclimates, elevational zones, and soil types. They are surrounded by many different vegetation associations. There are numerous combinations of diverse biophysical factors which have led to the diverse cropping patterns developed by farmers to exploit site-specific characteristics. Descriptions of the species and structural diversity and management of these traditional systems are found throughout the literature on agroecology (see for example, Altieri, 1995; Pretty, 1995; Netting, 1993; The Ecologist, 1998).

In many areas traditional farmers have developed and/or inherited complex farming systems which are highly adapted to local conditions, allowing them to sustainably manage production in harsh environments while meeting their subsistence needs, without depending on mechanization, chemical fertilizers, pesticides or other technologies of modern agricultural science (Altieri 1995).

Compared to the ecological wasteland of a modern export plantation, the small farm landscape contains a myriad of biodiversity. The forested areas from which wild foods, and leaf litter are extracted, the wood lot, the farm itself with intercropping, agroforestry, and large and small livestock, the fish pond, the backyard garden, allow for the preservation of hundreds if not thousands of wild and cultivated species. Simultaneously, the commitment of family members to maintaining soil fertility on the family farm means an active interest in long-term sustainability not found on large farms owned by absentee investors.

If we are truly concerned about rural ecosystems, then the preservation and promotion of small, family farm agriculture is a crucial step we must take.

### Big Farms Bad – Environment

#### Mass mono-cropping leads to biodiversity loss and groundwater contamination

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 388, accessed: 7/1/17, KF]

By many accounts, the rise of modern industrial agriculture began in the mid-20th century with the Green Revolution.78 The intention was simple—to alleviate global hunger and food insecurity through technological innovations in agriculture**.**79 **Crop yields were increased through large-scale monoculture farming with a combination of chemical inputs and industrially-engineered crop varieties**.80 This movement was championed in the United States under the guidance of Earl Butz, the former secretary of agriculture under President Richard Nixon. The Farm Bill of 1973 offered subsidies directly to farmers to grow commodity crops, which they would plant densely and exclusively as subsidies were directly linked to the farmers yield.81 These reforms were also viewed as ecologically sound because proponents believed that such landholding structures would prevent more of virgin land from being converted to farmland (as they saw happening with smaller farms) and allow unused farmland to be ecologically restored.82

Although in numeric terms, the Green Revolution succeeded in radically increasing yields of many crops, such as wheat, rice, soybeans, and corn, **other structural changes required to achieve these results had negative consequences for ecological health and sustainability.**83 In addition to rapid **declines in smaller traditional** farms and the replacement of farmers with large agribusinesses as leaders of the agricultural sector, the industrial farming model created unprecedented dependence on chemical inputs to crops and soil.84 Former food cultivation practices, such as crop rotation and manure fertilization, were replaced with manufactured pesticides and fertilizers, as the integration of livestock and diversified crop production were discontinued on factory farms.85 **These chemicals, on which there is often little research with regard to ecological and health impacts, are heavily concentrated in the soil**, run off into major water bodies, **and seep into groundwater**.86 Further, such **intensive farming techniques are linked with high levels of soil erosion and decreased biodiversity in surrounding areas.**87

### Big Farms Bad – Climate

#### Big farm practices are a major cause of climate change – only small farms can solve

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 389, accessed: 7/1/17, KF]

The **cumulative impacts of industrial farming have also been implicated as a major contributor to climate change patterns**, as the lifecycle impacts of these intensive practices—from production to transportation to consumption of food and fuel—disrupt critical ecological processes, and generate massive greenhouse gas emissions.91

Although these challenges have long been the cause of the mainstream environmental movement,92 **both the food justice and environmental justice movements also have major stakes in the ecological and climate consequences of the current farming system.** As discussed above, these stakes are in part predicated on the social inequities arising from environmental degradation. However, as illustrated below, literature from both movements indicates an equal and inextricable concern for ecological sustainability and the ethical treatment of animals.93

### Biodiversity Impact – Extinction

#### Biodiversity is intrinsically valuable and prevents extinction -- it’s not too late but changing agricultural practices is required

Hicks, Eco-Business Deputy Editor, 17

[Robin, internally cites Marco Lambertini, director-general of environmental group World Wide Fund for Nature, also known as WWF. June 21, 2017, Eco-Business, “Why biodiversity loss is scarier than climate change,” <http://www.eco-business.com/news/why-biodiversity-loss-is-scarier-than-climate-change/>, accessed 7.1.2017]//TRossow

While the plight of tigers, sharks and rhinos may be sad, does it really matter to mankind if these species go extinct? Should we care if the only way to see these beasts is in a zoo or aquarium, or if they go the way of the Dodo?

Preserving these species is not only in the interests of zoologists and animal lovers, **it is essential to safeguard the future of our own,** says Marco Lambertini, director-general of environmental group World Wide Fund for Nature, also known as WWF.

Talking to Eco-Business on the sidelines of [Ecosperity](https://www.ecosperity.sg/), an annual sustainability conference held by Singapore investment firm Temasek, Lambertini pointed out that nature has an **intrinsic, intangible value that cannot be measured.**

A price tag cannot be placed on the feeling of wonder on seeing, say, an eagle soaring over a hillside, or the sense of calm one feels when strolling through a forest, although [“forest bathing”](http://www.shinrin-yoku.org/shinrin-yoku.html) - the act of simply being in a forest - has been a recognised healing method in Japan since the 1980s.

Calculations can be made about the value of individual animals, for example, an African elephant might be worth around US$2 million a year in tourism value, and a whale shark in the Philippines a similar amount, estimates Lambertini. But it is harder to work out how much an ecosystem is worth.

“A forest is not just a piece of greenery,” says Lambertini. “It’s a network of animals and plants all working together to make the forest a living system that **produces oxygen, regulates water and retains the soil** for us. It’s hard to put a price on that.”

The cost of loss

Although it is more difficult to work out how many species of plants and animals there are on Earth than stars in the sky, says the World Resources Institute, the rate of species loss can be more reliably measured.

It is estimated that **150 to 200 species of plant, insect, bird and mammal go extinct every 24 hours**. This, Lambertini observes, is almost **1,000 times the natural rate of extinction**, and the fastest rate of species loss since the demise of the dinosaurs 65 million years ago.

WWF’s [Living Planet report](http://awsassets.panda.org/downloads/lpr_2016_full_report_low_res.pdf)from 2016 showed that of 3,706 wildlife populations around the world, 60 per cent have disappeared in the last 40 years.

“We need to work out the **invisible value of nature**,” says Lambertini. “**We cannot have a prosperous society in a depleted planet.”**

The numbers behind the impact of this decline are stark. According to a [report from the United Nations-backed Business and Sustainable Development Commission](http://www.eco-business.com/opinion/the-us5-trillion-opportunity-asian-businesses-cannot-afford-to-ignore/) launched at Ecosperity, biodiversity loss in Asia could **reduce g**ross **d**omestic **p**roduct **globally by 18 per cent** by 2050, up from just over 3 per cent in 2008.

The reason for the decline is that, for most of the two million years that humankind has been around, “we’ve taken nature for granted. Fruits were there to be picked, fish to be fished, game to be hunted,” says Lambertini.

“Only in the last 50 years, because of the demographic and technological boom, we’ve realised that these resources are not infinite. Using them up will massively affect economic and social stability.”

People and companies must go from being “grabbers” of natural resources, to being stewards and managers of nature. “That’s a big cultural transition to make, but it’s not easy,” he says.

Paying for ecosystems

A [study in 2014 by ecologists](https://www.cieem.net/news/184/global-ecosystem-services-revalued-at-us125-145-trillion-per-year) found that the services provided by nature, such as trees filtering air and water, plants storing carbon, insects pollinating crops and the mental health benefits of green spaces, were worth US$125 trillion to **US$145 trillion a year**. The study also found that losses **from land use change** amounted to US$4 to US$**20 trillion a year.**

The services provided by nature are now increasingly being valued because they are becoming **less reliable and less available**, says Lambertini. The deforested areas of Sumatra in Indonesia, for example, are experiencing much less precipitation than they used to, because the forest has gone, he notes.

Even mining companies are starting to invest in conserving forests upstream because they are such big users of water.

But the **agricultural sector**, which uses **70 per cent of the world’s fresh water**, is **far behind**, and moving **much slower** towards recognising **its own dependence** on nature, notes Lambertini.

“We need to be able to plan agriculture in a way that **incentivises high yields instead of just using more land**,” says Lambertini, whose comments came on the same day that the chairman of the Indonesia Investment Coordinating Board, Thomas Lembong, told delegates at Ecosperity that years of deforestation and haze had been caused by [low productivity on the part of Indonesia’s agroforestry industry](http://www.eco-business.com/news/how-to-build-a-business-around-the-sdgs-and-do-more-with-less/).

“We need to produce more food with less of everything; water, land and energy. We need to get the right balance of where we produce and where we protect,” says Lambertini. “The forest provides water regulation, pollination and local microclimate and precipitation services.”

Cities depend on the water regulated by forests, and Lambertini points to Singapore as a country whose water supply is reliant on the Central Catchment Reserve, a small patch of forest surrounding a lake that also holds the richest of Singapore’s biodiversity.

“The reason there are still trees in the middle of the island is because of their function to regulate water for the city. Municipalities are beginning to preserve forest areas because of the services they provide,” he says, at a time when Singapore’s remaining forests - which make up just three per cent of the city-state’s land area -[face ongoing threats from construction and development](http://www.eco-business.com/opinion/planet-earth-ii-ignores-threats-to-singapores-last-forests/).

Reason to be optimistic

Though ecosystems face increasing pressure from human development, the head of an organisation with 5 million followers says he is optimistic.

“It couldn’t be a better time. I’ve never seen a stronger response to the ecological crisis than now, both from government and business,” says Lambertini, who has been a conservationist for the last 45 years, taking the top job at WWF three years ago, moving across from BirdLife International, where he was chief executive.

**But there is a long way to go.** While climate change has entered the mainstream of political thinking and is now used by corporates to assess business risk, biodiversity is treated as largely an irrelevance.

Biodiversity loss is **even scarier than climate change.**

“It’s extraordinary how climate change has in the last 10 years surged to top of the political agenda and is used in business risk assessment. With the [Donald] Trump announcement about [the United States pulling out of the] Paris [Agreement on climate change], [80 per cent of big businesses in the US stood up and complained](http://www.independent.co.uk/news/business/news/donald-trump-climate-change-paris-agreement-wall-street-exxon-blackrock-global-warming-united-states-a7766331.html),” says Lambertini.

“Climate change is now considered a serious issue and a dangerous issue, for society, for business, for everything.”

“With climate change we’re not there yet, but we’re on the right track. With biodiversity, we’re nowhere near,” he says.

“The concept [of biodiversity] is too remote, too esoteric, too intangible. People don’t connect. And yet people are sad when they hear about extinctions, or the decline of animal populations, or deforestation - but they’re not worried.”

That’s the difference with climate change, says Lambertini, while acknowledging that the two issues are often interlinked, for instance climate change leads to coral bleaching, which in turns leads to biodiversity loss.

“We need to make biodiversity loss and nature loss a serious issue, an issue that people are afraid of,” he says. “We are scared of climate change, but the loss of nature is “**even more scary**,” says Lambertini.

“If we lose the oxygen that comes from the ocean and the forest, then **we really are doomed**. There’s no doubt about that.”

The struggle for environmentalists, says Lambertini, is to find ways to connect biodiversity - the foundation of ecosystems - to the services people enjoy every day.

“That’s the challenge. I am optimistic that we won’t ignore that challenge, and make nature as a big an issue as climate change.”

#### Biodiversity loss is on the brink - but it’s not too late to solve

Eurasia Review, independent journal, 17

[Eurasia Review, independent journal that provides news and analysis on world events that affect Eurasia and Afro-Eurasia, internally cites Forest Isbell, of University of Minnesota’s College of Biological Sciences, McGill biologist Andrew Gonzalez and coauthors from eight countries on four continents. [June 2, 2017](http://www.eurasiareview.com/02062017-report-says-were-on-brink-of-mass-extinction-but-still-time-to-act/), “Report Says We’re On Brink Of Mass Extinction, But Still Time To Act,” <http://www.eurasiareview.com/02062017-report-says-were-on-brink-of-mass-extinction-but-still-time-to-act/>, accessed 7.1.2017]//TRossow

Imagine being a scuba diver and leaving your oxygen tank behind you on a dive. Or a mountain climber and abandoning your ropes. Or a skydiver and shedding your parachute. That’s essentially what humans are doing as we expand our footprint on the planet without paying adequate attention to impacts on other living things, according to researchers from the University of Minnesota and McGill University. Because we **depend on** plants and animals for food, shelter, clean air and water and more, **anything we do** that makes life harder for them eventually comes around to make life harder for us as well.

But, reporting with colleagues from around the world in this week’s special biodiversity issue of the scientific journal Nature, the researchers also note that **all is not lost**, and offer specific strategies for turning that tide **before it’s too late.**

Forest Isbell, of University of Minnesota’s College of Biological Sciences, McGill biologist Andrew Gonzalez and coauthors from eight countries on four continents provided an overview of what we know and still need to learn about the impacts of habitat destruction, overhunting, the introduction of nonnative species, and other human activities on biodiversity.

In addition, they summarized previous research on how biodiversity loss affects nature and the benefits nature provides — for example, a recent study showing that reduced diversity in tree species in forests is linked to reduced wood production. Synthesizing findings of other studies, they estimated that **the value humans derive from biodiversity is 10 times what every country in the world put together spends on conservation today** — suggesting that additional investments in protecting species would not only reduce biodiversity loss but provide economic benefit, too.

“Human activities are **driving the sixth mass extinction** in the history of life on Earth, despite the fact that diversity of life enhances many benefits people reap from nature, such as wood from forests, livestock forage from grasslands, and fish from oceans and streams,” said Isbell, who served as lead author the paper. “It would be wise to invest much more in conserving biodiversity.”

“Biodiversity plays a big role in the UN Sustainable Development Goals that aim to ensure human wellbeing in the long-term” said Gonzalez. “Attaining the UN SDGs will require action to conserve and restore biodiversity from local to global scales”.

### Definition

#### Definition of small farms

Ebodaghe, National Institute of Food and Agriculture Small Farms Program, National Program Leader, 13

[Denis, Summer 2013, United States Department of Agriculture, “Small Farm Digest: Food Safety for Small Farmers”, <https://nifa.usda.gov/sites/default/files/sfd_s13.pdf>, accessed: 7/1/17, pg. 2, SK]

In 1998, the National Commission on Small Farms report, A Time to Act: A Report of the National Commission on Small Farms, described small farms as “farms with less than $250,000 gross receipts annually on which day-to-day labor and management are provided by the farmer and/or the farm family that owns the production or owns, or leases, the productive assets.” Today, this description describes approximately 91 percent of all U.S. farms.

# \*\*\*\*Food Justice

### Food Justice – 1AC Module

#### Food inequality growing rapidly now – absent intervention, the gap will widen

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

In the United States, policy discussions about food insecurity often ignore the histories of institutionalized racism that have caused widespread hunger and poverty, and instead tend to place the blame on the struggling communities. These discussions also often overlook a particular “relativistic quality that has wormed its way into our food system over the past ten years.” As lower-income areas begin to make small improvements in access to healthy food, such as the addition of a grocery store or the slightly improved reach of the food stamp program, higher-income communities, by comparison, “leap ahead” with increases in their purchase of local and organic foods. The result is that, “as trends in consumption associated with lifestyle and health expand one class's universe of choice and perceived health benefits, a lower, less privileged class barely catches up to where the other class was in the last decade.” Without an effective intervention, this gap is likely to continue its expansion.

#### Millions of households go hungry – local involvement key to reducing structural inequities in the food system

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

Over the past decade, the United States has seen a dramatic increase in awareness of the state of our food supply, urban agriculture, and nutrition. Often missing from these discussions, however, is an understanding of food oppression's structural causes. Instead, the focus typically lies on personal responsibility and the need to bring in outside information to educate communities deemed to be suffering from hunger and health problems. Because many people who work to address food access are outsiders to urban communities of color, “many community organizations remain unaware or closed to the ways racism works in the food system.” Such **food organizations often overlook the histories of institutionalized racism when proposing “solutions” or goals such as self-sufficiency**. **Funding needs often demand allegiance to organizations outside of the community and thus do not challenge the power structures that create racial disparities**.

Throughout the United States, many **low-income communities and communities of color face a daily food crisis.** According to the U.S. Department of Agriculture (USDA), **17.2 million households were “food insecure” in 2010, and struggled to acquire adequate food** due to lack of financial resources. In addition to facing food insecurity, urban areas often exist in what are commonly called “food deserts” or grocery gaps, locales in which there are no grocery stores or other opportunities to purchase fresh, healthy food, which typically co-exist with “food swamps,” areas which have a high prevalence of unhealthy food options, such as fast food and convenience stores. In a 2009 report to Congress, the USDA also found that “higher levels of racial segregation and greater income inequality” define urban areas. The USDA also found that close to six percent of all U.S. households lacked access to obtain the food they “wanted or needed,” and over half of these households also lacked sufficient financial resources for food.

#### Food justice is a crucial approach to solving environmental sustainability and justice

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 391, accessed: 7/1/17, KF]

Shared values of **ecological sustainability and respect for the interdependence of nature and life further illustrate the fundaental connections between the environmental justice and food justice movements**. Though **food justice advocacy alone cannot address all negative and disparately burdensome ecological impacts**, food is nevertheless one of the major—and most relatable—angles from which to approach environmental sustainability and environmental justice. Any **achievements in food justice, as defined by the current movement, will also be successes for environmental justice**.

#### Government inaction contributes to structural racial and economic inequality – prioritizing local farming and promotion of healthy options are key to reducing structural inequities

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

Racial justice scholar Andrea Freeman asserts that the **damage done by lack of access to healthy food has a “pronounced and extreme effect on low-income people of color**” which “represents a form of structural oppression that activists must incorporate into a struggle for racial and economic justice.” Structural food oppression undermines the well-being and very survival of low-income, urban communities of color. Since the food we consume so directly impacts our health, the **negative impacts of lack of adequate nutrition and the stress of hunger permeate all other aspects of life.** As expressed by one scholar, “[h]ealth is fundamental to every aspect of life,” and “**without health, a student cannot do well in school; a worker cannot hold a job,** much less excel at one; a family member cannot be an effective parent or spouse. **Health crises and the staggering costs they impose are critical underlying causes of poverty, homelessness and bankruptcy**. People of color who live in racially segregated neighborhoods are exposed to greater health risks. African-Americans confined to segregated areas have historically experienced rising mortality rates due to overcrowding leading to disease and drug use. These **forms of structural racism are shaped heavily by government policies.**

Such policies include providing public assistance that is insufficient to cover the cost of fresh food, drawing resources and services out of the cities, zoning and incentive policies that favor corporations over community-based businesses and urban farming, and government subsidies that facilitate saturation of urban communities and schools with fast food. This **government-sponsored racial inequality tends to be obscured by the “distinction between public and private spheres of action and is perpetuated by the myth of personal choice, even where a lack of options and resources severely limits the ability to exercise choice.**”

#### Agricultural education programming reduces community hunger and food swamps by providing access to healthy foods.

LaRose, University of Florida Agricultural Education doctoral graduate student, 2016

(Sarah, 3/14/16, The Agricultural Education Magazine. “Teach Local: Incorportating the Local Food Movement into Agricultural Education Curriculum.” ProQuest, P.22-23 , Accessed 6/30/17, GDI - JMo)

Responding to the Changing Agricultural Economy

While I worked as an agriculture education instructor at the Ellis Clark Regional Agriscience and Technology Program at Non- newaug High School in Woodbury, Connecticut, I noticed an increasing number of farms in the area had revised their production methods, products, services, and marketing strategies in order to capitalize on local markets. In particular, fruit and vegetable production was be- coming a more common practice of area farms, with many converting from exclusive dairy production to small-scale diversified crop operations. More and more of the SAE projects that I was visiting focused on direct-to-consumer sales of produce such as farmers’ market sales and Community Sup- ported Agriculture (CSA) business models, and some program graduates were the employers of these students. Nonnewaug’s agricultural education program be- gan in 1920, originally focusing on educating young men returning to work on their parents’ dairy farms. In subsequent years, it has grown to provide a wide range of programming offerings in animal science, ornamental horticulture, natural resources, and agricultural mechanics, but the last time hat curriculum offerings focused on fruit and vegetable production was over thirty years ago!

In response to the growing industry trend towards localized food sales, I created and implemented a Local Food Production curriculum within the agriscience program beginning in the fall of 2012. The course has grown from a single unit within the scope of a sophomore livestock production class, to an independent sophomore class, to now an independent junior/senior course offering in addition to a sophomore class. During this time our school constructed a hydroponic green- house and I obtained a National FFA Food For All Grant to begin a school garden. Both the garden and the greenhouse now supply produce to the town’s food bank along with the school’s culinary arts classes, school cafeteria, and most recently a few different restaurants. As a result, new community partners have been brought on board to support the programming offered by the agriscience program.

### Access to Healthy Food Low Now

#### Lack of funding presents problems to accessing healthy food in schools

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 380-2, accessed: 7/1/17, KF]

One important example of a food justice challenge is the source and quality of food served in school cafeterias. Although problems are pervasive in school food programs across the United States,32 they are particularly dire in under-resourced public schools, **which often do not have the means to create alternative school food programs or to secure resources for farm-to-school programs**.33 However, **the food justice framework views impacted communities as leaders in defining the problems and helping to craft viable solutions.** In a case study in examined in Gottleib and Joshi’s Food Justice, public school students from New Orleans—a city with a rich local food culture—were served cafeteria food that was imported from distant sources, “tasted terrible” and did not support the local economy.34 The middle school activists in the study, called the Rethinkers, defined **the problem in their schools not only as a matter of where their food came from and its quality, but also as a problem of the broader conditions of the cafeterias** where they ate, and the amount of time they were given to eat their food.35 Their advocacy also extended to support the local shrimp industry, which, as they learned, was being displaced because of imports of cheap, chemical-laden shrimp from abroad.36 Rather than relying on an authoritative, top-down solution to the problem, the students ensured that they had a say in the outcome, appealing to the school district Superintendent for eliminating “junky eating utensils,” using healthy, local food sources,, and placing local shrimp on the menus.37

In this way, Gottlieb and Joshi suggest**, the movement for food justice is about advancing “opportunities for moving toward a more just, healthy, democratic, and community-based system.**”38

Advocacy around food justice in the United States has manifested in many forms, from activism around domestic food law and policy (most notably, around the federal Farm Bill, which has historically created farm subsidies for commodity crops (e.g., corn, soybeans, wheat) **and public assistance funds for food to low-income individuals and families**39)or around developing programs and institutions designed to reconfigure local and regional food systems **such that they will provide all communities with greater and more equitable access to safe, healthy, and local food**.40 Urban agriculture, community supported agriculture (CSAs), kitchen gardens, coops, and local food artisans joined the menu of other food initiatives, most of which targeted hunger at an individual level.41 Food policy councils, first established in Knoxville, Tennessee in 1981,42 have rapidly proliferated in the past decade as forums through which concerned citizens and government officials can collaborate on resolving critical challenges to the local food system. This concentration on local food systems, with which local residents are most familiar, creates new opportunities not only for bolstering local economies, but also for gradually altering the global food system as localized policies are replicated across the nation.

### Community Gardening Unsustainable Now

#### Community gardening system unsustainable

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

The permanence of urban gardens is consistently in question. Often, rather than repeal or rewrite restrictive zoning ordinances to allow for urban agriculture, cities prefer to grant informal permission to community groups to create gardens on vacant lots. This structure is problematic because community groups have no legal recourse when the city decides to use the land for another purpose. In New York City Environmental Justice Alliance v. Giuliani, plaintiffs argued that “community gardens are highly beneficial to minority communities and that the elimination of gardens would therefore have an adverse impact on some aspects of the lives of the neighborhood residents.” Rejecting testimony that there were other available parcels suitable for development that would be less harmful to communities of color, the court held that the harm from eliminating the community garden was justified by the city's plan to “build new housing and foster urban renewal.” Here, as in the case of the Morning Glory Community Garden, the city prioritized other types of land use over urban agriculture. Community gardeners seeking to secure land sometimes achieve this goal thorough the use of intermediaries, such as land trusts to clear title, or through typically impracticable measures such as adverse possession or implied dedication.

#### Corporations undermine gardening opportunities

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

Land grabs are “large-scale acquisition of agricultural, range, and forest lands by outside interests.” These acquisitions are occurring throughout the world, mainly in Africa and other parts of the “Global South.” Many tend to think of land grabs as happening mostly in developing countries, but it is happening in the United States with increasing frequency. Corporations in the United States are currently engaged in urban land grabs under the guise of eradicating the “food deserts.” The global recession is forcing food retailers, seeking profits in untapped markets, to focus on low-income urban communities.

The poor and hungry do not benefit from these large-scale land acquisitions. According to one researcher, “[l]and grabs, which aim at 20 percent profits for investors, are all about financial speculation.” Accordingly, “this is why land grabbing is completely incompatible with food security; food production--or any other legitimate economic activity--can only bring profits of 3-5 percent. Land grabbing simply enhances the commodification of agriculture whose sole purpose is the over-remuneration of speculation capital.” These land grabs take money out of the community and put it into the hands of corporations. Recent government incentives to offer healthy food are providing large entitlements to corporate grocers, such as Wal-Mart to open stores in the inner city.

Global corporations, such as Wal-Mart and Kroger, see an opportunity to “capture public entitlements” by stating an intention to address the “food desert” problem. **These urban land grabs, however, “contradict the food justice movement's vision for a just, sustainable, and democratic food system,”** and they do not take history into account. **History reminds us that many of the same corporations have previously opened stores in our nation's low-income, inner cities and then abandoned them, taking community resources out of the community with them.** One such situation occurred in West Oakland, when the grocer Foods Co. entered the community, acquired land, opened a store, and closed its doors soon after, taking with it funding and local investment. Even though funding initiatives, such as the U.S. Department of Health and Human Services' Healthy Food Financing, are intended to support local food projects in practice, **large corporations are beating out food justice advocates because they have the necessary capital to set up their stores quickly**. Since there is no system in place to favor community-owned food projects, corporations are displacing local economies with the new urban land grab trend. While the corporate stores might meet some food access needs, this undemocratic development process will likely reduce green space, decrease community investment in urban areas, and further decrease food autonomy.

### Food Inequality Impacts

#### A lack of healthy food disproportionately creates health issues along class and race lines.

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 386, accessed: 7/1/17, KF]

Historic outflows of capital from urban centers starting in the second half of the 20th century took many food retailers away from cities, where supermarkets proliferated rapidly in suburbia.66 Despite densely populated communities with considerable market power, many urban food deserts have not been able to attract supermarkets back to inner-cities in part because of misconceptions about lack of profitability and security embedded into decades’ old business plans.67 Higher development costs in low-income areas may create further barriers to entry for major food retailers.68 **The result is a significant market failure,** wherein food desert residents are left with few local healthy food choices, and supermarkets compete for a smaller share of an oversaturated suburban market.69 Further, the types of food retailers that are available in these neighborhoods— convenience stores, liquor stores, and fast food restaurants—often have few healthy food options.70 **The lack of healthy food choice has major implications for health outcomes in these communities. Diabetes, heart disease, and other diet-related illnesses are prevalent in these environments,** **causing further disparities in the quality of life along race and class lines.**7

### Gardens Solvency

#### Gardens are key to survival in areas of severe hunger and obesity.

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

In an area such as the South Bronx, which is the reported **home of the most severe hunger problems in the United States**, community **gardens can be integral to survival**. There, obesity rates are also some of the nation's highest. While the simultaneous **existence of extreme hunger and obesity may suggest a paradox, hunger and nutrition experts explain that “[these] plagues [are] often seen in the same households, even the same person**: the hungriest people in America today, statistically speaking, may well be not sickly skinny, but excessively fat.” Significantly, the Bronx is also one of the most diverse areas in the country. According to the 2011 Census, the population is 43.3 percent African-American and 53.8 percent Latino. The South Bronx faces many challenges due to structural racism, creating a situation in which “the food insecurity study is hardly the first statistical measure in which the Bronx lands on the top--or, in reality, the bottom.” The **crisis in the South Bronx is representative of the hunger and food access limitations that impact communities of color throughout the country.** Institutionalized racism operates on multiple structural levels simultaneously; thus, an urban community of color that lacks healthy food will likely also face housing inequalities, **health disparities, substandard education,** and overrepresentation in the criminal justice system, as well as a lack of structural power to alter these injustices. **An anti-racist analysis of hunger is necessary to contextualize the power dynamics and structures responsible for food inequality**.

#### Gardening is a viable method to feed communities.

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

**Despite a history of urban agriculture as a viable method of feeding communities, the United States has generally regarded urban gardening as a recreational activity**, a way to build community, or a way to green the cities. Working class American urbanites, however, have long used urban gardening as “a source of food security in lean times.” Garden programs serving schools, prisons, and “at-risk” youth have existed for many years, and public health experts acknowledge the role of gardening to promote nutrition, socialization, **and healthy development.** In the 1890s and 1930s, urban **gardening was used to address unemployment**, and during World Wars I and II, **“victory” gardens were used to protect against food shortages**.

In the late 1960s **urban agriculture began spreading in the wake of urban riots over segregation and police brutality**. After the riots, thousands of empty lots lay unoccupied where buildings had previously stood. Many of the destroyed buildings had been food stores, and when there was no financial support to bring the stores back, communities began planting gardens in these abandoned lots. Most African-Americans in the cities had migrated from the South, so they used their knowledge of agriculture to grow urban vegetables. Now, fifty years later, thirty cities have urban-farming projects, and there are 10,000 community gardens in the United States. New York City alone has an impressive 600 city gardens, involving over 20,000 residents.

#### Gardens are the most effective way to reduce poverty and improve food security

DoCompo, research associate at the Chicago Council on Global Affair’s Global Food and Agriculture Program, 17

[Isabel DoCampo joined the Council's Global Food and Agriculture Program in 2015 and currently serves as a research associate. February 1, 2017, Chicago Council on Global Affairs, “A Food-Secure Future: The Promise and Power of Agricultural Development,” https://www.thechicagocouncil.org/blog/global-food-thought/food-secure-future-promise-and-power-agricultural-development, accessed 6.28.2017]//TRossow

Poverty and Hunger on the Decline

In the fight to end **global poverty and hunger**, **no effort has proved more effective than the promotion of small-scale agriculture as a development tool**. Agricultural development works—not only because the world’s poorest and hungriest are most often small farmers, but because of the **amplifying impacts** of rural poverty alleviation on nutrition, health, education, and community development.

Over the past two and a half decades, the world has seen impressive reductions in hunger and poverty. Between 1990 and 2015, the number of people living in extreme poverty—on less than $1.90 a day—decreased by **more than 1 billion**, even as populations grew significantly. The number of undernourished decreased by over **200 million**. And, these gains have been even more pronounced in low-income countries, with these regions seeing 75 and 50 percent reductions in numbers of poor and hungry people, respectively.

With nearly 80 percent of the world’s poor reliant on farming for income, it comes as no surprise that agricultural development has driven much of this advancement. Agricultural development efforts include a variety of activities: promoting access to finance, inputs, and new technologies, training on optimal agricultural techniques, encouraging the full participation of women throughout the sector, facilitating market access, and building research and government capacity, among others.

Together, these activities generate significant impact: **growth in the agricultural sector is up to four times more effective in raising incomes among the poorest people as compared to other sectors**. As efforts to expand the output, market reach, sustainability, and resilience of agriculture in low-income regions have taken shape, so too have effective pathways out of poverty. As families expand their agricultural production, they earn greater incomes—allowing them to access more diverse and nutritious diets, pay for school fees and healthcare, and invest in their business or communities.

### Community Food Solvency

#### Community produced food creates direct benefits.

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

Inner-city people are not going to the farmers markets. It's not because they're not interested. Some of it is because of prices, but mostly it's because they are not community-owned. The **issue of community ownership, the idea that this is ours and that the money spent will circulate to help us, is a real issue**. So **what we do. . .is have food stands that are run by neighborhood people. They're in front of churches, and people know that they're run by members of the community.** In this way, **we're bringing food directly to the people in a way that gives them ownership**, so they purchase the food. I think that's the missing link. **Inner-city people are tired of others creating things for them and expecting them to participate with no direct benefit.**

#### Community supported change can access politics of food inequality.

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

F**ood justice has the capacity to reorient the food movement towards addressing inequities while seeking to transform the food system as a whole.** Additionally, “[f]ood justice is integrated into other social justice movements, such as those concerned with community economic development, the environment, housing, or transportation.” If this integration does not take place within the context of a clear understanding of historical and present-day institutionalized racism, we will be unable to build an inclusive, successful coalition that makes the changes needed to achieve equality on all levels. Hopefully, however, as we come to understand the following sentiment, stated by Justo Gonzalez, **we will continue implementing community-supported solutions and institutional changes**:

The first thing we must do is realize that**, more often than not, hunger is a political problem.** ‘Politics,’ in the strictest sense, is the manner in which humans divide and distribute power and resources. **People are not hungry in this country and elsewhere because they don't know how to raise food or are lazy . . . . They are hungry because they have no access to power, and therefore no access to food.**

#### Community production is key to food justice– current lack of access to resources prevents change.

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 379-80, accessed: 7/1/17, KF]

Food Justice is an emerging movement that can be understood as a **departure from the sustainable food movement.**24 Like environmental justice, food justice centers its activities on achieving equality for low-income and low-access communities.25 Rather than aiming for food practices and policies—like do-it-yourself food cultivation and expensive fresh food markets—which require significant disposable income and presume easy access to other necessary resources26, food justice aspires to establish healthy food as a fundamental right and to eliminate barriers to its access.27 The term “food justice” is defined in several ways, likely as a result of its recent emergence as a social movement. Some have attempted to define it in terms of the injustices it is designed to combat, such as advocating against “the maldistribution of food, poor access to a good diet, inequities in the labour process and unfair returns for key suppliers along the food chain.”28 Others, like attendees of the 2012 Food + Justice = Democracy conference, define it as **“the right of communities everywhere to produce, process, distribute, access, and eat good food regardless of race, class, gender, ethnicity, citizenship, ability, religion, or community.”**29 The conference attendees also defined **“good, healthy food and community wellbeing” as “basic human rights**.”30 In the 2000 edition of the journal Race, Poverty, and the Environment, which was devoted to the food system, the editors observed that the environmental justice definition of the environment as the place “where we live, work, and play,” could be extended to “where, what, and how we eat.”31 In all these interpretations, **the food justice movement is a direct critique of the global industrial food system and the negative impacts of its policies, laws, and practices on human health, the environment, culture, and equity.**

#### Local food autonomy key to environmental and food justice

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 391-2, accessed: 7/1/17, KF]

Central to the purpose of the environmental justice and food justice movements in the United States is the conclusion, supported by empirical evidence,96 **that specific populations within the nation suffer the brunt of the negative externalities of industry, economic development, and food production, while receiving the smallest share of the economic, social, and political benefits of those activities.**97 Advocates of both movements view these results as unjust and anathema to principles of equality and democracy, and set as their missions the eradication of such disparities.98 The goals of both movements, however, reach beyond their core missions. With regard to environmental justice, Gottlieb and Fisher highlight several so-called parallel movements with which advocates are concerned, including fair access to affordable housing and gainful employment.99 Food justice activists are also affiliated with parallel movements to address immigration reform, labor, gender inequality, and cultural hegemony.100 Accounting for these related causes, perhaps the best interpretation of both movements’ goals is to achieve real improvements in the quality of the social, economic, and political lives of historically disenfranchised groups, including low-income and predominantly minority communities. Such improvements may be measured in various ways, such as the extent to which people are able to control what goes into their bodies through full disclosure of food inputs and industrial outputs, maintaining authority over the cultivation and stewardship of ancestral and tribal lands, or simply having access to public transportation to reach healthy food markets**. Justice in both movements, therefore, is not only about equity and access, but also about sovereignty, the power to determine, regardless of background, the conditions under which a community lives and the range of healthy choices available to its members.**

To that end, **both movements demand meaningful public participation in policy decisions impacting the quality of life in all communities**.101 Beyond the standard notice and comment procedures common to most government bodies, environmental and food justice advocates desire a place at the table for the full decision-making process, from initial policy proposals to implementation.102 Possessing the same vision for how to achieve just policies, food justice, and environmental justice operate within highly compatible frameworks, which can only be made stronger and more comprehensive if integrated. As discussed in detail below, food policy councils are ideal institutions in which to achieve such integration.

#### Benefits outweigh the costs– lack of public participation re-entrenches inequality.

**Purifoy, J.D. Harvard Law School, & Duke University Environmental Policy PhD candidate, 14**

[Danielle M., 2014, Duke Law Scholarship Repository, "Food policy councils: integrating food justice and environmental justice,” http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1302&context=delpf, p. 396, accessed: 7/1/17, KF]

Critiques by planning and engineering scholars Irvin and Stansbury, namely that the costs (money, time, imbalanced power dynamics, and ineffective or damaging outcomes) sometimes outweigh the many touted benefits (legitimacy, representation, and community empowerment)**, fail to account for the possible impacts of counterfactual scenarios in which people were not allowed to participate.**120 Indeed, **it is difficult to measure the short- and long-term costs of excluding the public from participation in matters impacting them,** however small. **An approach to participation predicated on justice, however, might find that the benefits to full participation do ultimately outweigh the real or perceived hazards of such a process,** even if it does fail. This is because those possessing more political, social, and economic power are far more likely to find a way to be heard, regardless of who is or is not offered a seat at the table, Thus, **to reduce opportunities for public participation in decision-making processes out of concern for reinforced inequalities** is tantamount, in most instances**, to allowing inequality to prevail by default.** Even if FPCs are not fully representative of all communities, **having under-represented communities with some opportunities to contribute to the process is preferable to full exclusion of those communities from participation**.

Beyond participation, **the true work of an integrated approach to environmental and food justice resides in setting an agenda that seeks to identify and evaluate important challenges from both angle**s—that is, the environmental justice challenges embedded in food justice issues and the food justice implications of environmental problems. Perhaps the best current example of a FPC operating within an integrated agenda is the Chicago Food Policy Advisory Council (CFPAC).

# \*\*\*\*Nutrition Advantage

### Nutrition – 1AC Module

#### Worsening obesity crisis undermines the economy and threatens national security

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 1-2, RK]

Abstract: This Article examines how America’s obesity epidemic threatens the security of the nation. One quarter of Americans aged 17 – 24 are ineligible for the U.S. military solely because they are overweight or obese. As result, the Department of Defense and the Pentagon have declared America’s obesity problem a national security crisis. Moreover, nearly 70% of Americans are overweight or obese. By 2050, one-third of all Americans will have diabetes. As a result, 18% of America’s GDP is spent on health care, at least double every other major industrialized country. By 2075, due to the rise in obesity related illnesses and diseases, 40% of America’s GDP will be spent on health care costs. Those rising costs will require reallocation of America’s economic resources, which will inevitably result in decreased spending on those government functions related to national security. This article offers potential solutions to address this growing problem.

“Obesity is the single greatest non-criminal hindrance for our young people seeking to enlist in the armed forces.”1

I. Introduction Since 1980 adult obesity rates in America have doubled from fifteen to thirty percent.2 Childhood obesity rates have almost tripled in the same time period.3 Since 1960, the incidence of extreme or "morbid" obesity (BMI above 40) has risen six-fold.4 In total, an estimated 160 million Americans are either obese or overweight.5 Nearly 75% of American men and more than 60% of women are obese or overweight.6

With these increased rates of obesity are significant increases in a plethora of illnesses including type-2 diabetes, heart disease, hypertension, cancer, arthritis, Alzheimer's disease, dementia, and infant mortality.7 “Because obesity affects self-esteem, which in turn affects academic performance, rising youth obesity rates may negatively impact American students' academic achievement and competitiveness in a global economy.” 8 In sum, ‘[B]eing overweight or even obese is a growing, unchecked problem in the US today,’9 said Dr. Ali Mokdad, Professor of Global Health at the Institute for Health Metrics and Evaluation. ‘We are looking at a major public health epidemic that must be stopped.’

This article posits a first step in stopping the epidemic – by reframing the obesity crisis into its proper perspective, as a threat to national security. Over 25% of Americans aged 17 – 24 are ineligible for the U.S. military solely because they weigh too much.10 Obesity is the leading cause of the substantial rise in medical rejections of potential military recruits.11 Obesity also poses serious challenges to the nation's economy by costing employers billions of dollars annually in health care expenditures, lost worker productivity, and workers' compensation claims. Government expenditures on health care through Medicare, Medicaid, and other social programs, already rising at a rate that far outpaces inflation, are significantly higher and will only increase further due to rising obesity rates.

The rising health care expenditures will soon leave little room for anything else – including the U.S. military. As such, if America’s overweight and obesity crisis is not only halted but reversed, she will soon find herself with bigger problems than jeans that do not fit anymore. As a result, the Pentagon has declared the obesity epidemic to be a serious national security issue.12 The Department of Defense has gone so far as to exclaim that a fit fighting force is the key to national security.13

Note – “She” describing the US, and “herself”

#### Continued health care cost escalation ensures cuts in military spending

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 18-19, RK]

D) Problems With Cutting The Military’s Budget To Pay For America’s Obesity Crisis In order to cover the increase in health care costs, a significant reduction in military spending would likely be necessary. Significantly reducing the military’s budget may not inherently be a negative outcome, though. Many people (including the author of this Article) feel the current military is probably too bloated and could benefit from less money and wiser allocation of resources. 103 However, such a focus misplaced. The point is not to debate whether or not military spending should be reduced, but rather the dangerous consequences if it has to be reduced. There is a difference between the federal government deciding, based on the current international and political landscape, that military spending can safely be reduced, versus forcibly shrinking the military because too many Americans are overweight or obese forcing unsustainably high health care costs.

Even the most ardent anti-military advocates and political theorists would have to admit that a forced, substantial reduction in military spending, amidst an already growing troop shortage problem, would likely weaken America for several reasons. First and most basically, America would have fewer troops available to defend itself from future attacks. The necessity of a healthy military, ready to deploy at any time in defense of the nation should not be underestimated. September 11, 2001 showed that people do not fear attacking mainland U.S. Reducing the military to the point where we would not be able to defend the nation could have the domino effect of emboldening America’s enemies, making them more likely to strike while America’s defense are depleted.

#### Military cuts risk unstable nuclear deterrence strategy and nuclear insecurity

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 19-20, RK]

America will undoubtedly retain enough nuclear weapons to sufficiently destroy/retaliate against any nation that attacks her. Currently, America has approximately 7,100 nuclear weapons available. 104 Thus, this Article is not saying that if America’s military budget is reduced, America would lose if Venezuela invaded and attempted to take over the country. America will likely maintain its nuclear capabilities to discourage/stop such an attack. But nuclear weapons as a primary defense have their limitations. Having the largest nuclear arsenal in the world did not prevent 9/11. Nor has it played a role in, much less ended, the war on terror. Individual groups and/or smaller factions require something less than nuclear bombs to defeat. Asymmetric warfare and on the ground guerilla tactics are often better utilized when fighting terrorist organizations, the type of enemy the U.S. is likely to face in the future.

Thus, even though America will likely retain nuclear preeminence in the world, to ward off relatively smaller in scale (but by no means small) attacks and attackers, America will likely need the rest of its military. Keeping nuclear weapons but reducing military spending on almost everything else would not be an effective national security strategy. On the other hand, an obesity necessitated reduction in budget, that leads to significant military cuts from the nuclear weapons program, would also be problematic. It is expensive to properly dispose of, and maintain effective safeguards in so doing, for thousands of nuclear weapons. Without the money to maintain and keep safe track of all of our nuclear weapons, one can imagine a sort of Wild West in which advanced nuclear materials and weapons are siphoned off to the highest bidder. One need only look to what has happened with some of the states in the former Soviet Union and the disorganized dismantling of its nuclear weapons program as a model the U.S. does not want to follow.105

Note – “her” describing US

#### Preventing obesity in childhood is uniquely key – drastically increases risk of adult obesity

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p.2, Accessed 7/1/17, GDI - JMo)

America’s children are bombarded daily with junk foods full of sugar, salt, and fat. On average, U.S. children consume five times the amount of sugar recommended by the Dietary Guidelines for Americans, but only about one-third the recom- mended amount of fruits and vegetables. Unhealthy diets have contributed to nearly 30 percent of our nation’s children being overweight or obese, with lower-income and racial or ethnic minority children at the greatest risk.

Children with obesity are as much as 10 times more likely than healthy-weight children to become obese adults. This, in turn, increases their risk of developing serious chronic diseases later on in life—including type II diabetes, cardiovascular disease, and some cancers. This is not only tragic for those suffering from obesity, but expensive for us all, as taxpayers and consumers cover some of the costs of treating these illnesses through public and military health insurance programs and higher private health insurance premiums. It is estimated that obesity-related healthcare costs in the United States account for $210 billion annually, or 16.5 percent of the country’s total healthcare costs.

#### Farm to School network key to education and improving nutrition

**Mills, Seven Generations Ahead farm to school coordinator, 16**

[Lydia, April 2016, The Education Digest, “Farm to School Leads School Lunch Revolution”, <http://search.proquest.com/docview/1753451166?accountid=1557&rfr_id=info%3Axri%2Fsid%3Aprimo>, accessed 6/30/17, JBC]

School lunch is in the middle of a revolution. After decades of nuggets and peas, students and school administrators are starting to demand more. In Illinois, much of the landscape is farmland, but the food grown there is rarely placed in a school salad bar or blended into cafeteria spaghetti sauce. While there are obstacles, the school lunch revolution has helped connect farmers and students through local food sales and curricular connections. This movement is called Farm to School, and it is quickly growing.

The purpose of the National Farm to School Network is to enrich the connection communities have with fresh, healthy food and local food producers by changing food purchasing and education practices at schools and preschools.

In Illinois, Farm to School encompasses three main areas: the cafeteria, the classroom, and the garden. If school or school district has a goal of starting a Farm to School program, it doesn't have to source all local produce or have farmers visit the cafeteria. If a school builds a raised bed and has students plant vegetables in the garden, it is engaging with Farm to School.

Often, schools find that one project leads to another. **If students plant a garden, they may want to visit different types of farm operations.** This could introduce new ideas about possibilities for agricultural careers. In rural areas, schools with Farm to School programs are reviving Future Farmers of America and 4-H groups, some for the first time in years. Students learn to appreciate agriculture while learning real, hands-on skills in the garden.

Schools in Valley View CUSD365U, in the Romeoville area, have found gardens a powerful learning tool. Meghan Gibbons, food service director for the district, created a grant program for schools to use when creating gardens. This initial connection between the cafeteria and the garden was a powerful partnership. "Though the school receives guidance from our department, they bring their unique spin to each garden," Gibbons said. "Our first pilot garden started in 2012-2013 and now eight of our 19 schools have 'Edible School Gardens.'"

Bringing garden fresh or locally-grown food into nutrition education has the added benefit of tasting fresh and delicious.

In the classroom, Farm to School can operate as a standalone curriculum or as a part of existing curricular modules. At Valley View, "Just about every subject has been taught in our gardens, making a tie to our K-12 curriculum," Gibbons said.

Many nutrition-focused Farm to School curricula are available. Although frequently used in health education, these can be used in many other subjects.

Teaching about food in the school garden and the classroom is a natural way to transition a cafeteria from the status quo to a part of the school lunch revolution. Local food procurement is not without hurdles. However, the USDA offers training and toolkits for food service directors to use when developing bids, so they can prioritize and select distributors who buy food from local farmers. Many schools find that once students are excited about local food, it is much easier to change the way food is purchased for lunch.

Oak Park ESD97 started its Farm to School program after deciding to improve the food served in the cafeteria. The district changed its bid to increase the amount of produce from local farmers, and discovered that when it brought in more local food, students were eating better. Anna Gacke, district assistant director of food and nutrition services, said, "We are proud to serve local food to students about once a week, depending on the season. So far this year, we have offered local apples, salad greens, kale mixes, broccoli slaw, baked potatoes, and cauliflower."

Serving local food in the cafeteria created a culture shift in the school overall. More healthy food promotion is done through the cafeteria, including days when students dress up as different fruit and vegetable colors each day of the week. Food service participates in wellness committees and helps teachers create activities connected to the local foods served. High school students maintain gardens and serve the produce once a year at a special meal.

In the 2012 U.S. Department of Agriculture Farm to School census, food service directors reported spending $6.4 million on food produced locally. That is a fraction of the $42 million spent in total. Farm to School programs not only have amazing impacts in the classroom, they also serve as an economic stimulus in rural communities.

As the National Farm to School Network states, Farm to School empowers children and their families to make informed food choices while strengthening the local economy and contributing to vibrant communities. Studies show that when children learn about where food comes from in a classroom setting, they actually do eat more fruits and vegetables. Farm to School helps students grow more likely to make healthy choices throughout their lives.

## Uniqueness

### School Nutrition Programs Insufficient Now

#### Status quo food program don’t overcome unhealthy influences

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 3, Accessed 7/1/17, GDI - JMo)

At the same time, school food programs are not strong enough to overcome other unhealthy influences on children’s diets and prevent obesity. Our further analysis of the U.S. Department of Education data uncovered a worri- some trend in the type of drinks and fast foods that FRP meal participants were consuming inside or outside of school:

• FRP meal participants consumed sugary beverages and fast food more often than non-participants—on average, one more time per week each in comparison to non-FRP participants.

While it may not seem like a substantial difference, low- income children can least afford this additional junk food consumption—which may represent as many as 460 added calories per week.

To determine the impact of FRP meal participants eating both the healthiest foods and the unhealthiest foods more frequently than non-FRP meal participants, we examined whether their weight status differed. We found that FRP-lunch participants were more likely to be overweight or obese than non-participants. More speci cally, we reveal that:

• Approximately half of the eighth graders in the FRP meal program were overweight or obese, as measured by body mass index (BMI), compared with only 30 percent of non-participants.

• Access to unhealthy foods in vending machines at school led to weight gain in Hispanic boys, an effect that was magnified for those from lower-income families.

[FRP: Free and reduced-price]

### Trump Budget Cuts Nutrition Programs

#### Trump cutting Supplemental Nutrition Assistance Program by 20 billion every year

**Evich, Politico senior food and agriculture reporter, 17**

[Helena, spent four years reporting on food politics and policy at Food Safety News, where she covered Congress, the FDA and the USDA, 5/22/17, POLITICO, “Trump going big on SNAP cuts”, <http://www.politico.com/tipsheets/morning-agriculture/2017/05/22/trump-going-big-on-snap-cuts-220429>, accessed 7/1/17, JBC]

TRUMP GOING BIG ON SNAP CUTS: President Donald Trump’s budget, expected to be released Tuesday, will call for a yuge (read: greater than 25 percent) reduction in Supplemental Nutrition Assistance Program spending — a request that is politically infeasible but will trigger a public fight over whether cutting anti-poverty programs is a good idea

The White House is after more than just top-line cuts: Trump is also set to propose work requirements for able-bodied adult recipients of SNAP benefits and ask that states match 20 percent of federal funding for the program, administration officials told POLITICO over the weekend. The Associated Press on Sunday reported that overall cuts to SNAP in the Trump budget would total $193 billion over 10 years.

### Health Care Costs Rising

#### Health care costs are rapidly rising- Congressional Budget Office Proves

Leonard, US. News Health Reporter, 16

[Kimberly, January 25, 2016, U.S News & World Report, “For the First Time, Health Care Spending Higher than Social Security, <https://www.usnews.com/news/articles/2016-01-25/health-care-programs-contribute-to-increasing-federal-deficit>, accessed: 7/1/17, SK]

The federal government spent more on health care in 2015 than on [Social Security](https://www.usnews.com/topics/subjects/social-security) for the first time ever.

So finds the Congressional Budget Office, the government’s nonpartisan scorekeeping agency, in a 200-page [report](https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51129-2016Outlook_OneCol.pdf) it released about fiscal 2015, which ended Sept. 30.

The federal government spent $882 billion on Social Security, compared with $936 billion in spending on health care programs, including Medicare, Medicaid, the Children’s Health Insurance Program and [tax subsidies](https://www.usnews.com/news/articles/2015/10/23/obamacare-website-gets-a-facelift) that help people pay for [private health plans](http://health.usnews.com/health-insurance) under Obamacare. The total represents a 13 percent jump in health care spending from fiscal 2014, according to the report.

Medicaid spending accounted for the largest increase in growth, at 16 percent or by $48 billion, because of the 30 states and District of Columbia that [expanded the program](https://www.usnews.com/news/the-report/articles/2015/12/04/opposing-medicaid-expansion) to 9.6 million more enrollees under Obamacare.

Authors of the report warn that the federal budget deficit will increase in relation to the size of [the economy](https://www.usnews.com/news/blogs/data-mine/articles/2016-01-08/us-economy-adds-nearly-300-000-new-jobs-in-december) for the first time since effects of the Great Recession began in 2009, projecting that the 2016 budget deficit will reach $544 billion, or $105 billion more than the previous year. The projected deficit would increase debt held by the public to 76 percent of gross domestic product by the end of 2016.

If laws around federal programs remain unchanged, authors of the report write, the deficit will continue to grow over the next 10 years, becoming even larger than its average during the past 50 years. Health care programs are projected to total 5.5 percent of GDP in 2016 and to grow quickly in subsequent years, reaching 6.6 percent of GDP in 2026. [Medicare](http://health.usnews.com/medicare) is projected to account for about three-quarters of that growth as the baby boomer population continues to age into the program.

The report could give ammunition to Republicans and others [opposed to Obamacare](https://www.usnews.com/news/articles/2016/01/08/obama-vetoes-budget-bill-that-would-have-repealed-obamacare), who predicted such an outcome on the federal budget. Supporters of the law may call for strengthening it, or for putting more cost controls on medical care and [on prescription drugs](https://www.usnews.com/news/the-report/articles/2015/09/24/expensive-drugs-a-drag-on-consumers-and-government).

### Obesity Increasing Now

#### Obesity and its health care costs growing now

**Fox, NBC News senior health writer, 12**

[Maggie, was Health and Science editor for 3 years at Reuters, and a Health and Science Correspondent for 11, 9/18/12, NBC News, “If you think we’re fat now, wait till 2030”, http://www.nbcnews.com/health/if-you-think-were-fat-now-wait-till-2030-1B5955205, accessed 7/1/17, JBC]

Think Americans are fat now? After all, a third of us are overweight and another 35 percent are obese. But a report out Tuesday projects 44 percent of Americans will be obese by 2030.

In the 13 worst states, 60 percent of the residents will be obese in less than two decades if current trends continue, the report from the Trust for America’s Health projects. That’s not chubby or a little plump – that’s clinically obese, bringing a higher risk of heart attacks, strokes, diabetes, several forms of cancer and arthritis.

“The initial reaction is to say, ‘Oh it couldn’t be that bad’,” says Jeff Levi, executive director of the Trust for America’s Health. “But we have maps from 1991 and you see almost all the states below 10 percent.” By 2011 every single state was above 20 percent obesity, as measured by body mass index (BMI), the accepted medical way to calculate obesity. Those with a BMI or 30 or above are considered obese.

In August, the Centers for Disease Control and Prevention reported that 12 states have an adult obesity rate over 30 percent. Mississippi had the highest rate of obesity at 34.9 percent. On the low end, 20.7 percent of Colorado residents are obese. CDC projections for obesity resemble those in Tuesday's report - it projects 42 percent of adults will be obese by 2030.

The problem isn’t just cosmetic. “The number of new cases of type 2 diabetes, coronary heart disease and stroke, hypertension and arthritis could increase 10 times between 2010 and 2020 — and then double again by 2030,” the report projects. “Obesity-related health care costs could increase by more than 10 percent in 43 states and by more than 20 percent in nine states.”

That’s bad news when states are already strapped to pay for public health programs such as Medicaid and the federal government is struggling to fund Medicare.

Over the next 20 years, more than 6 million patients will be able to blame obesity for their diabetes, 5 million will be diagnosed with heart disease and 400,000 will get cancer caused by obesity.

And some of them are frighteningly young.

"Now I am seeing 25-year-olds weighing 350 pounds who present with chest pain or shortness of breath," says Dr. Sheldon Litwin, a cardiologist at Georgia Health Sciences University. “Everything from the heart disease process to its diagnosis and treatment are affected by obesity. We see it every day. This really is the number-one issue facing us," added Litwin, who worked on one of a series of obesity studies published in this week’s issue of the Journal of the American Medical Association.

The trend is not inevitable, according to the report, entitled “F as in Fat.” Some programs are beginning to make a dent in the rising rates. “We certainly see, in some communities, the beginning of some changes,” says Levi. “We know what some of the answers are.”

For instance, making it easier for people to exercise day in and day out, and making it easier to get healthy food. “A large-scale study of New York City adults found that increasing the density of healthy food outlets, such as supermarkets, fruit and vegetable markets, and natural food stores is associated with lower BMIs and lower prevalence of obesity," the report reads.

What about initiatives like New York’s controversial ban on the largest sodas? “Every community is going to experiment with different approaches. It is going to be very interesting to see what happens in New York and whether this makes a difference,” Levi said.

New York’s health commissioner, Dr. Thomas Farley, defends the move in the medical journal’s obesity issue. "How should government address the health problems caused by this successful marketing of food? To do nothing is to invite even higher rates of obesity, diabetes, and related mortality,” he wrote.

Trust for America's Health

Many studies have also shown that people who live in big, walkable cities such as New York and Washington D.C. are thinner than their rural and suburban counterparts, and it’s almost certainly because they walk more and use public transportation instead of sitting in cars.

If everyone lost just a little weight, the savings would be enormous, the study predicts.

“If we could lower obesity trends by reducing body mass indices (BMIs) by only 5 percent in each state, we could spare millions of Americans from serious health problems and save billions of dollars in health spending —between 6.5 percent and 7.8 percent in costs in almost every state,” the report says.

#### Childhood obesity increasing now

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 5, Accessed 7/1/17, GDI - JMo)

Obesity rates among children and adolescents nearly tripled from 1970 to 2000, with approximately 16 percent of America’s youth currently classified as obese (Figure 1). In adults, obesity is often accompanied by a variety of chronic diseases, includ- ing cardiovascular diseases, type II diabetes, and some types of cancers. Factors that contribute to the development of these diseases are at work before a person’s birth and continue into adolescence. Therefore, today’s children face dire health consequences as they age, and health experts estimate that this generation of American children will become the first generation in history to die younger than their parents— due to obesity-related complications (Olshansky et al. 2005).

Childhood obesity is most easily measured by body mass index (BMI), the ratio of weight (in kilograms) divided by height (in meters) squared. A child is considered obese if his or her BMI is at or above the 95th percentile on sex-and age-specific growth charts as issued by the Centers for Disease Control and Prevention (Table 1, p. 6).

#### Obesity increasing now

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

Increasing concerns over children’s health have focused the nation’s attention on what children are eating, especially in school. According to federal statistics, between 1963 and 2004, obesity rates quadrupled for children ages six to eleven, and rates tripled for adolescents ages twelve to nineteen.2 This alarming trend continues, with the latest data showing that more than one-third of American children—roughly nine million children over age six3—are either obese or at risk for becoming obese.4 Equally disturbing is the increasing diagnosis of Type 2 diabetes (formerly called “adult- onset”) in young people.5 For those born in 2000, the lifetime risk of developing diabetes, barring major changes in diet and lifestyle, is 33 percent for males and 39 percent for females; it is even higher for Hispanics.6 Because obesity and diabetes are linked to myriad health problems in adulthood, prevention through ensuring proper eating habits in early stages of life is critical.

Although the public is still divided over whether obesity is a public health issue or personal problem, many people believe schools carry a substantial burden of responsibility—just behind parents and individuals—when it comes to addressing childhood obesity.7 This belief is well justified. The National School Lunch Program (NSLP) serves twenty-nine million school children every day and costs American taxpayers more than $7 billion a year to provide purportedly “nutritionally balanced” meals.8 Many students, however, fill up on items such as soft drinks, chips, and cookies, which are high in added sugars, fats, calories, and sodium, but low in nutrition.9 Such “junk foods” sold in vending machines, cafeteria à la carte lines,10 and school stores are known as “competitive foods” because they compete with federally funded meals.11 Although NSLP meals are required to meet nutritional standards based upon recommendations from the United States Department of Agriculture (USDA) Dietary Guidelines for Americans, which recommend limiting total fat to 35 percent of calories and limiting saturated fat to less than 10 percent of calories,12 competitive foods are not.13 As awareness of the nutritional wasteland in schools has increased,14 the scrutiny of unhealthy food and beverages available in public schools has intensified and reignited political firestorms all over the nation.15

#### US obesity spreading now

**Fox, NBC News Senior Writer for Health, 16**

[Maggie, was Health and Science editor for 5 years at Reuters, and a Health and Science Correspondent for 11, 6/7/16, NBC News, “America’s Obesity Epidemic Hits a New High”, <http://www.nbcnews.com/health/health-news/america-s-obesity-epidemic-hits-new-high-n587251>, accessed 7/1/17, JBC]

The U.S. obesity epidemic continues to worsen: The latest reports show that 40 percent of U.S. women are obese, and American teenagers are also continuing to put on weight.

The two reports from the Centers for Disease Control and Prevention show that efforts to encourage Americans to lose weight — at least to stop putting on more weight — are having little effect.

Overall, 38 percent of U.S. adults are obese and 17 percent of teenagers are, the two reports find.

That’s obese — medically defined as having a body mass index (BMI), a measure of height to weight, that’s more than 30. Another third or so of Americans are overweight.

People are considered overweight when their BMI hits 25, and they are obese when it gets to 30.

Someone who is 5-foot-5 and weighs 149 pounds has a body mass index of 24, considered a healthy weight. Add a pound and the same person has a BMI of 25 and is considered overweight. At 180 pounds this person has a BMI of 30 and is considered obese.

“Those with education beyond high school were significantly less likely to be obese.”

The National Institutes of Health has a BMI calculator online here.

People who are obese have higher rates of heart disease, diabetes, some cancers, arthritis and Alzheimer's disease.

The teams at CDC’s National Center for Health Statistics looked at national survey of more than 5,400 adults for their first study.

“The age-adjusted prevalence of obesity in 2013-2014 was 35 percent among men and 40.4 percent among women,” they wrote in their report, published in the Journal of the American Medical Association.

More than 5 percent of men and nearly 10 percent of women were morbidly obese, with a BMI of 40 or more. They’re at much higher risk of related diseases.

The team noted they measured just BMI and not body fat, but most obese Americans have too much fat.

Men who smoked were thinner, the team found. “For women, there were no significant differences by smoking status, but those with education beyond high school were significantly less likely to be obese,” they wrote.

The second study found 17 percent of children and teens are obese and 5.8 percent were extremely obese. Obesity in kids is measured a little bit differently — it’s how heavy they are compared to other kids the same age and height. Those weighing more than 95 percent of kids the same age are considered obese.

Obesity has decreased a little among the youngest children, the researchers noted, but it’s still going up among teens.

It’s not clear why obesity continues to worsen, despite many studies trying to put a finger on it.

“Numerous foundations, industries, professional societies, and governmental agencies have provided hundreds of millions of dollars in funding to support basic science research in obesity, clinical trials and observational studies, development of new drugs and devices, and hospital and community programs to help stem the tide of the obesity epidemic,” the journal’s editors, Dr. Jody Zylke and Dr. Howard Bauchner, wrote in a commentary.

“The obesity epidemic in the United States is now 3 decades old, and huge investments have been made in research, clinical care, and development of various programs to counteract obesity. However, few data suggest the epidemic is diminishing,” they added.

“The obesity epidemic in the United States is now 3 decades old.”

“Perhaps it is time for an entirely different approach, one that emphasizes collaboration with the food and restaurant industries that are in part responsible for putting food on dinner tables.”

Other studies suggest the epidemic will only worsen.

The Trust for America’s Health projects that 44 percent of Americans will be obese by 2030, while the Centers for Disease Control and Prevention it projects 42 percent of adults will be.

And the effects extend far beyond disease.

A study by Gallup and Healthways shows that obese adults are 29 percent more likely to say they lack purpose in life and nearly 34 percent more likely to suffer financially than non-obese adults.

## Obesity – Health

### Impact – Obesity Causes Disease

#### Obesity bad - leads to diabetes and other non-communicable diseases

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

Children’s health measures continue to worsen. Although obesity was cited decades ago as a negative impact of competitive foods, the focus was primarily centered on the epidemic of dental caries.25 Diabetes has also become a significant health issue for children. A 2003 study found the prevalence of children overweight at the onset of Type 1 diabetes had tripled from the 1980s to 1990s.26 This may suggest that obesity is contributing to the rise of both Type 1 and Type 2 diabetes in children. The condition known as “double diabetes,” previously only studied in adults, has also been reported for the first time in children.27 In addition, an estimated 61 percent of overweight youth have at least one additional risk factor for heart disease, such as high cholesterol or high blood pressure.28

#### Obesity causes health and mental issues within students

Centers for Disease Control, 13

[Center for Disease Control, “Make a Difference at Your School”, <http://digitalcommons.hsc.unt.edu/cgi/viewcontent.cgi?article=1030&context=disease>, 6/28/17, KW]

Since 1980, the percentage of obese children aged 6 to 11 has doubled, and the percentage of obese adolescents aged 12 to 19 has tripled. Childhood obesity has both immediate and long-term serious health impacts.

• In some communities, almost half of pediatric diabetes cases are type 2 diabetes, which was once believed to affect only adults.

• In one large study, 61% of obese 5- to 10-year-olds already had risk factors for heart disease, and 26% had two or more risk factors for the disease.

• Obese children have a greater risk of social and psychological problems, such as discrimination and poor self-esteem.

• Obese children have a 70% chance of being overweight or obese as adults—facing higher risks for many diseases, such as heart disease, diabetes, stroke, and several types of cancers.

The costs of treating obesity-related diseases are staggering and rising rapidly. In 2004, direct and indirect health costs associated with obesity were $98 billion.

Good eating habits and regular physical activity are critical for maintaining a healthy weight. Unfortunately, less than 25% of adolescents eat enough fruits and vegetables each day. Sixty-four percent of high school students don't meet currently recommended levels of physical activity.

### Impact – Obesity Causes Deaths

#### Poor diets led to 300,000 easily preventable deaths

**Dr. Micha, Tufts Friedman School of Nutrition Science and Policy professor, et al., 17**

[Renata, an epidemiologist whose research focuses on the effects of diet on cardiometabolic diseases, José Peñalvo, Tufts University, Nutrition Science and Policy, assistant professor, worked for 6 years on how lifestyle determines cardiovascular health, Fred Cudhea, PhD in Biostatistics from Harvard, Fumiaki Imamura, Cambridge, Epidemiology, Senior Investigator Scientist and Harvard, Epidemiology, Postdoctoral Research Fellow, Colin Rehm, Einstein University, Epidemiology & Population Health, Clinical Assistant Professor, Dariush Mozaffarian, Tufts University, Nutrition Science and Policy, Dean, 3/7/17, The Jama Network, “Association Between Dietary Factors and Mortality from Heart Disease, Stroke, and Type 2 Diabetes in the United States”, [http://jamanetwork.com/journals/jama/article-abstract/2608221, Jama](http://jamanetwork.com/journals/jama/article-abstract/2608221,%20Jama) Network, pg. 913-21 accessed 6/28/17, JBC] \* Research done from data in 2012 but published in 2017

Dietary habits influence many risk factors for cardiometabolic health, including heart disease, stroke, and type 2 diabetes, which collectively pose substantial health and economic burdens.1 In both global2,3 and national4 modeling studies, the associations of suboptimal diet with overall health have been estimated. Understanding the relations of individual dietary components with cardiometabolic disease at the population level is essential to identify priorities, guide public health planning, and inform strategies to alter these dietary habits and improve health. In addition, the differences in these estimated health burdens by underlying personal characteristics, such as age, sex, race/ethnicity, and education, are relevant to consider more targeted approaches to reducing disparities.

For the United States, prior analyses have estimated the associations of suboptimal dietary habits with cardiometabolic health overall4 or for a limited number of dietary factors (eg, sodium, sugar-sweetened beverages).5Theresults for other individual dietary components, as well as differences by age, sex, race/ethnicity, and socioeconomic status, are not well established. The current investigation used a comparative risk assessment modeling design2,6,7 to estimate the cardiometabolic mortality related to suboptimal intakes of 10 dietary factors, individually and jointly, among US adults in 2012; to assess diet-associated mortality by disease subtypes (heart disease and subtypes, stroke and subtypes, and type 2 diabetes) and population subgroups (age, sex, race, and education); and to evaluate trends between 2002 and 2012.

Methods Study Design A comparative risk assessment model was used to estimate the numbers and proportions of cardiometabolic deaths associated with suboptimal intakes of 10 dietary factors in the United States, both individually and in combination (eAppendix 1 in the Supplement). The model incorporated separately derived data and corresponding uncertainty on (1) population demographics and dietary habits by sex, age, race, and education from the National Health and Nutrition Examination Survey (NHANES); (2) the estimated relationships of 10 foods and nutrients with heart disease, stroke, or type 2 diabetes mortality, by age, from meta-analyses of prospective cohorts and randomized clinical trials, further evaluated by several validity analyses; (3) the optimal population intake distributions of these dietary factors based on observed intakes associated with lowest risk in observational studies; and (4) observed US disease- specific cardiometabolic deaths by sex, age, race, and education from the National Center for Health Statistics (NCHS). This modeling investigation was exempt from human subjects review because it was based on published data and nationally representative, deidentified data sets that included no personally identifiable information.

Identification of Relevant Dietary Factors The methods and results for review, identification, and assessment of evidence for etiologic diet-disease relationships have been described (eAppendix 2 in the Supplement).8,9 Using Bradford-Hill criteria and considering consistency with other criteria for assessing potential causality of diet-disease relationships,10-12 probable or convincing evidence was identified for associations of 17 dietary factors with coronary heart disease (CHD), stroke, type 2 diabetes, body mass index (BMI), or systolic blood pressure (SBP) (eTables 1-5 in the Supplement). Of these, 10 were included in the present analysis (Table 1), excluding others with major overlap for estimating joint effects (eg, dietary fiber overlaps with whole grains, fish overlaps with omega-3 fats). Several other dietary factors were evaluated and not included because of insufficient evidence for casual relationships, including monounsaturated fats, vitamin D, magnesium, calcium, antioxidant vitamins, dairy products, cocoa, coffee, and tea. Evidence for potential associations of diet with other conditions such as cancer, osteoporosis, gallstones, inflammatory diseases, depression, cognitive function, or micronutrient deficiency diseases was not evaluated.

National Distributions of Dietary Intake and Demographics Dietary intakes were estimated using nationally representative data from multiple NHANES cycles, accounting for complex survey design and sampling weights,16 to be representative of the US population aged 25 years or older (eTable 6 in the Supplement). As previously described,17 intakes were assessed from up to 2 standardized 24-hour dietary recalls per person, accounting for within-person variation (eTables 7-10 in the Supplement).18 Optimal metrics and units for each dietary factor were characterized to be consistent with studies providing evidence on etiologic diet-disease relationships (Table 1; eTable 3 in the Supplement).8 All dietary factors were adjusted for energy intake (using the residual method18 or, for polyunsaturated fats, as percentage energy) to reduce measurement error and account for potential differences in body size, lean mass, metabolic efficiency, and physical activity.

The means and standard deviations of intake of each dietary factor were estimated in population strata by age (25- 34, 35-44, 45-54, 55-64, 65-74, or ≥75 years), sex (male or female), race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American/other Hispanic, or other race/mixed race), and education (less than high school diploma, high school diploma/ equivalent or some college, or 4-year college degree or greater). These demographic characteristics were classified in NHANES based on self-report. Dietary factors were modeled based on the mean and standard deviations using gamma (rather than normal) distributions, allowing for and incorporating skewed distributions. To maximize power for subgroups, 2002 intakes were estimated by combining 1999- 2000 and 2001-2002 cycles (the earliest with nationally representative 24-hour recalls; n = 8104;48.2%men)and 2012 intakes by combining 2009-2010 and 2011-2012 cycles (n = 8516; 47.6% men).

Estimated Diet-Disease Relationships Methods for reviewing and synthesizing evidence to estimate effect sizes (relative risks) for associations between dietary factors and cardiometabolic end points have been described (eAppendix 2 in the Supplement).8,9 The present analysis incorporated evidence from published or de novo meta-analyses of prospective cohorts or randomized clinical trials evaluating direct associations of dietary factors with CHD, stroke, or type 2 diabetes by age (Table 1;eTable 2 in the Supplement). We included additional BMI-mediated associations of sugar-sweetened beverages (SSBs) by age and overweight/ obesity status on deaths due to CHD, hypertensive heart disease, stroke, and type 2 diabetes and SBP-mediated associations of dietary sodium by age, race, and hypertensive status on deaths due to heart disease, stroke, and type 2 diabetes (eTable 5 in the Supplement).

These estimated effects can be used to model associations with cardiometabolic diseases if bias from confounding (which might overestimate effects) or measurement error (which might underestimate effects) is limited. To reduce bias from confounding, all identified observational studies in these meta-analyses used multivariable adjustment for other risk factors. Measurement error was generally not addressed, although some studies used serial measures of diet. In addition, associations of individual dietary factors with health may be different from joint associations when consumed as diet patterns; eg, healthful dietary factors such as fruits, vegetables, and whole grains tend to positively correlate in diets while inversely correlating with unhealthful dietary factors such as SSBs or processed meats. To determine the extent to which the estimated multivariable-adjusted effect sizes might be biased because of these limitations, 3 separate validity analyses were performed comparing the estimated effect sizes for individual dietary components to (1) observed associations of overall dietary patterns with clinical end points in long-term observational studies; (2) effects of dietary patterns on cardiovascular risk factors (low-density lipoprotein cholesterol, SBP) in randomized clinical feeding trials; and (3) effects of dietary patterns on hard end points in a large randomized clinical trial (eAppendix 2 and eTable 4 in the Supplement).9,19,20 Each of these validity analyses demonstrated that estimated effect sizes for individual dietary components were very similar to what would be expected based on these other lines of evidence.

Characterization of Optimal Intakes Optimal consumption levels for each dietary factor were characterized (Table 1) based on observed levels associated with lowest disease risk in meta-analyses of clinical end points, while further considering feasibility (observed national consumption levels in at least 2 to 3 countries around the world) and consistency with major dietary guidelines (eTable 3 in the Supplement).8 The population distribution (ie, standard deviation) around each optimal population mean was estimated from the optimal distributions of diet related metabolic risk factors in the Global Burden of Diseases study (10% of the mean).2 For each dietary factor, the modeling assumed no additional health benefits beyond the optimal intake distribution within each sex, age, race, and education stratum.

National Mortality, BMI, and SBP Distributions by Sex, Age, Race, and Education National disease-specific deaths in each stratum for 2002 and 2012 were obtained from the NCHS, which includes the entire US population (https://www.cdc.gov/nchs/data\_access /vitalstatsonline.htm). Deaths were excluded for foreign residents (individuals dying in the United States but whose place of residence is outside the United States), ages 25 years or younger, missing age information (2012: 0.005%; 2002: 0.006%), or, in education-stratified analyses, missing education information (2012: 2.1%; 2002: 6.2%). Diet-related cardiometabolic diseases were defined using International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, including heart disease (the sum of CHD, hypertensive heart disease, and other cardiovascular disease), stroke (the sum of ischemic, hemorrhagic, and other stroke), and type 2 diabetes (Table 2; eTables 11-12 in the Supplement). Events were characterized by age, sex, race /ethnicity, and education as described above to match dietary strata. For associations mediated by BMI(SSBs), including with CHD, hypertensive heart disease, stroke, and type 2 diabetes, and by blood pressure (sodium), including with CHD, hypertensive heart disease, other cardiovascular disease, and stroke, the stratum-specific distributions (means and standard deviations) of BMI (based on measured heights and weights) and SBP (from certified examiners, using the mean of 3 measurements or 4 if necessary) in 2002 and 2012 were estimated from the 1999-2002and2009-2012NHANEScycles, respectively. Hypertension was defined as systolic blood pressure of at least 140mmHg, diastolic blood pressure of at least 90mmHg, or use of antihypertensive drugs.23

Cardiometabolic Disease Burdens Attributable to Key Dietary Targets All data inputs were combined in a comparative risk assessment model to estimate the absolute number and percentage of overall cardiometabolic deaths associated with suboptimal intake of each dietary factor. This framework21 incorporated each stratum-specific input and its uncertainty (except for uncertainty in baseline number of deaths, not reported by the NCHS) to estimate associated mortality by age and sex; by age, sex, and race; and by age, sex, and education. Stratification by all 4 demographic factors was not performed because of low sample size and unstable estimates in some strata. The main outcomes were the estimated absolute number and percentage of cardiometabolic mortality related to suboptimal intakes of 10 dietary factors, individually and jointly, in 2012. We also evaluated disease-specific and demographic-specific (age, sex, race, and education) mortality and trends between 2002 and 2012.

For each stratum, the model calculated the percentage of disease-specific mortality associated with each dietary factor by comparing the present distribution of consumption with the optimal distribution using the continuous population attributable fraction (PAF) formula (eAppendix 1 in the Supplement).21 This PAF was multiplied by the actual number of disease-specific deaths in that stratum of the US population to estimate the absolute number of disease-specific deaths in that stratum related to the dietary factor. The joint associations of all 10 dietary factors was estimated by proportional multiplication of each stratum-specific PAF (eAppendix 1). For comparing trends between 2002 and 2012, the estimated absolute (2012-2002) and relative (2012-2002/ 2002×100) associated mortality rates in 2002 were age- and sex-standardized to 2012 age-sex distributions.

Uncertainty was quantified using multiway probabilistic Monte Carlo simulations, jointly incorporating stratum specific uncertainties in dietary exposure distributions, diet disease relative risk estimates, and, for sodium, prevalence of hypertension and proportion of non-Hispanic blacks. Corresponding 95% uncertainty intervals (UIs) were derived from the 2.5th and 97.5th percentiles of 1000 estimated models. Different outcomes were evaluated without adjustment for multiple comparisons, so the UI bounds for each finding should be interpreted in that context. These analyses represent the estimated total cardiometabolic mortality associated with each dietary factor, including any mediated relationships through major cardiovascular risk factors (eg, the estimated mortality from low fruit or vegetable consumption would include any association mediated by their effects on lowering of blood pressure and blood cholesterol). Except for SSBs, additional potential relationships of dietary habits with obesity were not considered, which could underestimate total diet-related cardiometabolic mortality. All analyses were performed using R statistical software, version 3.1.0.

Results In both 2002 and 2012, national intakes of each dietary factor were suboptimal (Table 1; eTables 7-10 in the Supplement). In 2012, a total of 702 308 cardiometabolic deaths occurred in US adults, including 506 100 due to heart disease (including 371 266 due to CHD, 35 019 due to hypertensive heart disease, and 99 815 due to other cardiovascular disease), 128 294 from stroke (16 125 ischemic, 32 591 hemorrhagic, and 79 578 other), and 67 914 from type 2 diabetes (eTable 11 in the Supplement).

Estimated Cardiometabolic Mortality Attributed to Diet When all 10 dietary factors were evaluated in combination, they were associated with 318 656 estimated cardiometabolic deaths, or nearly 1 in 2 (45.4%) of all US cardiometabolic deaths in 2012. Among individual factors, largest numbers of estimated diet-related cardiometabolic deaths were related to high sodium (66 508 estimated cardiometabolic deaths [9.5% of all cardiometabolic deaths]), low nuts/seeds (59 374 [8.5%]), high processed meats (57 766 [8.2%]), low seafood omega-3 fats (54 626 [7.8%]), low vegetables (53 410 [7.6%]), low fruits (52 547 [7.5%]), and high SSBs (51 694 [7.4%]) compared with optimal consumption levels (Table 2; eFigure 1 in the Supplement). Lowest estimated mortality burdens were associated with low polyunsaturated fats (16 025 [2.3%]) and high unprocessed red meats (2869 [0.4%]).

Among cardiometabolic diseases, the largest numbers of deaths due to CHD were associated with low nuts/seeds (54 591 [14.7% of CHD deaths]), low seafood omega-3 fats (54 626 [14.7%]), high processed meats (45 637 [12.3%]), high SSBs (39 937 [10.8%]), and high sodium (37 744[10.2%]);due to total stroke, to low vegetables (28039 [21.9%]), low fruits (28 741 [22.4%]), and high sodium (13 787 [10.7%]); due to hypertensive heart disease, to high sodium (7505 [21.4%]); and due to type 2 diabetes, to high processed meats (11 900 [17.5%]), low whole grains (11 639 [17.1%]), and high SSBs (10 043 [14.8%]) (Table 2).

Findings by Sex, Age, Race, and Education Estimated cardiometabolic mortality associated with each dietary factor was modestly higher in men than in women, primarily because of generally unhealthier dietary habits in men (Figure 1; eFigure 5 and eTable 14 in the Supplement). The largest sex differences were seen for processed meats (10.8% of all cardiometabolic deaths in men and 5.4%inwomen; difference, +5.4%; 95%UI, 2.3%-8.3%) and SSBs (9.3%vs 5.3%; difference, +3.9%; 95% UI, 2.3%-5.4%). In men, the top 5 estimated dietary factors associated with cardiometabolic deaths were excess processed meats (38 632 deaths [10.8%of all cardiometabolic deaths]), sodium (35 777 [10.0%]), SSBs (33 314 [9.3%]); and insufficient nuts/seeds (31 587 [8.8%]) and seafood omega-3 fats (31 545 [8.8%]). In women, these were excess sodium (30 281 [8.8%]) and insufficient nuts/seeds (27 721 [8.1%]), vegetables (25 592 [7.4%]), fruits (24 449 [7.1%]), and omega-3 fats (23032 [6.7%]). Jointly, suboptimal diet was relatedto48.6% of estimated cardiometabolic deaths in men and 41.8%inwomen in 2012 (absolute difference, +6.9%; 95%UI, 3.3%-10.1%) (Figure 2).

By age, in 25- to 64-year-olds, excess SSBs and processed Meats were the top estimated diet factors associated with cardiometabolic mortality; in 65-year-olds and older, these were excess sodium and insufficient nuts/seeds and vegetables (eFigure 2, eFigure 5, and eTable 14 in the Supplement). Overall, suboptimal dietwasassociatedwith64.2%of all estimated cardiometabolic deaths in 25- to34-year-oldsand35.7%in 75-yearolds and older (absolute difference, −28.6%; 95%UI, −32.9%to −24.0%)(Figure 2). The highest estimated proportional deaths at youngest ages (<44 years) were associated with SSBs followed by processed meat, fruits, nuts/seeds, and vegetables; at middle age (45-54 years), with SSBs, processed meat, nuts/ seeds, and seafood omega-3 fats; and at oldest age (≥65 years), with sodium. For example, estimated proportions of SSB related deaths were much higher at age 25-34 years (26.8%)and 35-44years (28.9%)than at age ≥75years (3.5%). Estimated proportions of deaths related to processed meat and nuts/seeds were higher at age 45-54 years (16.8%and 15.7%, respectively) than at age ≥75 years (4.9%and 6.8%).

By race/ethnicity, estimated proportional diet-related mortality was higher among blacks or Hispanics for most dietary factors assessed (Figure 2; eFigure 3, eFigure 5, eFigure 6, and eTable 14 in the Supplement). For example, estimated cardiometabolic mortality associated with SSBs was nearly twice as high in blacks (12.6%; the leading factor) vs whites (6.4%), and from low nuts/seeds, higher in Hispanics (11.7%; the leading factor) vs whites (7.9%). One exception was omega-3 fat–associated proportional mortality, which was higher in whites (8.0%). Relative rankings of cardiometabolic mortality related to different dietary factors were otherwise generally similar by race/ethnicity. Overall, suboptimal diet was associated with 53.1% of total estimated cardiometabolic deaths among blacks, 50.0% among Hispanics, and 42.8% among whites (absolute differences, +10.5% [95% UI, 8.0%-12.7%] for blacks vs whites and +7.2% [95% UI, 4.8%-9.8%] for Hispanics vs whites).

Estimated proportional diet-related cardiometabolic mortality was generally higher among individuals with low or medium education compared with high education (Figure 2; eFigure 4, eFigure 5, eFigure 7, and eTable 14 in the Supplement). This was most notable for nuts/seeds (in low vs high education, 10.7%vs 6.2%of cardiometabolic deaths), SSBs (8.4%vs 4.5%), and fruits (8.5%vs 6.4%). Overall, suboptimal diet was associated with 46.8% of cardiometabolic deaths for lower-, 45.7%for medium-, and 39.1%for higher-educated adults (absolute differences, +7.7%[95%UI, 4.9%-10.4%]for low vs high and +6.7% [95% UI, 4.1%-9.0%] for medium vs high).

Trends Between 2002 and 2012 Between 2002 and 2012, the total number of population adjusted US cardiometabolic deaths per year decreased by 26.5%. Improvements were seen in national intakes of some factors, including polyunsaturated fats, nuts/seeds, SSBs, whole grains, and fruits (eFigure 8 in the Supplement). Thus, absolute numbers of diet-related cardiometabolic deaths decreased for all dietary factors (eTable 13 in the Supplement). As a percentage of annual cardiometabolic deaths, which accounts for underlying trends in absolute death rates, estimated diet-associated mortality declined for polyunsaturated fats (−20.8% smaller proportion of deaths; 95% UI, −18.5% to −22.8%), nuts/seeds (−18.0%; 95% UI, −14.6% to −21.0%), and SSBs (−14.5%; 95% UI, −12.0% to −16.9%); remained relatively stable for whole grains, fruits, vegetables, seafood omega-3 fats, and processed meats; and increased for sodium (+5.8%; 95% UI, 2.9%-8.8%) and unprocessed red meats (+14.4%; 95% UI, 9.1%-19.5%) (Figure 3). In 2002, excess SSB intake was the third leading risk factor for diet-associated cardiometabolic death among these 10 dietary factors, with an estimated 73 162 associated deaths, or 8.6% of all cardiometabolic deaths (see eTables 5, 8, and 12 for 2002 inputs and eFigures 9-16 in the Supplement for 2002 results overall and by population subgroups). In comparison, by 2012, SSBs had declined to the seventh cause of diet-associated deaths.

Proportional trends in cardiometabolic mortality associated with dietary factors were generally similar by sex and age (eFigures 5, 14, and 17 in the Supplement). Trends by race were also consistent with overall results, with some exceptions. For instance, the percentage of cardiometabolic deaths associated with insufficient nuts/seeds declined in whites (from 10.0% to 7.9%; −21.8% [95% UI, −35.8% to −3.4%]) but not in blacks or Hispanics, while the percentage of cardiometabolic deaths associated with insufficient whole grains declined in Hispanics (from 12.9% to 7.6%; −41.2% [95% UI, −49.8% to −28.8%]) but not in whites or blacks, yet Hispanics started at higher levels and declined to more similar associated burdens by 2012. Trends in diet-associated cardiometabolic deaths were also generally similar by education, except that the percentage of cardiometabolic deaths associated with low nuts/seeds declined in adults with high (8.7% to 6.2%; −29.7% [95% UI, −36.0% to −23.3%]) but not low (10.9% to 10.7%; −3.0% [95% UI, −8.4% to 6.3%]) education; and with SSBs declined more among adults with high (5.9% vs 4.5%; −23.9% [95% UI, −29.5% to −17.9%]) compared with low (9.2% vs 8.4%; −8.3% [95% UI, −12.6% to −4.0%]) education.

Discussion Based on a comparative risk assessment model and nationally representative data, an estimated 45.4% of all cardiometabolic deaths (n=318 656 due to heart disease, stroke, and type 2 diabetes) were associated with suboptimal intakes of 10 dietary factors in 2012. By sex, larger diet related proportional mortality was estimated in men than in women, consistent with generally unhealthier dietary habits in men. Suboptimal diet was also associated with larger proportional mortality at younger vs older ages, among blacks and Hispanics vs whites, and among individuals with low and medium education vs high education.

Among individual dietary components, the largest estimated mortality was associated with suboptimal sodium (9.5%) followed by nuts/seeds, processed meats, seafood omega-3 fats, vegetables, fruits, SSBs, and whole grains (each between 5.9%-8.5%), and, last, polyunsaturated fats (2.3%) and unprocessed red meats (0.4%). Estimated deaths related to processed meats and SSBs were higher among men than women. By age, SSBs were the leading estimated factor associated with cardiometabolic mortality between ages 25 and 64 years and sodium at age 65 years or older. Disparities were evident by race, especially for excess SSBs among blacks and insufficient nuts/seeds among Hispanics, and by education, especially for low nuts/seeds and fruits and excess SSBs among less-educated adults. Income-related disparities in current levels and trends over time of national consumption of nuts/seeds, fruits, and SSBs have been reported,17 which likely contribute to the disparities in diet associated mortality by race and education identified in the present investigation.

### Health Care Costs

#### Obese people have higher medical bills

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p.2, Accessed 7/1/17, GDI - JMo)

Key Findings

Increased healthcare costs due to poor diets and obesity are a reality, even for young Americans just out of the school system. Our analysis of survey data from the U.S. Department of Health and Human Services shows the asso- ciations between diet, obesity, and individuals’ medical expenditures. We found that among 18- to 25-year-old respondents, those who were cautioned by a doctor to reduce their consumption of fatty foods (a proxy for having a diet too high in fat and cholesterol) were 20 percent more likely than their peers to be obese, and they had annual medical expenses nearly one-third higher. The situation only worsens with advancing age. Among respondents aged 18 to 85, the average annual medical expenditures among those who were cautioned about their diets were 90 percent higher than those who were not cautioned about their diets.

## Obesity – Structural Inequity

### Disproportionate Impacts

#### Obesity disproportionally affects socioeconomically disadvantaged students – creates a cycle of obesity

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 5-6, Accessed 7/1/17, GDI - JMo)

Socioeconomically disadvantaged children are at the greatest risk for being overweight and obese, and rates of childhood obesity among some racial and ethnic minority groups are rising (Ogden et al. 2014; Singh, Siahpush, and Kogan 2010; Skelton et al. 2009). From 2001 to 2012 the increase in obesity prevalence for white children was fairly small, increasing just slightly, from 13.9 percent to 14.1 per- cent; the increase over the same period was greater for African-American children (from 17.5 percent to 20.2 percent) and for Hispanic children (from 19.5 percent to 22.4 percent) (NCHS 2013).

Not only is childhood obesity partially caused by socioeconomic inequities, but it perpetuates them, bringing about negative academic, social, psychological, and health consequences. Children who are obese are more likely than healthy-weight children to miss school due to illness, have lower academic achievement, and experience slower skill development (Trudeau and Shepherd 2010; Taras and Potts- Datema 2005). Obesity is also a highly stigmatizing condi- tion associated with low self-esteem (Strauss 2000). And obesity is associated with health issues for children, such as increased risk for type II diabetes, asthma, and high blood pressure (CDC 2009). Since some of these illnesses may limit children’s ability to be physically active, this further rein- forces the problem by making it more di cult for them to adopt healthy behaviors.

Many American children are trapped in a cycle that must be stopped: children in lower-income households have greater barriers to maintaining a healthy lifestyle, which results in poorer health outcomes and lower academic performance. As these children grow into adults, low educational attainment leads to lower-paying jobs, and lower-paying jobs make it more diffcult to maintain healthy lifestyles.

#### Obesity disproportionately affects Hispanic and African-American children – improving healthiness in schools key to prevent disparities

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 10-11 Accessed 7/1/17, GDI - JMo)

Using data from the Department of Education’s longi- tudinal study, we identified enrollment patterns of students in FRP meal programs. We looked at differences between FRP participants in fifth and eighth grade and found that FRP meal program participation declined from 44 percent in fifth grade to 36 percent in eighth grade. Additionally, we compared various racial/ethnic and socioeconomic groups enrolled in FRP meal programs with those that were not. The racial/ethnic group with the greatest participation in FRP meal programs in both the fifth and eighth grades was Hispanic. Approximately 77 percent of Hispanic children were enrolled in the FRP meal program, followed by African- Americans (76 percent), and whites (28 percent). Since obesity disproportionately affects Hispanic and African-American children, improving the healthfulness of school meals is an important opportunity for schools to help prevent further gaps in racial/ethnic disparities.

[FRP: Free and reduced-price]

### Discrimination

#### Obesity affects people’s wages and interviews

**Pinkston, University of Louisville Economics Associate Professor, 16**

[Josh, Northwestern, Ph.D. in Economics, 10/12/16, University of Louisville, “The Dynamic Effects of Obesity on the Wages of Young Workers”, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2537554>, pg. 36-37, accessed 7/1/17, JBC]

The results of this paper demonstrate the importance of using dynamic models when considering effects of body mass on wages. I find that past body mass affects the wages of young workers more often than current body mass. Furthermore, current wages are affected by lagged wages, which are affected by further lags of body mass and wages. Therefore, in contrast to previous work, my results make it clear that the penalty for becoming heavy is not the same as the penalty for being heavy throughout the early years of a career. Penalties for a high body mass can persist and even accumulate over time, especially for women.

Consistent with the youth of the sample, the penalties for high body mass identified in this paper do not appear to be driven by changes in health or selection into jobs with employer-provided health insurance. The main 36 results are robust to the addition of controls for general health or having a job that offers insurance coverage. Furthermore, the differences in penalties by gender seem more consistent with discrimination based on appearance than with impaired health or expected healthcare costs. The results are consistent with dynamic models of discrimination that incorporate labor market frictions. For example, models in which discrimination affects labor market search, like those in Bowlus and Eckstein (2002) and Lang et al. (2005), are consistent with penalties based on recent lags of body mass. The idea that body mass can affect labor market search is also supported by the field experiment of Rooth (2009), who finds that obese job applicants receive fewer interview requests.

Finally, persistent effects of high body mass on wages are consistent with effects on occupational selection. Some of the evidence in this paper points to occupation as an intermediate outcome through which body mass affects wages, especially in the case of white women. The results suggest that the occupational selection observed in the NLSY79 by Lakdawalla and Philipson (2007) and Harris (2015) still affects the wages of young workers who entered the labor market in more recent decades.

## Obesity – Economy

### Econ & National Security

#### Obesity massively undermines the economy and threatens national security

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 1-2, RK]

Abstract: This Article examines how America’s obesity epidemic threatens the security of the nation. One quarter of Americans aged 17 – 24 are ineligible for the U.S. military solely because they are overweight or obese. As result, the Department of Defense and the Pentagon have declared America’s obesity problem a national security crisis. Moreover, nearly 70% of Americans are overweight or obese. By 2050, one-third of all Americans will have diabetes. As a result, 18% of America’s GDP is spent on health care, at least double every other major industrialized country. By 2075, due to the rise in obesity related illnesses and diseases, 40% of America’s GDP will be spent on health care costs. Those rising costs will require reallocation of America’s economic resources, which will inevitably result in decreased spending on those government functions related to national security. This article offers potential solutions to address this growing problem.

“Obesity is the single greatest non-criminal hindrance for our young people seeking to enlist in the armed forces.”1

I. Introduction Since 1980 adult obesity rates in America have doubled from fifteen to thirty percent.2 Childhood obesity rates have almost tripled in the same time period.3 Since 1960, the incidence of extreme or "morbid" obesity (BMI above 40) has risen six-fold.4 In total, an estimated 160 million Americans are either obese or overweight.5 Nearly 75% of American men and more than 60% of women are obese or overweight.6

With these increased rates of obesity are significant increases in a plethora of illnesses including type-2 diabetes, heart disease, hypertension, cancer, arthritis, Alzheimer's disease, dementia, and infant mortality.7 “Because obesity affects self-esteem, which in turn affects academic performance, rising youth obesity rates may negatively impact American students' academic achievement and competitiveness in a global economy.” 8 In sum, ‘[B]eing overweight or even obese is a growing, unchecked problem in the US today,’9 said Dr. Ali Mokdad, Professor of Global Health at the Institute for Health Metrics and Evaluation. ‘We are looking at a major public health epidemic that must be stopped.’

This article posits a first step in stopping the epidemic – by reframing the obesity crisis into its proper perspective, as a threat to national security. Over 25% of Americans aged 17 – 24 are ineligible for the U.S. military solely because they weigh too much.10 Obesity is the leading cause of the substantial rise in medical rejections of potential military recruits.11 Obesity also poses serious challenges to the nation's economy by costing employers billions of dollars annually in health care expenditures, lost worker productivity, and workers' compensation claims. Government expenditures on health care through Medicare, Medicaid, and other social programs, already rising at a rate that far outpaces inflation, are significantly higher and will only increase further due to rising obesity rates.

The rising health care expenditures will soon leave little room for anything else – including the U.S. military. As such, if America’s overweight and obesity crisis is not only halted but reversed, she will soon find herself with bigger problems than jeans that do not fit anymore. As a result, the Pentagon has declared the obesity epidemic to be a serious national security issue.12 The Department of Defense has gone so far as to exclaim that a fit fighting force is the key to national security.13

Note – “She” describing the US, and “herself”

### Economy

#### Obesity adversely strains the economy and lowers job performance

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 6-7 Accessed 7/1/17, GDI - JMo)

Foods that are high in fiber, vitamins, and minerals—such as whole grains, fresh fruits and vegetables, and lean meats— contain essential nutrients for supporting children’s growth and development, maintaining a healthy weight, and protec- ting against chronic diseases (CDC 2009). Conversely, when children consume too many unhealthy foods high in fat, sugar, and sodium, and not enough healthy foods, they are more likely to become obese and to develop diet-related health conditions.

While these diet-related conditions can have serious adverse health impacts while children are still young (see Box 1, p. 7), other consequences of poor diet and obesity can persist into adulthood. According to one study, obese children between the ages of six and eight years were 10 times more likely to become obese adults than were children with healthy weights (Freedman et al. 2005). Obesity, in addition to having detrimental effects on quality of life and life expectancy, has negative economic impacts. Perhaps the most obvious are the direct costs, those associated with medical care including health services, diagnostic tests, and medication. In 2008, medical expenditures to treat obesity in the United States were estimated at $147 billion (Finkelstein et al. 2009). Seen from a different angle, obesity accounts for an estimated 16.5 percent of U.S. medical expenditures ($210 billion in 2008 dollars) (Cawley and Meyerhoefer 2012).

There are also indirect costs of obesity. Cawley, Rizzo, and Haas (2007) found that increased weight was correlated with lower wages for white women, a link that may be due to a variety of factors. Obese employees miss more workdays than non-obese employees (Trogdon et al. 2008; Finkelstein et al. 2005). Additionally, employers with employer-sponsored health insurance plans may pay higher rates for obese employees, and some may pass along these costs through wage reductions (Bhattacharya and Sood 2011; Bhattacharya and Bundorf 2009). Lastly, obese employees may have lower self-esteem than non-obese employees, resulting in decreased confidence in the workplace (Mocan and Tekin 2009). Finally, even if some obese employees have high workplace attendance and low healthcare costs, they still can suffer from weight stigma in the workplace, which can affect wages, promotion, and potential termination (Puhl and Brownell 2011).

Not only do individuals with obesity incur costs, but society does as well. Some of these costs are borne by private health insurance consumers, who pay higher healthcare premiums to cover increasing obesity-related chronic condi- tions. Other costs are paid by taxpayers through public health insurance programs like Medicare and Medicaid, as well as military health insurance programs such as TRICARE for active military and the Department of Veterans A airs for veterans and their families. A recent study using a nationally representative sample of U.S. adults found that if the obesity rate remained at the 1970 level (13 percent)—before the surge in obesity—savings to public health insurance programs in 2009 alone would have been $137 billion (MacEwan, Alston, and Okrent 2014). The cumulative savings over the past three decades could have been trillions of dollars.

#### Obesity causes lower productivity, foregone economic growth, higher healthcare costs, and 5% of worldwide deaths

**Tremmel, Institute for Medical Informatics, Biometry and Epidemiology, et al., 17**

[Maximillian, Ulf-G. Gerdtham, Lund University, Department of Clinical Sciences, Health Economics Unit, Centre for Primary Health Care Research, Faculty of Medicine, Department of Economics, Professor, Peter Nilsson, Lund University, Department of Clinical Sciences professor, Sanjib Saha, Lund University, Department of Clinical Sciences, Health Economics Unit, Centre for Primary Health Care Research, Assistant researcher, 4/19/17, International Journal of Environmental Research and Public Health, “Economic Burden of Obesity: A Systematic Literature Review”, <http://www.mdpi.com/1660-4601/14/4/435/htm>, accessed 7/1/17, JBC]

Obesity is a condition in which fat accumulates in the body to a point where it is a risk factor or marker for a number of chronic diseases including diabetes, cardiovascular diseases (CVDs) and cancer, and has adverse effects on overall health [1,2,3]. Body mass index (BMI), calculated as weight in kilogram (kg) divided by height in meters squared, is one of the most commonly used screening tools to measure and characterize obesity. A BMI of 25 to <30 kg/m² is defined as overweight and BMI ≥ 30 kg/m² is classified as obese [4,5].

**Obesity constitutes an important threat to national and global public health in terms of prevalence, incidence and economic burden. In 2014, more than 2.1 billion people, nearly 30% of the global population, were overweight or obese and 5% of the deaths worldwide were attributable to obesity.** If the incidence continues at this rate, almost half of the world’s adult population will be overweight or obese by 2030 [6].

Obesity also imposes a large economic burden on the individual, and on families and nations [7,8]. In 2014 the global economic impact of obesity was estimated to be US $2.0 trillion or 2.8% of the global gross domestic product (GDP) [6]. Besides excess health care expenditure, obesity also imposes costs in the form of lost productivity and foregone economic growth as a result of lost work days, lower productivity at work, mortality and permanent disability. It has been described in recent studies and reviews that there is a gradient between increasing BMI and costs attributable to obesity [9,10,11,12].

Cost of illness (COI) studies help policy makers understand the economic burden of a specific disease. Such COI studies identify different components of costs of specific diseases or disease-related complications in different sectors of the society, which may have been saved if the disease had not existed. They are conducted from different perspectives that determine the types of cost included in the analysis. These perspectives measure costs to the society, health care systems, participants and their families and third-party payers [13,14]. Furthermore, COI studies have a significant role in public health in formulating and prioritizing health care policies and allocating health care resources by estimating the amount of costs attributable to a disease [15].

Systematic literature reviews represent a systematic way to identify relevant studies, to summarize the results, to critically analyse the methods of the studies and, finally, to comment and recommend improvements for future research. Systematic reviews in the context of cost of obesity (COO) summarize the results of available studies in order to provide a high level of evidence on the cost burden due to obesity, which may help decision makers to develop policies to tackle the burden of obesity [16].

There have been a number of literature reviews on COO [17,18,19,20,21,22,23,24,25,26,27,28] including studies from before 2011. Since 2011, however, advanced methods such as microsimulation modelling [29,30,31] have been used and have led to new findings, requiring further, systematic exploration. Furthermore, some reviews have included studies that were specific to a single country or continent, e.g., the USA [18,26], Canada [24] or Europe [21,22,27], and have excluded studies from all over the world. Some reviews have included studies that accounted for direct costs [23,26,28], while others have included only indirect costs [25]. Direct costs include all direct medical and non-medical costs for diagnosis, treatment and transportation [32]. Indirect costs are the productivity loss cost due to morbidity and early mortality [33]. Moreover, some studies include costs for both overweight and obesity and do not separately differentiate the cost burden [21,26].

In addition, none of the reviews has systematically analysed the obesity-related co-morbidities included in the cost calculation. Since obesity itself is not only a disease but also a risk factor for other diseases, it is important to study which co-morbidities have been included in the different COO analyses. The attributable burden of obesity differs across studies. Attributable burden is determined by the co-morbidities included in a cost calculation. It would be interesting to examine how, in the included studies, these co-morbidites are adjusted for in the overall cost calculation.

Two recently published systematic reviews have attempted to explore the problems associated with the methodological heterogeneity of studies [10] and performed a quality appraisal of the analysed studies [12]. Nevertheless, there is still a methodological heterogeneity within COO studies and a lack of systematic reviews examining the different obesity-related diseases included in these studies.

The objective of this study was to: (1) perform a systematic review to assess the economic burden of adult obesity; and (2) identify and describe different obesity-related diseases included in the selected studies.

2. Methodology

This systematic review has been performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines [34]. Moreover, the Campbell and Cochrane Economics Methods Group guidelines have been followed including search criteria, data extraction, synthesis and critical analysis.

2.1. Search Strategy

A systematic search was performed to identify relevant articles published in databases from 1 January 2011 until 14 September 2016. The databases used were Medline and Web of Science. Additional publications were searched on Google Scholar from the reference lists of included studies and reviews by backward and forward snowball searches. The details of the searching strategy with key words and initial hits are provided in Appendix A to ensure reproducibility and transparency of the work.

2.2. Inclusion and Exclusion Criteria

We included studies that satisfied the following criteria: (1) obesity was defined as BMI ≥ 30 kg/m²; (2) the estimation was based on the entire country and a representative population; (3) the estimated COO could be either direct or indirect or both; (4) estimated costs were specific to obesity and not overweight; (5) the research was reported in English in a peer-reviewed journal; and (6) studies with any perspective (e.g., societal, health care or third-party payers) in cost estimations.

Studies were excluded if they were: (1) economic evaluations such as cost-effectiveness, cost-utility or cost-benefit analyses; (2) reviews, notes, commentaries, or editorials related to obesity; or (3) COO studies that included children aged <18 years and pregnant women; (4) Articles describing study protocol or study design were likewise excluded.

2.3. Selection and Data Extraction

Following each search in the above mentioned databases, the initial hits were exported into EndNote. After removing the duplicates, all titles and abstracts were screened to select the relevant studies based on the inclusion and exclusion criteria. The selection of the papers was done separately by two of the co-authors (Maximilian Tremmel and Sanjib Saha) who then checked the comparability of studies by reviewing a random sample of included and excluded studies after the initial screening. After removing studies that met the exclusion criteria during the initial screening, the full text of the remaining studies was assessed against the inclusion criteria and any differences were discussed and a consensus was reached. A flow chart of the study selection procedure is presented in Figure 1.

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Figure 1. Flow chart depicting the process of the study selection for the systematic review.

Data were extracted on two issues: (1) the results; and (2) the methodology used to derive the results. Other information was gathered as well, such as perspective, study time frame, sample size, target group, inclusion of cost items, and discount rate. Moreover, we also collected information on types of obesity-related co-morbidities included in the studies.

3. Results

We included twenty-three studies in this review [29,30,31,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54]. Detailed characteristics of these studies are presented in Table 1. Eleven studies [29,30,38,39,40,44,45,46,50,53,54] used a top-down (population-based) approach and eleven studies applied a bottom-up (person-based) approach [31,35,36,37,41,42,43,47,48,51,52] to calculate the costs attributable to obesity. The top-down approach estimates economic costs by using aggregate data on mortality, morbidity, hospital admissions, general practice consultations, disease-related costs, and other health-related indicators along with population attributable fraction (PAF) or population attributable risk (PAR) to calculate attributable costs [55,56,57]. The measures of PAF and/or PAR were used in seven studies [38,40,44,45,46,50,53], while four studies did not mention the approach to estimating the costs [29,30,39,41]. One study [54] used population attributable prevalence (PAP), which takes into account that risk factors and their relative risks (RRs) can change over time.

Table

Table 1. Characteristics of the included studies.

The bottom-up approach calculates the resources used and productivity loss in individuals with the health problem in question, obesity in this case. The per-capita costs are then extrapolated to the whole population with the health problem, based on relevant epidemiological data [58]. The items that were included in the estimation of the patient-level data included drug medication in all twelve studies, but the other items, e.g., hospitalization costs, physician visit costs, inpatient and outpatient costs, varied across all studies. For example, whereas An [36] included out-of-pocket expenses, inpatient and outpatient costs, office-based medical provider services, emergency room services and medication, Effertz et al. [42] considered nursing costs, rehabilitation treatments, and financial compensations for job integrations, accidents, and medication.

There were 17 studies from developed countries [31,35,36,37,39,41,42,43,44,45,46,47,48,49,51,52,54] and six studies from developing countries [29,30,38,40,50,53] according to the World Economic Situation and Prospects (WESP) report. According to the WESP and Organization for Economic Co-operation and Development (OECD), there is no established convention for the designation of “developed” and “developing” countries, but in common practice, Japan, Canada, the USA and European countries, for example, are considered “developed” countries, while Mexico and Brazil are considered to be “developing” countries [59]. There were six studies from Germany [42,43,44,46,47,54], six from the USA [31,36,37,39,51,52], three from Brazil [30,38,40] and two from Canada [35,45].

In five studies [36,39,48,51,52] two-part models were used to calculate the health care expenses attributable to obesity. In two-part models, the probability of the medical expenditures is calculated first; thereafter it is multiplied by the amount of expenses conditional on the presence of these expenses. A microsimulation model was designed and applied by Rtveladze et al. for Brazil [30] and Mexico [29]. Both these studies employed the two-stage modelling process developed by the UK Foresight working group [60] and results were simulated for three hypothetical scenarios (no BMI reduction, a 1% reduction, or a 5% reduction in BMI across the population). The model predicted the costs for Mexico to rise from US $806 million (2010) to US $1.7 billion in 2050. For Brazil, the costs were estimated to increase from US $5.8 billion (2010) to US $10.1 billion (2050). Another microsimulation model (Markov-based microsimulation) was developed by Su et al. [31], which predicted the 5-year and 10-year total economic burden per capita attributable to obesity at US $33,900 and US $70,200 (2013), respectively.

Studies also varied in terms of inclusion of direct costs and indirect costs, i.e., in terms of perspective of analysis (Table 1). Direct medical costs include costs for the treatment and management of the diseases, e.g., inpatient or outpatient care. Direct non-medical costs include, e.g., transportation costs to health care providers. Indirect costs include early mortality costs and morbidity costs due to sickness absence and informal care costs [13]. In six studies [42,44,45,46,50,53], both direct and indirect costs were included and therefore a societal perspective was used. In twelve studies [29,30,35,36,38,39,40,41,43,48,51,52] only direct costs were calculated and therefore a health care perspective was used. However, one of these studies [43] described this method as a societal perspective rather than a health care perspective.

Indirect costs only were calculated in two studies [47,49]. In a study from the USA [52], direct costs were estimated from a third-party payer perspective and in another study from Germany [42] both direct and indirect costs were estimated from a third-party payer perspective. The third-party payer perspective includes insurance companies, governmental agencies, and employers. The Medicaid perspective, a government programme financed by federal, state and local funds for persons of all ages within certain income limits, was used in the U.S. study while in the German study, the perspective of the “Techniker Krankenkasse” insurance company was used. The informal costs and informal caregiver costs were included in only two studies [43,53].

We found a substantial variation in the items that were included while estimating the direct cost (Table 1). For example, in one study from Brazil, by Bahia et al. [38], only inpatient and outpatient costs were included for the estimation of the direct costs, while in another Brazilian study, by de Oliveira et al. [40], costs for bariatric surgery, medication, orthotics, prosthetics, medical consultation and diagnostic procedures were additionally included. There was also variation in the calculation of indirect costs. Out of nine studies, in eight studies [42,44,45,46,47,49,50,53] researchers used the human capital approach (HCA) to calculate the indirect costs. Neovius et al. used the friction cost approach (FCA) as well as the HCA to estimate the indirect COO for Swedish men [49]. The HCA measures lost production, in terms of lost earnings of a patient. For mortality or permanent disability costs, the HCA multiplies the earnings lost at each age by the probability of living to that age [57]. In the FCA, only the production losses during the time it takes to replace a worker [57] are measured. Andreyeva et al. used average earnings to measure indirect costs [37].

We further gathered information on the obesity-related diseases included in each of the studies listed in Table 2. In 14 studies, researchers mentioned obesity-related diseases in the cost calculation [29,30,31,35,38,40,44,45,46,47,50,52,53,54]. The costs of diabetes were included in all of these 14 studies, three of which [35,51,53] included both Type 1 and Type 2 diabetes. Additionally, all of the studies, except one [35], considered CVDs. Therefore, diabetes and CVDs were the most commonly considered comorbidities of obesity in the selected studies. In addition to diabetes and CVDs regarded as comorbidities of obesity, both hypertension [29,30,31,35,38,40,44,46,47,50,53,54] and cancer [29,30,31,37,40,44,45,46,50,52,53,54] were included in twelve studies. However, these studies differ with regard to the type of cancer included in the cost analysis.

Table

Table 2. Obesity-related diseases included in the studies.

For example, Konnopka et al. [44] included neoplasms of the oesophagus, stomach, colon, liver, gallbladder, pancreas, postmenopausal breast, cervix uteri, ovary, prostate, and kidney, non-Hodgkin’s lymphoma, multiple myeloma, and leukaemia, while Kang et al. [53] included only colon cancer among the cancers. Furthermore, musculoskeletal disorders were considered in nine [29,30,31,38,40,45,50,53,54], respiratory disorders in six [31,38,40,45,50,52] and digestive diseases in five studies [31,44,45,46,50]. Four studies [31,35,47,50] have also included mental disorders such as depression. All of the abovementioned diseases were included only in the studies by Pitayatienanan et al. [50] and Su et al. [31].

Two studies estimated the obesity burden in Brazil from a health care perspective. Bahia et al. [38] calculated the costs over 3 years from 2008 to 2010 to be US $1.1 billion per year and de Oliveira et al. [40] gave the burden of obesity in 2010 as US $269.6 million. Both studies used the PAF and a top-down approach. Bahia et al. [38] collected data from the national health database from 2008 to 2010 and the costs reflected the average costs for 3 years. De Oliveira et al. [40] used Ministry of Health Data to estimate the annual health care costs.

Konnopka et al. [44] used the concept of attributable fractions based on German prevalence data and relative risks from US studies as well as statistics from the German Federal Statistics Office and the German Retirement Insurance Office. These results were updated by Lehnert et al. [46] 6 years later using the same method to calculate the cost burden. The total annual societal (direct and indirect) costs due to obesity increased from €9.8 million in 2002 to €12.2 million in 2008. Another study from Germany [42], using a different method based on claims data from a German health insurance company, estimated the total costs for third-party payers to be €63.0 billion per year. Konig et al. [43] estimated the average 3-month individual health care costs (also including informal care) in Germany to be €1244 (2008) using questionnaire data from an 8-year follow-up contact of a large population-based prospective cohort study titled “Epidemiologische Studie zu Chancen der Verhütung, Früherkennung und optimierten Therapie chronischer Erkrankungen in der älteren Bevölkerung” (the ESTHER study). Yet another German study [54] estimated the total national health care costs at €5.1 billion, using the OBCOST tool to estimate incidence, prevalence and mortality (IPM) to calculate the COO.

For Canada, the annual societal costs were estimated to be CAD $1.0 billion, according to Krueger et al. [45] using data from the 2012 Canadian Community Health Survey. Kang et al. [53] included 1,910,194 Korean individuals in their study to calculate the annual societal costs, which in 2005 amounted to US $1786 billion. Annual societal costs were also estimated in a study in Thailand [50] and costs attributable to obesity were US $725.3 million in 2009. For Sweden, Neovius et al. [49] estimated that the total lifetime productivity loss due to obesity was €95,400 per man in 2003. This study was based on a 38-year follow-up of 45,920 Swedish men who were performing mandatory military conscription tests at age 18.7 ± 0.5 years.

Direct per-capita costs of obesity were reported in seven studies [31,35,36,37,43,48,52] and indirect per-capita costs were calculated in one study in Sweden [49]. When comparing the results of two studies in the USA [36,39] estimating annual direct costs per capita, the costs increased from US $2741 in 2005 to US $6899 in 2011. Both these studies used data from the Medical Expenditure Panel Survey. Alter et al. [35] estimated the direct per-capita costs attributable to obesity over a time frame of 11.5 years to be CAD $8294.67 (2006) while the direct per-capita costs over a lifetime (>65 years) amounted to US $171,482 (2010) in the USA [52]. Total per-capita costs in the USA were predicted, using a Markov-based microsimulation, to be US $33,900 and US $70,200 (2013) over a time frame of 5 and 10 years, respectively [31].

4. Discussion

In this paper, we have performed a systematic literature review of recent cost of obesity (COO) studies. We have found that there is still a large heterogeneity across the available COO literature. Although there is a substantial international literature on COO, we have found that a review and synthesis of the results based on homogeneous methods and costing approaches is hindered by a wide range of sources, as well as methodological approaches, perspectives, target groups and included diseases, used to estimate the prevalence of obesity.

A key issue of COI studies is the PAF applied to calculate the fraction of costs attributable to obesity. There are no agreed recommendations or guidelines on what fraction of the co-morbidities can be attributed to obesity and what fraction can be attributed to the co-morbidities themselves. Since obesity is a complex disease condition with much different co-morbidity, what fraction of the co-morbidities is attributed to obesity has much influence on the cost calculation. The PAF is calculated by using the RRs for co-morbidities related to obesity. In the literature review, we found different methods for calculation of RRs and, subsequently, PAF. For example, Lette et al. [54] applied age- and gender-specific RRs and used obesity-related co-morbidities from the Comparative Quantification of Health Risks [61]. Bahia et al. [38] selected co-morbidities based on two conditions: firstly, those RRs are ≥1.20 for diseases and secondly, that RRs are ≥1.10 but <1.20 for diseases that are a substantial problem for public health due to high prevalence rate. The authors calculated the RRs by performing meta-analyses. The different methods for calculation of PAF can lead to an over—or an underestimation of costs attributable to obesity and can therefore make it difficult for comparison between studies.

Our literature review included studies that are based on different approaches for calculating the disease burden of obesity (Table 1). Each approach has advantages and disadvantages. The top-down approach is simple, transparent, and cheaper and faster than the bottom-up approach. A disadvantage of the top-down approach is that all possible confounding variables need to be adjusted for when estimating the PAF. For a complex disease such as obesity, this approach may underestimate or overestimate the costs derived from co-morbidities. The bottom-up approach, on the other hand, calculates the mean per-person costs, which are then extrapolated to the whole population. In this case, the patient sample size needs to be unbiased and representative of the national population. This might require extensive resources and may not be always practical (e.g., for estimating the future cost) [62]. On the other hand, this approach is more comprehensive and valid, and enables detection of the variability related to differences in important demographic characteristics between patients [58]. Microsimulation models can predict the future cost and can incorporate data from other countries, if data are missing in a specific case or if data from another country are known to be valid and sufficiently reliable to be incorporated. A disadvantage of microsimulations is that a number of assumptions are made that may or may not be valid; these assumptions have to be checked using sensitivity analysis to evaluate how sensitive indicators can react to changes in input parameters. This process makes the model complex and sometimes makes it difficult to understand [63].

The study by Lehnert et al. [46] aimed to update the study by Konnopka et al. [44] and used the same method, perspective and target group in Germany. Therefore, these studies provide a good picture of the increase in the societal COO in Germany, from €9.8 million in 2002 to €12.2 million in 2008. Researchers argued that the main driver behind the cost increases was the rise in the prevalence of overweight and obesity in Germany between 2002 and 2008. This series of studies from Germany, using the same methods to measure the COO, may provide a valid statement about the development of COO between these two time points and gives a good example of how COO studies can be conducted in a structured and valid way. Nevertheless, the costs estimated in these two studies differ crucially from those reported by Krueger et al. [45] who used a similar approach to estimate the annual COO in Canada. Although the population of Canada is less than half of the population of Germany, these authors estimated the annual COO at CAD $1.0 billion. This variation in estimated costs can be explained by the approaches to calculating the risk factor exposure of obesity. The two studies from Germany used relative risks (RR) data from studies conducted in the USA to calculate the PAF. Even though estimates of RR were adjusted for important confounders such as gender, age, race and smoking status in both studies, transfer of costs to the German population causes uncertainty. By contrast, the study from Canada used RR data from a previously conducted literature review on studies of the general population of Western countries. Whereas Konnopka et al. [44] used German prevalence data and RRs from the US studies, Krueger et al. [45] used self-reported data from the Canadian Community Health Survey to calculate the risk factor exposure. Moreover, the two studies included different diseases in the cost calculation. Krueger et al. [45] excluded hypertension while Konnopka et al. [44] excluded respiratory and musculoskeletal disorders in the costing approach, which may explain some of the variation in estimated costs.

We included three studies from Brazil which calculated direct COO. Bahia et al. [38] collected data of the national health database from 2008 to 2010 and their estimated cost of US $1.1 billion reflects the average of 3 years. De Oliveira et al. [40] also used a top-down approach with Ministry of Health data to estimate the annual health care costs, which amounted to US $269.6 million. Rtveladze et al. [30] used a microsimulation model (Monte Carlo simulation), which requires county-specific disease incidence data, to predict health care costs from 2010 to 2050. Their results are limited by the lack of country-specific incidence and, e.g., cancer mortality data, as they used data from the USA, which has led to an overestimation of costs because Brazilian per capita health care spending is nearly eight times lower compared with the USA. When comparing these three study results, several limitations have to be pointed out: e.g., Bahia et al. [38] used RR data from countries other than Brazil since no data were available based on Brazilian cohorts. In addition, obesity prevalence rates were obtained from self-reported weight and height, which method may lead to either overestimation or underestimation of costs attributable to obesity, when either too many or too few people are categorized as obese, based on self-reported weight and height. On the other hand, de Oliveira et al. [40] used the PAR of obesity to calculate the costs for morbid obesity, which can lead to an underestimation of costs; also, they obtained RR data from cohort studies and meta-analyses published in international journals. Consequently, the different data sources used to estimate the RR relevant for the cost calculation need to be considered. When comparing these costs with costs in developed countries, it should be borne in mind that the Brazilian public health system has a large unmet demand for bariatric surgery, and consequently, that there may be an underestimation of COO in Brazil due to unmet needs [64].

Another characteristic of studies included in this review was the limited time frame of the analyses. In only six studies [31,35,38,48,49,52] was the time frame of the analyses longer than 1 year. Su et al. [31] reported per-capita costs in the USA over a time frame of 5 and 10 years. Alter et al. [35] investigated a time frame of 11.5 years to estimate the cumulative per-capita costs. Additionally, a propensity score matching method based on important confounders such as age, gender, socioeconomic status, smoking, physical activity, psychosocial stress and comorbidity, and a sensitivity analysis were performed, but the results did not change. Nevertheless, these results are limited by the exclusion of patients aged 65 and older, which may imply an underestimation of the costs and hinder a useful comparison with, e.g., the study by Yang et al. [52], who calculated lifetime costs from 65 years onwards.

Some studies failed to incorporate a discount rate (Table 1) [29,30,31,35,36,37,38,39,40,41,43,45,47,48,51,52,54]. Discounting allows calculation of the present value of payments that will be made in the future and should be applied when the duration of the analysis is longer than 1 year, otherwise the calculated costs might overestimate the true costs. Effertz et al. [42] incorporated discounting in a 1-year time frame of analysis, whereas for example Alter et al. [35] did not apply any discounting over a time frame of 11.5 years. Furthermore, the discount rates also vary among studies. Effertz et al. [42] used a discount rate of 2% while Kang et al. [53] discounted the costs at a rate of 6%. Hence, the costs reported by Effertz et al. [42] might overestimate the true costs, while the costs calculated by Kang et al. [53] might underestimate them. There is no agreement on the discount rate to be used in the scientific literature, although the World Health Organization (WHO) has recommended using a 3% discount rate [65].

Moreover, it should be pointed out that only four studies [31,35,47,50] include costs for mental disorders as a relevant obesity-related disease. According to Vigo et al. [66], the burden of mental disorders still seems to be underestimated even though e.g., depression as a mental disorder is on the rise globally, according to the WHO [67]. A recent systematic review [68] investigated the relationship between obesity and depression among adult men and women. The results indicate that there is a bidirectional relationship between obesity and depression. Consequently, excluding depression and other mental disorders from the obesity-related diseases may lead to an underestimation of costs. For example, the societal costs of depression in Germany were estimated at €15.6 billion per year [69].

The International Agency for Research into Cancer (IARC) [70] and the World Cancer Research Fund (WCRF) [71] report that common cancers in obese people are endometrial, oesophageal, colorectal, postmenopausal breast, prostate and renal cancer and adenocarcinoma. Less common malignancies associated with obesity are malignant melanoma, thyroid cancers [72], leukaemia, non-Hodgkin’s lymphoma, and multiple myeloma [73]. However, there was a crucial heterogeneity between the studies that included different types of cancer. Kang et al. [53] only included colon cancer as an obesity-related disease, while Konnopka et al. [44] and Lehnert et al. [46] included stomach, kidney, liver, gallbladder, cervix, ovary cancers and non-Hodgkin’s lymphoma, multiple myeloma, and leukaemia in addition to the common cancers in obese people mentioned by the IARC and WCRF. Su et al. [31] included 16 different types of obesity-related cancers in their study. The reported costs due to cancers need to be interpreted with the knowledge that different types of cancer were included in the different studies, which may have led to over- or underestimation of costs. Due to the fact that cancers create a big cost burden for society [74], there is a need for standardization when including cancers in the obesity-related costs. Within the twelve studies that have mentioned the included obesity-related diseases, one study, by Su et al. [31], included obesity-related liver diseases, such as non-alcoholic fatty liver disease (NAFLD), liver fibrosis and cirrhosis of the liver, which are also associated with obesity [75,76]. For example, NAFLD, a very common chronic liver disease worldwide, is on the rise following the trend of increasing prevalence of obesity, and is the second most common indication for liver transplantation, and an important cause of hepatocellular carcinoma [77]. Also, hepatic steatosis is known to be an associated comorbidity of obesity [78]. Consequently, we recommend considering liver diseases when costs of obesity and related diseases are calculated.

We found three studies, from the USA [37], Germany [47] and Sweden [49], in which only indirect costs due to obesity were calculated. While Andreyeva et al. [37] used overall average earnings to calculate the costs, Lehnert et al. [47] and Neovius et al. [49] used the HCA. Therefore, it has to be noted that using overall average earnings may overestimate average earnings for obese workers, especially women, in light of evidence that obesity is associated with low socioeconomic status [79]. Neovius et al. [49] state that using an FCA, compared with the HCA, reduced the estimated productivity losses by about 80%. Therefore, it may be beneficial to calculate indirect costs both using HCA and FCA approach.

Summarizing these results, we can state that **obesity is responsible for a large fraction of costs, not only to the health care system but also to society at large**. As we stated previously, almost half of the world’s adult population will be overweight or obese by 2030 if the prevalence continues on the current trend [6] and consequently also the costs attributable to obesity will increase. A useful example for rapidly rising costs attributable to obesity from these selected studies are the two mentioned studies from Germany [44,46]. The results of the two papers together show that total societal costs in Germany due to obesity have increased from €9.8 million to €12.2 million between 2002 and 2008. Therefore, **public health interventions should focus on the prevention of obesity as soon as possible, ideally at a young age. A** possible **option would be to focus on** worksite **health promotion** (WHP) **to increase** physical activity and **healthy lifestyles** at the workplace, **especially as obesity has been found to be associated with absenteeism, disability pension and overall work impairment** [80]. Higher physical activity at work may not only lead to a reduction in BMI and obesity, but also increase the health status of the employees. This may in turn further reduce indirect costs due to absenteeism and disability pension.

### Health Care Costs

#### Unhealthy food leads to obesity and chronic diseases and causes health care costs to skyrocket

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p.2, Accessed 7/1/17, GDI - JMo)

America’s children are bombarded daily with junk foods full of sugar, salt, and fat. On average, U.S. children consume five times the amount of sugar recommended by the Dietary Guidelines for Americans, but only about one-third the recom- mended amount of fruits and vegetables. Unhealthy diets have contributed to nearly 30 percent of our nation’s children being overweight or obese, with lower-income and racial or ethnic minority children at the greatest risk.

Children with obesity are as much as 10 times more likely than healthy-weight children to become obese adults. This, in turn, increases their risk of developing serious chronic diseases later on in life—including type II diabetes, cardiovascular disease, and some cancers. This is not only tragic for those suffering from obesity, but expensive for us all, as taxpayers and consumers cover some of the costs of treating these illnesses through public and military health insurance programs and higher private health insurance premiums. It is estimated that obesity-related healthcare costs in the United States account for $210 billion annually, or 16.5 percent of the country’s total healthcare costs.

#### Obesity biggest internal link to health care costs – destroys economic sustainability

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 14-16, RK]

IV. The Weight of the Nation Threatens National Security Because it Costs So Much Lack of eligible troops is not the only way obesity can be portrayed as a national security issue. Having nearly 70% of Americans overweight or obese places an enormous financial drain on America as well. Worse still, if unchecked, the burden will likely worsen over time. As will be explained below, the financial burden created by the obesity crisis strongly indicates that America may not be able to adequately defend itself in the future, because so much money will be going towards health care costs related to diseases associated with obesity.

A) Untenable Health Care Costs The rising share of U.S. gross domestic product (GDP) devoted to health care has been well documented and often lamented.81 In 2000, 13% of America’s GDP was spent on health care.82 By 2015, that number has climbed to 18%.83 Most nations spend less than 9% of their GDP on health care, many doing so with successful programs.84 More specifically, in 2014 the Commonwealth Fund did a survey of 11 similarly situated industrialized nations, including most European countries, the United States and Australia.85 The United States had the most expensive and also the worst performing health care system of any nation surveyed.86 Thus, most nations spend nowhere near what America spends on health care. Having health care costs account for 18% of GDP is an alarmingly high and unsustainable percentage, one that places America at a strategic disadvantage geopolitically. By spending so much to care for the diseases that come with being overweight and obese, America will continue to have less to spend on national security.

Too often people are consumed in debating what type of health care system America should employ rather than examining the sheer cost of taking care of its sick, regardless of the plan.87 In other words, because Americans are so overweight, the delivery of the health care plan is far less important to keeping health care costs down.88 This makes intuitive sense as well. If people are sick and need care, that care costs money. The less sick people a country has, the less money will have to be spent on health care.

There are undoubtedly a number of reasons for such high costs. But the obesity epidemic is far and away the greatest reason for rising health care costs.89 In fact, obesity has surpassed smoking as the number one contributor to high health care costs.90 As a result, the Pentagon has declared the obesity epidemic as a serious national security issue.91

The following two projections help explain. First, if Americans continue to gain weight at their current pace, by 2075 America is projected spend nearly 40% of its GDP on health care costs.92 18% is already more than double every major developed nation, many of which have arguably better health care as well.93 40% is simply untenable.

Second, according to an article published in the U.S. National Library of Medicine by the National Institutes of Health, it is projected that 100% of Americans will be overweight or obese by 2048. 94 That is not a typo. Sometimes statistics are misleading and fail to tell the whole story. Unfortunately here, there is nothing too confusing or misleading about an entire nation comprised of overweight or obese citizens. This will lead to increases in health care expenditures that America simply cannot afford.

One does not need an advanced economics degree to understand this is problematic. In sum, if everyone in America is overweight or obese, thereby facilitating well beyond 18% GDP spent on health care, there will be little money for anything else. No nation as large and powerful as the United States can effectively defend itself when everyone is overweight or obese and some much of it’s GDP is devoted to health care expenditures.

#### Obesity drives diabetes – costs trillions of dollars in healthcare alone

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, 20-22, RK]

Though not all of the current and projected increase in health care costs will come from obesity related preventable diseases, a large majority of them will. Currently, 75% of healthcare costs are spent on preventable diseases that are the major causes of disability and death in our society.108 Obesity is a major contributor to these preventable health costs and diseases, including the top killers – heart disease109, cancer, and diabetes related illnesses.110

One of the most common overweight and obesity related diseases is diabetes.111 One in two Americans has pre-diabetes or diabetes (or what Dr. Mark Hyman calls “diabesity”).112 There are two types of diabetes. Type I diabetes is almost strictly genetic and inherited. Changing the diets of those individuals will have likely have little to no impact on health care costs. But over 90% of American diabetes cases are type II.113 Type 2 diabetes is almost 100% preventable and curable with dietary intervention.”114 Thus, four out of every 5 people that has diabetes in America could have prevented it through diet and simply not being as heavy. And while some people undoubtedly have a genetic predisposition to obesity and diabetes, “those genes only get turned on when doused in mountains of white flour, white sugar, and fat.”115

That is because “[o]besity is the major driving force behind insulin resistance, which leads to diabetes.”116 The result is that “obesity is driving the epidemic of diabetes.”117 Until Americans start weighing less, the obesity epidemic will continue to spiral out of control. This is not hyperbole. In 2010, 25.8 million Americans were diagnosed with diabetes.118 By 2012, the number had grown to 29.1 million.119 These, however, are only the diagnosed cases. 25% of diabetics and 90% of pre-diabetics are not even diagnosed.120 This leads to the estimate that at least 50% of Americans already have diabetes or are pre-diabetic, whether they realize yet or not.

Without a change in diet and weight loss, the problem is projected to get worse. If the current overweight and obesity trends continue, by 2050 one-third of all Americans will have diabetes. 121

One out of every three children born in the year 2000 and later will get diabetes in their lifetime.122 Half of African American children and Latino children born in the year 2000 or later will be diabetics, and the number of Latinos in America grew 53% between 2000 and 2013. 123

The cost of diabetes is startling. Currently one in three Medicare dollars is spent on diabetes. 124 Caring for those with diabetes will cost America $3.4 trillion dollars over the next decade.125 “National health expenditures totaled an estimated $2.8 trillion in 2012.”126

This is another reason why rising obesity rates are so troubling for America’s national security. If the overweight and obesity rates do not significantly decline, health care expenses will soon be high enough that they could adversely impact military spending. At a time when America faces troop shortage, a decrease in military spending could have an even greater impact.

#### Obesity not only causes health and mental health issues within students, but increase health care costs

Centers for Disease Control, 13

[Center for Disease Control, “Make a Difference at Your School”, <http://digitalcommons.hsc.unt.edu/cgi/viewcontent.cgi?article=1030&context=disease>, 6/28/17, KW]

Since 1980, the percentage of obese children aged 6 to 11 has doubled, and the percentage of obese adolescents aged 12 to 19 has tripled. Childhood obesity has both immediate and long-term serious health impacts.

• In some communities, almost half of pediatric diabetes cases are type 2 diabetes, which was once believed to affect only adults.

• In one large study, 61% of obese 5- to 10-year-olds already had risk factors for heart disease, and 26% had two or more risk factors for the disease.

• Obese children have a greater risk of social and psychological problems, such as discrimination and poor self-esteem.

• Obese children have a 70% chance of being overweight or obese as adults—facing higher risks for many diseases, such as heart disease, diabetes, stroke, and several types of cancers.

The costs of treating obesity-related diseases are staggering and rising rapidly. In 2004, direct and indirect health costs associated with obesity were $98 billion.

Good eating habits and regular physical activity are critical for maintaining a healthy weight. Unfortunately, less than 25% of adolescents eat enough fruits and vegetables each day. Sixty-four percent of high school students don't meet currently recommended levels of physical activity.

### Health Care Costs Affect Debt

#### Rising health care costs greatly impact the national budget – Economist reports prove

Spross, Think Progress, 12

[Jeff, October 22, 2012, ThinkProgress, “How Rising Health Care Costs Impact the National Budget”, <https://thinkprogress.org/how-rising-health-care-costs-impact-the-national-budget-14c0ed5032e8>, accessed: 7/1/17, SK]

The defining problem of the United States federal budget is that the [cost of health care](http://thinkprogress.org/health/2012/05/21/487505/rising-care-costs-increased-health-spending-as-americans-used-fewer-services/) is growing much faster than prices in the overall economy. The result is that Medicare and, to a lesser extent, Medicaid — the two programs dedicated to providing their enrollees with health coverage — become more expensive each year even when the benefit packages they provide remain the same. Buying the same amount of health care is costing the two programs ever more money, and that cost is rising faster than the increased tax revenue the government receives each year due to economic growth.

Today, the Incidental Economist [flagged](http://theincidentaleconomist.com/wordpress/health-cares-huge-contribution-to-current-debt-in-one-nay-two-charts/) a remarkable set of graphs from [Robert Dittmars](http://www.mcsweeneys.net/articles/why-we-have-debt) at McSweeney’s that attempt to identify just how much this specific problem has contributed to the country’s deficit spending. Dittmars calculated what annual deficits (the blue line) and the national debt (the green line) would look like without health care costs factored in. When the lines go above zero the nation is running a surplus, and when they go below zero we’re adding to the debt.

Now, in some sense differentiating between Medicare’s payroll taxes and other revenue streams is arbitrary. At the end of the day, a certain amount of revenue comes into the government from all taxes, and a certain amount goes out in spending programs. What Dittmar’s calculation does clarify is that when Medicare and Medicaid were created, lawmakers assumed a certain amount of revenue would be necessary to fund them. Since then, the actual cost of these programs has diverged to an ever greater degree from that assumption — not because of any failure of discipline or frugality on the government’s part, but simply because of how the health care economy evolved.

## Obesity – Military

### Readiness

#### Reduced military from health care costs prevents readiness to address future problems – terrorists, military alliances, and unknown threats

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 20, RK]

Finally, reducing America’s military would leave the nation with fewer troops to complete or continue the current conflicts of the day. Not only would America be less able to fend off future aggressors, but those currently in conflict with America might suddenly have the upper hand. On the contrary, one could argue that America may be involved in less armed conflict in the future, thus drastically reducing the need for such a vast military. An axiom that has remained constant throughout history, however, is man’s desire for war.106 With the rise of the Islamic State and the continued threat of a nuclear Iran and Al Qaeda associated forces, it is unlikely that America will see a significant reduction in fighting in the future.

Moreover, all of the above listed conflicts involve countries or person directly in conflict with America. But those directly at odds with America are not the only instances where the U.S. needs troops or utilizes it’s military. Since the end of the Cold War, the U.S. military has routinely been utilized to combat individuals abroad that were not directly attacking or threatening America.107 For reasons mentioned earlier, it remains highly unlikely that this trend would suddenly change in the future. As such, the U.S. military will continue to be called upon to use force against nations or individuals not directly attacking America, many of which are currently unknown. Because unknown threats are inherently difficult to prepare for, it remains imperative to maintain a fluent and sufficiently funded military to adequately address future, hard to predict situations.

In sum, if the nation continues to increase in weight, health care spending will increase significantly, and one of the few places where budget money could come from to pay for these is the military. If that happens, it will make America less safe and more vulnerable to attack.

### Military Recruitment

#### Growth in obesity prevents military recruitment – leads to vulnerability

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 5-6, RK]

From 1998 to 2008, the number of states reporting that 40 percent or more of young adults are overweight or obese has risen from one to 39.20 More specifically, since 1995, the proportion of potential U.S. military recruits who failed their physical exams because of weight issues has increased nearly 70 percent. 21 Currently, more than 25% of American men between the ages of 17-24 are not eligible for the military because they are too overweight. This last statistic is particularly troubling since "not everyone wants to be in the military, and when you reduce it by 25 percent, it's a real problem.”22

Currently, America needs 2.2 million soldiers combined between active duty (1.4 Million) and the reserves (840,000).23 Thus, America needs to recruit and enlist almost 200,000 new troops every year to maintain national security. 24 This, however, has become increasingly challenging, because 80% of United States military recruits are turned away.25 The “most common cause for rejection is simple: obesity.”26 In short, the pool from which the military may draw upon for recruits is nearly 30% smaller due to obesity.”27

This has taxed recruitment in a major way. Recruitment has already become more challenging for the U.S. military in recent years, as it has been strained by numerous major overseas￼ operations: Operation Iraqi Freedom (March 20, 2003 – September 1, 2010), which transitioned into Operation New Dawn (September 1, 2010 – present), and Operation Enduring Freedom (OEF) – Afghanistan (October 7, 2001 – 2014).28 And though OEF has technically ceased in Afghanistan, American troops still remain, and will remain, present there for the foreseeable future.29 Moreover, there are recent discussions about adding more troops back into Iraq to deal with the mounting exigencies presented by the Taliban and ever rising Islamic State.30 As such, the need for American military troops is not likely to significantly diminish any time in the near future.

Moreover, America needs troops not just for its current, active military conflicts, but to be ready for those that have yet to begin. In 2014, Dr. Jonathan Woodson aptly stressed the necessity of a healthy military force that must be ready to deploy at any time in defense of the nation, but noted “[y]ou cannot do that if you are not healthy.”31 This is how and why losing so many potential recruits due to obesity hurts America’s future ability to defend itself. The United States has the highest rate of overweight males among all major countries, with almost 3 out of 4 adult American males being overweight or obese.32 And according to Major General Allen Batschelet, who is in charge of U.S. Army Recruiting Command, this is “most troubling because the trend is going in the wrong direction…by 2020 [American obesity rates] could be as high as 50%, which mean only 2 in 10 would qualify to join the Army…It's a sad testament to who we are as a society right now."33

### Military Budget Trade-off

#### Continued health care crisis trades off detrimentally for military spending

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 18-19, RK]

D) Problems With Cutting The Military’s Budget To Pay For America’s Obesity Crisis In order to cover the increase in health care costs, a significant reduction in military spending would likely be necessary. Significantly reducing the military’s budget may not inherently be a negative outcome, though. Many people (including the author of this Article) feel the current military is probably too bloated and could benefit from less money and wiser allocation of resources. 103 However, such a focus misplaced. The point is not to debate whether or not military spending should be reduced, but rather the dangerous consequences if it has to be reduced. There is a difference between the federal government deciding, based on the current international and political landscape, that military spending can safely be reduced, versus forcibly shrinking the military because too many Americans are overweight or obese forcing unsustainably high health care costs.

Even the most ardent anti-military advocates and political theorists would have to admit that a forced, substantial reduction in military spending, amidst an already growing troop shortage problem, would likely weaken America for several reasons. First and most basically, America would have fewer troops available to defend itself from future attacks. The necessity of a healthy military, ready to deploy at any time in defense of the nation should not be underestimated. September 11, 2001 showed that people do not fear attacking mainland U.S. Reducing the military to the point where we would not be able to defend the nation could have the domino effect of emboldening America’s enemies, making them more likely to strike while America’s defense are depleted.

#### Continuing obesity trends cause detrimental cuts to programs

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 17-18, RK]

Of even greater concern, however, is what happens if America does not reverse the obesity trend and all of Americans are overweight or obese as projected? If the remaining 1/3 of Americans that are currently not overweight or obese become so, then the already too large Medicare and Health Care expenditures will likewise increase to keep pace. Hence the looming national security concern - where is that increase in spending going to come from? What program or programs are most likely to be cut in order to pay for America’s sick?

The most logical starting point for cutting is to examine the greatest expenditure. For America’s budget, that means Social Security and Unemployment and Labor. However, any such move would be extremely difficult to effectuate. It would take a massive, bipartisan collaboration, the likes of which America hasn’t seen in decades, to eliminate so called “entitlement” programs. This is in part because the baby boomer generation, which still comprises a large part of Congress, is unlikely to reduce benefits, such as social security, to themselves or their children. It is unwise to expect Congressmen to take the counterintuitive measure of voting to cut programs that reduce the amount of money they will receive in the future. 101

The remaining major non-military categories do not offer much relief for rising health care costs. Seven percent of the budget is used to pay off interest on the federal debt, which is a fixed cost. After that, the next highest cost is veteran’s benefits. Thus, like social security, one could conceivably cut veteran’s benefits, although even the smallest cuts are likely to face fierce backlash. 102 Even if one did cut veteran’s benefits, that still only amounts to 4.5% of the budget total. In sum, unless more drastic and unlikely measures are undertaken, the most logical choice to ensure America cares for it’s sick is to significantly reduce the 15.8% of the budget devoted to the military.

### Military Cuts Risk Nuclear Insecurity

#### Military cuts risk unstable nuclear deterrence strategy and nuclear insecurity

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 19-20, RK]

America will undoubtedly retain enough nuclear weapons to sufficiently destroy/retaliate against any nation that attacks her. Currently, America has approximately 7,100 nuclear weapons available. 104 Thus, this Article is not saying that if America’s military budget is reduced, America would lose if Venezuela invaded and attempted to take over the country. America will likely maintain its nuclear capabilities to discourage/stop such an attack. But nuclear weapons as a primary defense have their limitations. Having the largest nuclear arsenal in the world did not prevent 9/11. Nor has it played a role in, much less ended, the war on terror. Individual groups and/or smaller factions require something less than nuclear bombs to defeat. Asymmetric warfare and on the ground guerilla tactics are often better utilized when fighting terrorist organizations, the type of enemy the U.S. is likely to face in the future.

Thus, even though America will likely retain nuclear preeminence in the world, to ward off relatively smaller in scale (but by no means small) attacks and attackers, America will likely need the rest of its military. Keeping nuclear weapons but reducing military spending on almost everything else would not be an effective national security strategy. On the other hand, an obesity necessitated reduction in budget, that leads to significant military cuts from the nuclear weapons program, would also be problematic. It is expensive to properly dispose of, and maintain effective safeguards in so doing, for thousands of nuclear weapons. Without the money to maintain and keep safe track of all of our nuclear weapons, one can imagine a sort of Wild West in which advanced nuclear materials and weapons are siphoned off to the highest bidder. One need only look to what has happened with some of the states in the former Soviet Union and the disorganized dismantling of its nuclear weapons program as a model the U.S. does not want to follow.105

Note – “her” describing US

### AT – They Won’t Cut Military

#### If health care costs increase, Congress will be forced to cut military – other large expenditures are fixed and smaller programs not enough

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, 17-18, RK]

B) What to Cut As shown above, the two largest categories of government spending per year are on Social Security, Unemployment and Labor, and Medicare and Health Care.97 Those two comprise 60% of the budget, with the military being the next largest expenditure at 15.8%.98 The two next largest expenditures are interest on America’s outstanding debt (7%) and veteran’s benefits (4%). 99 Every other category of expenses comprises 3.5% or less of the federal budget.100

Thus, the above diagram provides a useful context for the growing health care expenditures. Currently, with over two-thirds of Americans overweight or obese, onethird of America’s budget is spent on Medicare and Health Care. This is an alarming high amount and an unsustainable situation. America cannot sustain its current pace of health care expenditures.

Of even greater concern, however, is what happens if America does not reverse the obesity trend and all of Americans are overweight or obese as projected? If the remaining 1/3 of Americans that are currently not overweight or obese become so, then the already too large Medicare and Health Care expenditures will likewise increase to keep pace. Hence the looming national security concern - where is that increase in spending going to come from? What program or programs are most likely to be cut in order to pay for America’s sick?

The most logical starting point for cutting is to examine the greatest expenditure. For America’s budget, that means Social Security and Unemployment and Labor. However, any such move would be extremely difficult to effectuate. It would take a massive, bipartisan collaboration, the likes of which America hasn’t seen in decades, to eliminate so called “entitlement” programs. This is in part because the baby boomer generation, which still comprises a large part of Congress, is unlikely to reduce benefits, such as social security, to themselves or their children. It is unwise to expect Congressmen to take the counterintuitive measure of voting to cut programs that reduce the amount of money they will receive in the future. 101

The remaining major non-military categories do not offer much relief for rising health care costs. Seven percent of the budget is used to pay off interest on the federal debt, which is a fixed cost. After that, the next highest cost is veteran’s benefits. Thus, like social security, one could conceivably cut veteran’s benefits, although even the smallest cuts are likely to face fierce backlash. 102 Even if one did cut veteran’s benefits, that still only amounts to 4.5% of the budget total. In sum, unless more drastic and unlikely measures are undertaken, the most logical choice to ensure America cares for it’s sick is to significantly reduce the 15.8% of the budget devoted to the military.

### AT – Smaller Military Good

#### Involuntary shrinking of military risks emboldening opposition and harm interests

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 9-10, RK]

As noted earlier, many elected officials and military leaders are concerned about not having enough troops in the military. But perhaps the premise is mistaken and the troop shortage is not a dilemma at all. Perhaps America’s decrease in enrollment and shrinking military is a positive development, one that should continue into the future.57 Thus, to some there may not be a troop shortage problem. The lack of troops is not a shortage but rather the antidote to an overly bloated military.

This argument, however, is flawed for a few reasons. It may appear America has too many troops in places that are not active combat zones. But the average American is not privy to the same high level and classified information as the military and elected officials. They simply know more because they have access to far greater levels of information. While it is not smart to blindly trust the military and America’s elected officials, with no accountability, it is equally unwise to presume that just because we cannot see the need for 50,000 troops in Germany, it does not mean there is no benefit to having them there.58

Second, even if one agrees that the military should have less troops, it is difficult to guarantee America’s safety if those troops were drastically reduced over the next decade. Cold zones can turn hot when opportunity presents itself. Any significant decrease in American troops, whether drastically or gradually over time, could produce the unintended consequence of emboldening known dangerous characters (the Islamic State, Al Qaeda, North Korea) as well as currently unknown threats. These unknown threats are the hardest to prepare for, but imagine the burglar who strikes not because his lifelong dream is to rob you, but rather you presented an easy target at that particular moment. It was more a crime of opportunity. Thus, if a strong troop presence remains, those opportunistic only threats, the ones we may currently be unable to even identify, remain at bay, unwilling to strike. But as soon as troop levels start significantly lowering across the world, one can imagine the emboldening effect it could have on those looking to harm America and her interests.

Finally, the argument is flawed because even if the military is bloated, and America could effectively defend herself and her interests worldwide with less troops, those choices should be made after careful analysis of the international scene. Global risk assessments should be undertaken to indicate a reduction is necessary. Relying on less troops to fight simply because America is too overweight and thus have no other choice is problematic, because if nothing else it lacks regulation and control.

For example, if the troop reduction was a result of careful assessments and geopolitical analysis, and the risk assessment calculations indicated America could sustain and be safe with less troops, then one could presumably reduce the troop level proportionately. One cannot, however, carefully reduce the troop size in a controlled manner, one consistent with recommendations based on research, if there are no recommendations based on research, but rather the troop reduction is involuntarily imposed because Americans are too large to support a sufficient military. The latter scenario, imposed by an obesity crisis, could bring troop levels down low enough that it makes America more vulnerable both home and abroad. Thus, for all of the foregoing reasons, an involuntary reduction in troop size would be problematic for the U.S. military.

Note – “her” describing US

### AT – Lower Military Requirements

#### Lowering Requirements for military to solve obesity fails – ineffective during war and requires more resources

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 10-11, RK]

iii) Lower The Requirements One of the simplest potential solutions to the troop shortage problem based on obesity, is to lower the weight requirements. Allow people to join the military that weigh more and are in worse physical condition. The main advantage to allowing more people into the military is that it directly solves the troop shortage problem. It also may be plausible because perhaps the military’s weight and fitness requirements are outdated. Maybe technological advances have lessened the necessity for soldiers to be a healthy weight. Perhaps some could be less fit and still allow America to maintain an effective fighting force.

Intuitively, though, one may be concerned that the requirements to join the military are in place for a reason - necessity. Not everyone can qualify to be a firefighter, though if we lowered the requirements more people certainly could, but would that be smart? Maybe not, as they may be unable to do all the heavy lifting and body weight exercises, nor have the stamina required to be an effective firefighter.

Fortunately, with respect to lowering the military’s entrance requirements, we no longer have to analyze it’s efficacy in terms of hypotheticals because the military has already tried it. Starting in 2003, when America announced Operation Iraqi Freedom and invaded Iraq,59 American leaders quickly realized there were not enough troops to fight. The primary reason was so many were being disqualified due to being overweight or obese.60 Thus, because the military could not meet its recruitment goals during the Iraq war, it lessened the entry requirements and allowed applicants “who had more excess body fat than previously allowed” into the Army.61 To further assist in recruitment, Congress expanded the number of recruiters and also increased bonuses for new recruits.62

This experiment, however, was not a success. “The Army found that the overweight recruits were 47 percent more likely to experience a musculoskeletal injury (such as a sprain or stress fracture) and that more overweight recruits had to recycle back through boot camp.”63 It thus ending up costing America more time and money, as these heavier recruits got injured nearly 50% more of the time and had to retrain and retake boot camp. Put another way, because of their much higher incidence of injury and need to recycle through boot camp, they were less effective, weakening the American military during wartime. For example, many soldiers who were deployed during the recent conflicts in Iraq and Afghanistan were evacuated from the war zone not for combat injuries, but for sprains and fractures, which occurred mainly because “less-fit young men and women are at higher risk for these injuries.”64 One can make a colorable claim that the defense nation suffered when America utilized soldiers that were too overweight. Though there may be a way to lower the weight requirements and maintain a highly effective fighting force, the most recent attempts to do so have proved unsuccessful.

iv) Outsource the Military If lowering the entrance requirements is ineffective, and obesity continues to prevent the country from sustaining necessary troop levels with America’s continued involvement in combating threat such as ISIS, we may come to see an era where instead of replacing boots on the ground, the military either outsources those military jobs or replaces humans with machines. This has already occurred in the War on Terror where the U.S. increased its “outsourced activities to private military companies, (PMCs) which can recruit from a broader, international, labor pool.” 65 As with lowering the entrance requirements, this proposed solution also seemingly has several advantages. First, it could solve America’s troop shortage problem quickly, without Americans having to change. If there are not enough Americans to fight, then pay non-Americans to fight on our behalf. Because, as will be shown in the final section of the Article, solving America’s obesity problem is not an easy task. Another potential solution could be to rely more on technology. Perhaps technological advances have lowered the need for more troops Technology, such as drone strikes, solves the problem by lessening the number of military personnel that are necessary to maintain and effective fighting force. We do not need 50,000 troops with one-shot muskets if 1000 with machine guns will produce the same amount of firepower.

Yet outsourcing military tasks to PMCs is wrought with it’s own difficulties. One of the biggest drawbacks to outsourcing the military is it forces America to place its faith and security in other countries and private contractors. The infamous Blackwater incident in Iraq highlights the problematic nature of using private contractors to fight on America’s behalf. Blackwater proved to be “undisciplined, unaccountable bunch of mercenaries” at a cost of $2 billion dollars to the country.66 Further examination into both recent invasions of Iraq and Afghanistan reveals that the problems with Blackwater were not isolated incidents, but rather emblematic of an overall system failure.

For example, in 2004 America reinvaded Iraq and was quickly faced with a troops shortage. “Weak public support became an acute issue in the U.S. during the Iraq War as military recruitment and reenlistment rates descended.”67 In addition to lowering the entrance requirements to the military, government officials also increased the use of private contractors to fight on America’s behalf. The number of PMC personnel in Iraq steadily appreciated over several years and by 2007 there were 180,000 PMCs in Iraq compared with 160,000 U.S. troops.68 In 2008, the Congressional Budget Office reported that “the number of private contractors exceeded 190,000.”69 By 2012, U.S. Central Command estimated that of the contractors working in the region “40,110 were American citizens, 50,560 were from counties in the region, and 46,231 were not from the U.S. or from the region.”70 Having so many non-U.S., non-military personnel fighting on America’s behalf in Iraq proved problematic. Oversight of their activities was difficult, as was recording exactly everything they were doing and when. It also proved costly. The U.S. military occupation of Iraq formally ended in December 2011, “but not without U.S. taxpayers providing $138 billion for PMC operations.”71

The problems with PMCs continues in America’s other main area of combat as well, Afghanistan. In 2010, the Senate Armed Services Committee reported the findings of a year-long study of PMCs in Afghanistan.72 The investigation revealed two conclusions that exemplify the dangers of utilizing PMCs as a replacement for U.S. military troops. First, an alarming lack of oversight and enforcement of Department of Defense (“DoD”) procurement in Afghanistan generated “insufficiently trained and highly ineffective PSC [Private Security Company] personnel.”73 The Committee observed that “despite serious financial and ethical blemishes identified in auditing reports, the DoD took practically no steps to sanction irresponsible firms or remedy dubious contract performance.”74 Second, misconduct by PSCs in Afghanistan often went beyond poor performance, frequently involving outright delinquency.75 The Committee concluded that throughout Operation Enduring Freedom, “American PSCs engaged in bribery of local warlords linked to Taliban and other anti-Coalition activities.”76

Poor performances by those defending America weakens the nation, and potentially places more American lives in jeopardy. Worse still, poor performance and uncontrolled bribery are not the only problems with outsourcing the military. Subcontracting has also been an issue, as sometimes the PMC’s decide to hire other people, completely unvetted by any American officials, for import military functions. For example, the contractor ArmorGroup was hired to provide security in Afghanistan and on its own “subcontracted with Afghani strongmen to provide armed security forces used to protect the base.”77 Moreover, in addition to bribery and subcontracting, sometimes it is hard to track where the money goes period. For example, Afghani President Hamid Karzai noted that “U.S. taxpayers were indirectly funding ‘mafia-like groups' and terrorist activities with the American government's support of private contractors inside [Afghanistan].”78 America may not have been doing it on purpose, but by relying on PMCs, it resulted in funding the very people we continue to fight against.

Furthermore, in 2011, “the congressionally chartered U.S. Commission on Wartime Contracting (CWC)--a body charged with monitoring and analyzing the state of PSC procurement--corroborated that wasteful spending and fraud have run rampant among American PSCs.”79 In sum, the totality of the evidence shows that outsourcing the military to private contractors is not the answer. Poorer performance, lack of institutional control and uncertainty have run rampant when using PMCs. The United Nations agrees. Due in large part to the failure of PMCs in Iraq and Afghanistan, in November 2013, the United Nations Working Group on Use of Mercenaries concluded that “‘[p]roviding security is a fundamental human right and a fundamental responsibility of the State”’ and indicated that governments worldwide must participate in efforts to implement a framework for “robust international regulation of private military and security companies.”80

With a shrinking pool of eligible recruits, the U.S. cannot afford to delegate military tasks to contractors that cannot be controlled or have the potential to create more problems overseas. As such, neither lowering the entrance requirements to the military nor outsourcing military functions to private companies makes America safer. As noted earlier, these are not hypothetical solutions to America’s troop shortage without dealing with obesity, but rather methods that were tried but failed. The result is America’s troop shortage due to obesity remains a national security problem.

## Solvency

### Ag Education Solves Nutrition

#### Increased the agricultural sector is necessary to improve nutrition and health especially in low income areas – also improves economy

Fan, International Food Policy Research Institute Director General, 15

(Shenggen, 4-9-15, World Economic Forum, “How agriculture can improve health and nutrition”, https://www.weforum.org/agenda/2015/04/how-agriculture-can-improve-health-and-nutrition/, accessed 7-1-17, VB)

The agricultural sector presents key opportunities for improving nutrition and health. But this connection is often not given due attention, despite parallel initiatives across the three sectors.

The potential impacts of agricultural activities on health and nutrition extend across a number of channels. One area of impact is household ability to produce, purchase and consume more, better and cheaper food. Over the past 40 years, agricultural advances, such as the Green Revolution, led to the doubling of cereal production and yields, improving the well-being of many people and providing a springboard for remarkable economic growth. More recently, biofortification efforts to breed and disseminate crops that are rich in micronutrients, such as vitamin A, zinc and iron, have improved vitamin and mineral intake among consumers in Africa and Asia.

Another important contribution of agriculture towards nutrition and health is increased rural income, allowing people to improve their diets. The poor are overwhelmingly located in rural areas and derive a significant share of their income from agricultural activities. Given the importance of agriculture for the livelihoods of the rural poor, agricultural growth has the potential to greatly reduce poverty – a key contributor to poor health and undernutrition. Agricultural activities can also generate economy-wide effects such as increasing government revenues to fund health, infrastructure and nutrition intervention programmes.

Agricultural intensification has been essential to feed the world’s growing population, but it has also brought its own risks for people’s health, including zoonotic diseases, water- and food-borne diseases, occupational hazards, and natural resource degradation and overuse. Similarly, water, energy (electricity) and fertilizer subsidies have been linked to distorted consumption and production choices and the crowding out of public investment.

Despite major progress, serious concerns remain about the nutrition and health situation throughout the developing world. An estimated 805 million people still go hungry and many people also suffer from hidden hunger, that is, deficiencies of essential vitamins and minerals, which are associated with a number of negative health and economic impacts. At the same time, 2.1 billion people worldwide (37% of men and 38% of women) are obese and overweight and this figure is rising (especially in the developing world), bringing with it a rise in non-communicable diseases (such as diabetes, heart disease and some forms of cancer).

Much more can be done to take advantage of agriculture’s potential to improve nutrition and health.

A critical first step is improved knowledge on the agriculture-nutrition-health nexus. We need to go beyond a blind pursuit of indiscriminate agricultural growth. Instead, we should promote “smarter” growth by learning more about the health and nutrition impacts of different subsectoral patterns of agricultural development. Important steps to build up this knowledge base include investments in research, evaluation and education systems capable of integrating information from all three sectors.

### Farm to School Solvency

#### Farm to School network key to education and nutrition

**Mills, Seven Generations Ahead farm to school coordinator, 16**

[Lydia, April 2016, The Education Digest, “Farm to School Leads School Lunch Revolution”, <http://search.proquest.com/docview/1753451166?accountid=1557&rfr_id=info%3Axri%2Fsid%3Aprimo>, accessed 6/30/17, JBC]

School lunch is in the middle of a revolution. After decades of nuggets and peas, students and school administrators are starting to demand more. In Illinois, much of the landscape is farmland, but the food grown there is rarely placed in a school salad bar or blended into cafeteria spaghetti sauce. While there are obstacles, the school lunch revolution has helped connect farmers and students through local food sales and curricular connections. This movement is called Farm to School, and it is quickly growing.

The purpose of the National Farm to School Network is to enrich the connection communities have with fresh, healthy food and local food producers by changing food purchasing and education practices at schools and preschools.

In Illinois, Farm to School encompasses three main areas: the cafeteria, the classroom, and the garden. If school or school district has a goal of starting a Farm to School program, it doesn't have to source all local produce or have farmers visit the cafeteria. If a school builds a raised bed and has students plant vegetables in the garden, it is engaging with Farm to School.

Often, schools find that one project leads to another. **If students plant a garden, they may want to visit different types of farm operations.** This could introduce new ideas about possibilities for agricultural careers. In rural areas, schools with Farm to School programs are reviving Future Farmers of America and 4-H groups, some for the first time in years. Students learn to appreciate agriculture while learning real, hands-on skills in the garden.

Schools in Valley View CUSD365U, in the Romeoville area, have found gardens a powerful learning tool. Meghan Gibbons, food service director for the district, created a grant program for schools to use when creating gardens. This initial connection between the cafeteria and the garden was a powerful partnership. "Though the school receives guidance from our department, they bring their unique spin to each garden," Gibbons said. "Our first pilot garden started in 2012-2013 and now eight of our 19 schools have 'Edible School Gardens.'"

Bringing garden fresh or locally-grown food into nutrition education has the added benefit of tasting fresh and delicious.

In the classroom, Farm to School can operate as a standalone curriculum or as a part of existing curricular modules. At Valley View, "Just about every subject has been taught in our gardens, making a tie to our K-12 curriculum," Gibbons said.

Many nutrition-focused Farm to School curricula are available. Although frequently used in health education, these can be used in many other subjects.

Teaching about food in the school garden and the classroom is a natural way to transition a cafeteria from the status quo to a part of the school lunch revolution. Local food procurement is not without hurdles. However, the USDA offers training and toolkits for food service directors to use when developing bids, so they can prioritize and select distributors who buy food from local farmers. Many schools find that once students are excited about local food, it is much easier to change the way food is purchased for lunch.

Oak Park ESD97 started its Farm to School program after deciding to improve the food served in the cafeteria. The district changed its bid to increase the amount of produce from local farmers, and discovered that when it brought in more local food, students were eating better. Anna Gacke, district assistant director of food and nutrition services, said, "We are proud to serve local food to students about once a week, depending on the season. So far this year, we have offered local apples, salad greens, kale mixes, broccoli slaw, baked potatoes, and cauliflower."

Serving local food in the cafeteria created a culture shift in the school overall. More healthy food promotion is done through the cafeteria, including days when students dress up as different fruit and vegetable colors each day of the week. Food service participates in wellness committees and helps teachers create activities connected to the local foods served. High school students maintain gardens and serve the produce once a year at a special meal.

In the 2012 U.S. Department of Agriculture Farm to School census, food service directors reported spending $6.4 million on food produced locally. That is a fraction of the $42 million spent in total. Farm to School programs not only have amazing impacts in the classroom, they also serve as an economic stimulus in rural communities.

As the National Farm to School Network states, Farm to School empowers children and their families to make informed food choices while strengthening the local economy and contributing to vibrant communities. Studies show that when children learn about where food comes from in a classroom setting, they actually do eat more fruits and vegetables. Farm to School helps students grow more likely to make healthy choices throughout their lives.

### Nutrition Standards

#### Upgraded nutrition standards lead to better consumption - increased HHFKA standards key

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 3-4, Accessed 7/1/17, GDI - JMo)

We also reviewed a number of early studies that examined the impacts of the updated nutrition standards that were implemented in 2012. These studies reveal a largely positive impact on children’s consumption of healthy food at school. Offering children a larger quantity and variety of fruits and vegetables in school cafeterias has led to increased consump- tion, which researchers have attributed in part to stronger fruit and vegetable requirements. Studies also show that when offered new vegetables at school, children are more likely to try them.

Overall, our analysis demonstrates that stronger nutrition standards for all school food—breakfast, lunch, and snacks bought from vending machines—can improve children’s dietary choices. Healthy school foods serve as a lifeline for children, particularly those from socioeconomically disad- vantaged families, who are surrounded by unhealthy food everywhere else. But the data also suggest that school food programs alone are not yet strong enough to prevent child- hood obesity and its lifelong impacts. Therefore, the HHFKA needs to be further strengthened to ensure that school food is as healthy as possible, and to instill healthy eating habits in children that will carry beyond the schoolhouse door.

[Note: HHFKA= Healthy, Hunger-Free Kids Act]

### Nutrition Education Solves Obesity

#### Nutrition education can help lower obesity levels – targeting kids key

**Fox, NBC News senior health writer, 12**

[Maggie, was Health and Science editor for 3 years at Reuters, and a Health and Science Correspondent for 11, 9/18/12, NBC News, “If you think we’re fat now, wait till 2030”, http://www.nbcnews.com/health/if-you-think-were-fat-now-wait-till-2030-1B5955205, accessed 7/1/17, JBC]

Education can’t hurt, either. The more educated people are, the less likely they are to be obese. Higher-earners are also thinner. “More than 33 percent of adults who earn less than $15,000 per year were obese, compared with 24.6 percent of those who earned at least $50,000 per year,” the report notes. And several studies have shown that people who eat more fruits and vegetables are thinner, as well as healthier. “Seven of the 10 states with the highest rates of obesity were also in the bottom 10 for fruit and vegetable consumption,” the report says.

Levi believes it’s worthwhile targeting kids the hardest. New nutritional guidelines for schools will help, he said, as will initiatives to restore recess and physical education classes. Beverage makers have agreed to replace sugary sodas in vending machines with water and other low-calorie drinks. “It is as simple as an hour a day less of screen time and one less sugar beverage,” Levi says. “Just 120 calories can make a big difference as to whether a kid crosses over from being normal weight into overweight and obesity.”

### Childhood Obesity Key

#### Resolving childhood obesity is key to adult obesity – studies prove

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, page 5-6, RK]

“From 1980 to 2013, the prevalence of overweight and obesity in children increased by nearly 50%.”38

This remarkable and unrelenting increase must be stopped for a multitude of reasons, national security being just one. But before that can happen, there needs to be a greater understanding of the origins of childhood obesity. Fortunately, America has made progress in this regard, thanks in part to cardiologist Gerald Berenson.

In 1972, Dr. Berenson began a study examining the origins of heart disease. He started with children in Bogalusa Louisiana, and as a result 93% of Bogalusa children (Louisiana) became part of the Bogalusa Heart Study (BHS). 39 The study, funded by the National Institutes of Health (NIH), is historic for its discovery that heart disease begins in childhood.40 It was designed to look at all aspects of childhood health, including weight, as future predictors of adult heart disease.

The BHS study continues today, following the same group of children into adulthood. The results of the study show that adult obesity often begins in childhood. Nearly 80% of the Bogalusa Heart Study participants who were obese as children remain obese as adults.41 Yet only 7% of participants who were at a healthy weight as children became obese adults.42 In addition, the BHS was the first scientific evidence that the plaques involved in heart disease can exist in children.43

Though fascinating on many levels, the BHS study’s findings solidify the need to reduce American obesity. Overweight children become overweight and obese adults, and those who are a healthy weight tend to stay that way. Thus, in order to improve the number of adults that are military eligible, and to reduce health care costs nationwide, America must make sure it’s children are not obese. As such, overweight children and childhood obesity needs to be seen as a national security concern.

#### Preventing obesity in childhood is uniquely key – drastically increases risk of adult obesity

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p.2, Accessed 7/1/17, GDI - JMo)

America’s children are bombarded daily with junk foods full of sugar, salt, and fat. On average, U.S. children consume five times the amount of sugar recommended by the Dietary Guidelines for Americans, but only about one-third the recom- mended amount of fruits and vegetables. Unhealthy diets have contributed to nearly 30 percent of our nation’s children being overweight or obese, with lower-income and racial or ethnic minority children at the greatest risk.

Children with obesity are as much as 10 times more likely than healthy-weight children to become obese adults. This, in turn, increases their risk of developing serious chronic diseases later on in life—including type II diabetes, cardiovascular disease, and some cancers. This is not only tragic for those suffering from obesity, but expensive for us all, as taxpayers and consumers cover some of the costs of treating these illnesses through public and military health insurance programs and higher private health insurance premiums. It is estimated that obesity-related healthcare costs in the United States account for $210 billion annually, or 16.5 percent of the country’s total healthcare costs.

### School Gardens Improve Nutrition

#### School gardens can help educate children about healthy nutrition choices.

Barnes, Task Force on Childhood Obesity Chair, and Domestic Policy Council Director, 10

[Melody, May 2010, “White House Task Force on Childhood Obesity Report to the President,” “Solving the Problem of Childhood Obesity Within a Generation”, https://letsmove.obamawhitehouse.archives.gov/sites/letsmove.gov/files/TaskForce\_on\_Childhood\_Obesity\_May2010\_FullReport.pdf, pp. 44-45, 6/28/17, KF]

Recommendation 3.10: USDA and **the U.S. Department of Education should collaborate with states to increase the availability and consistency of nutrition education in schools.** States should be encouraged to ensure that teacher preparation requirements include basic nutrition knowledge and nutrition education as part of every teacher’s skill set. USDA and the **U.S. Department of Education should work together to improve national standards and requirements for nutrition education**. Teachers in local schools can explore interdisciplinary approaches to incorporate healthy eating in the school curriculum (for example, history may have a subject related to healthy diets, math may include how to calculate the needed caloric intake, foreign languages may have students design a menu). The Bureau of Indian Education, Teach for America, and other teacher corps programs could also **expand their partnership to include nutrition education**. Recommendation 3.11: Where possible, u**se school gardens to educate students about healthy eating. School gardens offer opportunities for fun and physical activity while also serving as an important educational tool to help students understand how healthful food is produced.** Some research suggests that **school gardens used as part of a nutrition education strategy can increase knowledge of fruits and vegetables and influence behavior change among children**. 197 Schools can further **make the link between agriculture and nutritious food by inviting local farmers markets to operate from area school yards.** Parents and students can also share their knowledge when shopping together for locally grown fruits and vegetables or participating in Community Supported Agriculture programs.

### Nutrition Solves Academic Achievement

#### Diet and nutrition affects academic achievement

Burrows, Newcastle University, Health Sciences, associate professor, et al., 16

[Tracy, Bernard Goldman, Newcastle University, School of Psychology, conjoint lecturer, Kirrilly Pursey, Newcastle University, School of Medicine and Public Health, conjoint lecturer 9/7/16, The British Dietetic Association Ltd., “Is there an association between dietary intake and academic achievement: a systematic review”, <http://onlinelibrary.wiley.com/doi/10.1111/jhn.12407/full>, accessed 6/30/17, JBC]

The most common association between an aspect of dietary behaviour/intake and academic achievement was breakfast consumption, which was reported to be significantly associated in 12 studies (Table 3). Three studies reported associations as a correlation value, which varied between r = 0.12 and 0.278 [36, 46-49]. Other studies reported the associations between breakfast and academic achievement as an odds ratio. The different reporting outcomes make it difficult to quantify the association and compare across studies as a result of the differences in cut-off points used for satisfactory/good achievement. However, if studies were considered collectively, regular intake/higher consumption was associated with increased scores of academic achievement in 12 studies. In one study by Acham et al. [50] , breakfast consumption was considered with collective meal intake, where cumulative meals (i.e. breakfast and a lunch meal) were shown to increase academic achievement.

Junk food/fast food

The next most common dietary association was that of energy-dense, nutrient-poor ‘junk food(s)’ consumption/intake, which was assessed in nine studies ([19, 24, 31, 34, 40, 43, 45, 51]). Lower intakes of fast food were associated with higher academic achievement. Specifically, in one study in kindergarten children, fast food [19] once per day was associated with reading scores of −18.25 points, whereas consumption at three times per day was associated with reading scores of −33.88 [19]. In another study by Li et al. [45], a one unit increase in fast food intake was associated with a 2.6 lower point score in math and a 2.87 lower score in reading. Other studies that reported this dietary variable more broadly as ‘junk’ [24] or termed ‘bad food’ and were negatively associated with collective scores (the sum of several subjects) of academic achievement with correlations of r = −0.14 to −0.15 [34, 40]. Conversely, Purtell et al. [26] reported that any fast food consumption was associated with small gains in academic growth when kindergarten children were followed up at eighth grade. Lower intakes of sugar sweetened beverages (SSB) were associated in four studies with higher academic achievement [43] [51]. Specifically, Ickovics et al. [31] reported that a SSB intake <2 times per week was correlated with higher academic achievement and and Snelling et al. [52] described students who achieved higher grades who reported a lower consumption of soda.

Fruit and vegetables

A total of six studies reported significant associations for fruit and vegetables with academic achievement. For those studies that reported a correlation, a consistent positive relationship was demonstrated between fruit and vegetable consumption and academic achievement, with values ranging from r = 0.195 to 0.23 [53] [odds ratio = 1.61 (1.11–2.32)] [34] (r = 0.23) (25,32,[33, 40, 47]) for adequate amounts of fruit and vegetables ([40],[53]). Two studies reported on fruit only with increases in academic achievement[32, 47].

Mirconutrients

Four studies reported on micronutrients as outcomes, with the most commonly reported to be associated with academic achievement being folate [54] and iron ([22],[29]), as assessed in three studies. Other studies reported nutrients including energy, protein, B group vitamins [55] and omega 3, which also assessed supplement use [56], and these were found to be positively associated with academic achievement.

Fish consumption

Self-reported fish intake was associated with academic achievement in two studies [42, 44]. Both studies report increased intake/or higher consumption of fish is associated with higher academic achievement. Specifically, one study reported broad classifications of consumption of no fish compared to fish once per week showed an increase in scores of academic achievement of 14.5 (11.8–17.1) points and >1 per week of 19.9 (16.5–23.3) points [44]. This relationship was not observed at the highest consumption level of 3150 mg day−1.

Diet quality

Seven studies showed an association of academic achievement with more global measures of diet including: diet quality [15, 27, 39] (n = 3 studies), meal quality [37], adherence to Mediterranean diet, and dietary patterns [16]. Two studies using validated diet quality scores from the Diet Quality Index/Healthy Eating Index and the KIDMED index, which showed that variety and adequacy, rather than moderation and balance, were most associated with academic achievement [57]. However, the other study showed those with a positive GPA [15] attained a higher diet quality score compared to those with a negative GPA [mean (SD) diet quality score: 26.3 (10.4) versus 21.04 (8.77)]. Higher adherence to the Mediterranean diet and less of a ‘western’ dietary intake were also associated with higher outcomes of academic achievement.

### Gardening Solves Academic Achievement

#### Gardening allows children to experience a greater connection to nature, fostering self-confidence and focus at school and reducing obesity.

Parker, et al., Institute of Medicine Food and Nutrition Board scholar, 12

[Lynn, Emily Ann Miller, Dietrician, Elena Ovaitt, Institute of Medicine Keck Center S enior Program Assistant, and Stephen Olson, Rapporteur, 2012, The National Academies of Sciences, Engineering, Medicine, “Alliances for Obesity Prevention: Finding Common Ground: Workshop Summary,” <https://www.nap.edu/read/13305/chapter/4#20>, pp.18-20, 6/28/17, KF]

G**ardening has many positive effects on children**, adults, and the community (Box 3-1), but its most enduring effects may be the least tangible. “Go back to a time when you found yourself in a garden. What does that bring to mind?” asked Mike Metallo, president and chief executive officer of the National Gardening Association (NGA). “For me, it hits a reset button. **It helps me put everything in perspective. I have a sense of place. I understand myself in relation to the world.**”

**Many children today, especially in the inner cities, lack opportunities to experience a garden.** They live in an environment of concrete, asphalt, and maybe a few scraggly trees and other plants. “**They are not experiencing the benefits of having a connection with nature**,” said Metallo.

Urban gardens can be any collection of plants with which children or adults are engaged. **It can be herbs in pots on a fire escape. It can be plants in a raised bed indoors or outdoors. “There are all types of gardens, and each garden has its place and its purpose and its uses,**” said Metallo.

NGA, a leading authority and resource for gardeners of all ages, **has a grant program through which it works with corporate donors to install gardens in schools.** The observed **effects of these gardens are increased fruit and vegetable consumption, increased physical activity, and decreased sedentary behavior. Children also learn more about the sources of the foods they eat**. “**People don’t understand where their food is coming from because they don’t live in an environment** where [unprocessed] food is easily accessible,” Metallo said. “It comes to them packaged, it comes to them in cans, it comes to them sorted out. But they have no idea what happened to get it there. And that is a serious issue.”

Besides its demonstrated potential to increase fruit and vegetable consumption and boost physical activity (see Box 3-1), **gardening changes the relationships among children, parents, and the community. In this way, gardening contributes to a variety of social, cultural, and educational goals.** For example, NGA has developed a curriculum that uses gardening to teach the academic content specified in education standards so teachers can achieve the same outcomes as they would using their usual curriculum.

Data compiled from educator observations of NGA’s garden grant program point to a variety of benefits**, including better attitudes toward school, greater self-confidence, and improved social skills.** Two of the attitude changes cited most frequently are in attitudes toward nutrition and the environment. “The children didn’t mean to learn about nutrition this way, but they did, just by engaging in the experience,” Metallo said. He ended by mentioning NGA’s initiative “A Garden in Every School,”17 a manifestation of the organization’s belief that school gardens are a component of positive change that will lead to achieving positive outcomes**, such as a reduction in obesity.**

#### Gardening allows Farm to School participation­– key to education and nutrition

**Mills, farm to school coordinator for a nonprofit organization promoting sustainable and healthy communities, 16**

[Lydia, April 2016, The Education Digest, “Farm to School Leads School Lunch Revolution”, <http://search.proquest.com/docview/1753451166?accountid=1557&rfr_id=info%3Axri%2Fsid%3Aprimo>, accessed 6/30/17, JBC]

School lunch is in the middle of a revolution. After decades of nuggets and peas, students and school administrators are starting to demand more. In Illinois, much of the landscape is farmland, but the food grown there is rarely placed in a school salad bar or blended into cafeteria spaghetti sauce. While there are obstacles, the school lunch revolution has helped connect farmers and students through local food sales and curricular connections. This movement is called Farm to School, and it is quickly growing.

The purpose of the National Farm to School Network is to enrich the connection communities have with fresh, healthy food and local food producers by changing food purchasing and education practices at schools and preschools.

In Illinois, **Farm to School encompasses three main areas: the cafeteria, the classroom, and the garden**. If school or school district has a goal of starting a Farm to School program, it doesn't have to source all local produce or have farmers visit the cafeteria. If a school builds a raised bed and has students plant vegetables in the garden, it is engaging with Farm to School.

Often, schools find that one project leads to another. **If students plant a garden, they may want to visit different types of farm operations.** This could introduce new ideas about possibilities for agricultural careers. In rural areas, schools with Farm to School programs are reviving Future Farmers of America and 4-H groups, some for the first time in years. Students learn to appreciate agriculture while learning real, hands-on skills in the garden.

Schools in Valley View CUSD365U, in the Romeoville area, have found gardens a powerful learning tool. Meghan Gibbons, food service director for the district, created a grant program for schools to use when creating gardens. This initial connection between the cafeteria and the garden was a powerful partnership. "Though the school receives guidance from our department, they bring their unique spin to each garden," Gibbons said. "Our first pilot garden started in 2012-2013 and now eight of our 19 schools have 'Edible School Gardens.'"

Bringing garden fresh or locally-grown food into nutrition education has the added benefit of tasting fresh and delicious.

In the classroom, Farm to School can operate as a standalone curriculum or as a part of existing curricular modules. At Valley View, "Just about every subject has been taught in our gardens, making a tie to our K-12 curriculum," Gibbons said.

Many nutrition-focused Farm to School curricula are available. Although frequently used in health education, these can be used in many other subjects.

Teaching about food in the school garden and the classroom is a natural way to transition a cafeteria from the status quo to a part of the school lunch revolution. Local food procurement is not without hurdles. However, the USDA offers training and toolkits for food service directors to use when developing bids, so they can prioritize and select distributors who buy food from local farmers. Many schools find that once students are excited about local food, it is much easier to change the way food is purchased for lunch.

Oak Park ESD97 started its Farm to School program after deciding to improve the food served in the cafeteria. The district changed its bid to increase the amount of produce from local farmers, and discovered that when it brought in more local food, students were eating better. Anna Gacke, district assistant director of food and nutrition services, said, "We are proud to serve local food to students about once a week, depending on the season. So far this year, we have offered local apples, salad greens, kale mixes, broccoli slaw, baked potatoes, and cauliflower."

Serving local food in the cafeteria created a culture shift in the school overall. More healthy food promotion is done through the cafeteria, including days when students dress up as different fruit and vegetable colors each day of the week. Food service participates in wellness committees and helps teachers create activities connected to the local foods served. High school students maintain gardens and serve the produce once a year at a special meal. School lunch is in the middle of a revolution. After decades of nuggets and peas, students and school administrators are starting to demand more. In Illinois, much of the landscape is farmland, but the food grown there is rarely placed in a school salad bar or blended into cafeteria spaghetti sauce. While there are obstacles, the school lunch revolution has helped connect farmers and students through local food sales and curricular connections. This movement is called Farm to School, and it is quickly growing.

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In the 2012 U.S. Department of Agriculture Farm to School census, food service directors reported spending $6.4 million on food produced locally. That is a fraction of the $42 million spent in total. Farm to School programs not only have amazing impacts in the classroom, they also serve as an economic stimulus in rural communities.

As the National Farm to School Network states, Farm to School empowers children and their families to make informed food choices while strengthening the local economy and contributing to vibrant communities. Studies show that when children learn about where food comes from in a classroom setting, they actually do eat more fruits and vegetables. Farm to School helps students grow more likely to make healthy choices throughout their lives.

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#### School lunch programs are working now, but progress is slow- federal funding and policies are necessary to maintain growth

Union of Concerned Scientists 15

[February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom: Childhood Obesity, School Lunch, and the Way to a Healthier Future”, <http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/lessons-lunchroom-childhood-obesity-school-lunch#.WVgzxNMrK1t>, accessed: 7/1/17, SK]

Children need healthy food. This should go without saying, but the current U.S. food system makes it hard to ensure that kids get the kinds of foods they need to grow into healthy adults. The average U.S. child eats only one-third of the fruits and vegetables recommended by the Dietary Guidelines for Americans.

This problem is especially acute for children from lower-income and racial and ethnic minority families. These children often lack adequate access to fresh, healthy food, while unhealthy processed foods—made artificially cheap in part by federal subsidies—are readily available. Coupled with environmental factors, this leads to a predictable result: high obesity rates.

Obesity rates among children nearly tripled between 1970 and 2000; today approximately 16% of American’s youth are classified as obese. Obesity has disproportionately affected minority children, especially in recent years: since 2000, the rise in obesity rates has leveled off for white children, but it continues to climb for African-American and Hispanic children.

Obese children are 10 times more likely than their peers to become obese adults—and adult obesity has serious health consequences, including increased risk of type II diabetes, hypertension, and other chronic diseases. These impacts not only mean shorter and less fulfilling lives for millions of Americans; they also carry a heavy price tag in health care costs.

Childhood obesity also plays a key role in a cycle that can trap low-income children: poor health and missed school days result in lower academic achievement, which leads to lower-paying jobs—and low incomes make it harder to maintain healthy lifestyles.

Healthy school lunches can be a key factor in breaking this cycle by improving kids’ diets. Children consume about half of their daily calories at school; for low-income children, school lunch may be their only real meal of the day. And the foods kids eat at school influence their lifelong eating habits.

For decades, the U.S. Department of Agriculture (USDA) has administered school meal programs that provide funding to support free and reduced-price (FRP) meals for students who meet income eligibility criteria. Meals offered under the program must meet nutritional standards.

In recent decades, subsidized school meals had tilted toward processed foods high in fat, sugar, and sodium. In response to these trends, Congress passed the Healthy, Hunger-Free Kids Act (HHFKA) of 2010, which required the USDA to update its standards for school meals to align with the Dietary Guidelines for Americans. Schools began implementing these new standards in 2012.

The report shows that school lunch programs have a positive impact on the eating habits of students. Fifth grade FRP meal participants ate fruits and vegetables 22.2 times per week on average, versus 18.9 times for non-FRP participants. While both groups ate fewer fruits and vegetables in eighth grade, FRP meal participants continued to eat them more often than their non-FRP peers (19.2 vs. 17.6 times per week).

Unfortunately, the positive impact of school food programs is not strong enough to overcome other unhealthy influences on children’s diet. Our analysis found that FRP meal participants drank more sugary beverages and ate more fast food than their peers, and they were more likely to be obese—gaps that widened between 5th and 8th grade.

Starting in 2012, schools began to implement the stronger nutrition standards mandated by HFFKA. While researchers are still in the early stages of evaluating the effectiveness of the updated standards, the evidence so far is promising. For example, a 2014 Harvard School of Health study found that vegetable consumption increased by 16.2 percent in the first year of implementation at four low-income schools. Other studies have shown that changes to the way healthy foods are presented and marketed in the cafeteria can have significant benefits.

Stronger school lunch policies have made a positive difference in children’s diets—and Congress needs to build on these gains by improving those policies further. The report has several specific recommendations for Congress as it renews the HHFKA in 2015:

Protect gains made in 2010

Increase the federal meal reimbursement rate

Improve nutrition education

Finance school cafeteria kitchen equipment

Prioritize fruits and vegetables

Increase funding for the Farm to School grant program

Not allow politics to trump science

### National Policy Key

#### Federal action key to nutrition – avoids chaos and it’s across the board – states empirically fail

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

One way to approach the answer is to ask what level—federal, state, or local—is best for policymaking. Or is it best to have all three operating at once and just hope that effective policies result? In considering the best course of action from a public health perspective, it is usually wisest to have the strongest policy across the board. This leads us to conclude that federal action is best. Such matters do not take place in a vacuum, however, and the political context for policymaking must be considered.

Generally, there is an inverse relationship between feasibility and effectiveness. Although it may be more effective to set nationwide nutrition standards (and avoid the chaos that reigns at the local and state levels), it is also less feasible. A general rule of thumb is that it is harder politically to get things done at the federal level, somewhat less hard at the state level, and easiest at the local level. That is why so many public health advocates are fond of touting local policies as a critical strategy.227

But another political challenge raises questions about the effectiveness of federal policymaking: agency capture. Can the USDA be expected to set meaningful nutrition standards when the agency has demonstrated time and again how much corporations influence it?228 Although it would seem that states are more immune to political pressures when it comes to the regulatory process, this is not always true. In Arkansas and Illinois, compromise and politics infused the state regulatory process as well.229

#### Policies to promote healthier food and farms must first address the need of marginalized communities- fed key to create a national food policy

Union of Concerned Scientists, 16

[February 23, 2016, Union of Concerned Scientists, “Working Towards a More Equitable Food System”,<http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/working-toward-more-equitable-food#.WQdxdtIrL4s>, accessed: 7/1/17, SK]

The broken U.S. food system is a problem for all Americans. But like many of our national problems, it hits communities of color and low-income communities hardest of all. African-Americans, Latinos, and low-income Americans disproportionately lack access to healthy food—and as a result, they are more likely to suffer from diet-related chronic diseases like diabetes, hypertension, and heart disease than the average American. They are also more likely to work at food system jobs that feature some of the lowest wages in our economy as well as unsafe and unhealthy working conditions.

These inequities are propped up by agricultural policies that promote the production and distribution of unhealthy processed foods while putting obstacles in the way of making healthy food more available and affordable for everyone.

So fixing our food system is not only a matter of health and sustainability—it’s also a matter of justice.

[Recent research has confirmed](http://nursing.jhu.edu/news-events/news/news/race_food) what food activists and journalists have been saying for years: all Americans do not enjoy equal access to healthy food. Inequities in food availability and affordability operate along both racial and income lines, with low-income communities of color facing a double disadvantage.

The solution is not as simple as “more supermarkets.” Transportation, affordability, and other food access barriers need to be overcome as well. Communities across America are coming up with innovative ways to meet these challenges locally, as profiled in our 2016 report [Fixing Food: Fresh Solutions from Five U.S. Cities](http://www.ucsusa.org/our-work/food-agriculture/expand-healthy-food-access/fixing-food-fresh-solutions-five-us-cities-2016).

But local governments and community groups shouldn’t have to work so hard to overcome obstacles put in place by the current system and the federal policies that drive it. We need a national food policy, coordinated across all relevant federal agencies, aimed at promoting healthy food, economic opportunity, and environmental sustainability.

As part of this effort, we need to ensure that the most reliable food source for many American children—[the school cafeteria](http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/school-lunch-and-beyond-better-food-policy-healthier-kids)—can be counted on to serve healthy food to nourish growing bodies and minds. Childhood obesity, a problem with serious, lifelong potential health consequences, continues to grow at a faster pace for African American and Latino children than for the population as a whole. So maintaining high standards for healthy school food is also a matter of food justice.

### National Food Programs Solve

#### The National School Lunch Program is a crucial source of healthy food for impoverished children- a federally coordinated comprehensive food and well-being policy is key

Union of Concerned Scientists 16

[October 29, 2016, Union of Concerned Scientists, “School Lunch and Beyond: Better Food Policy for Healthier Kids”, <http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/school-lunch-and-beyond-better-food-policy-healthier-kids#.WVgyzdMrK1t>, accessed: 7/1/17, SK]

Our children need—and deserve—healthy food. A diet rich in fruits, vegetables, lean proteins and whole grains, as recommended by the U.S. Department of Agriculture (USDA) and nutrition experts, can help kids grow up physically healthy, mentally alert, and capable of meeting the challenges of adulthood in the 21st century.

But in a food system dominated by unhealthy, artificially cheap processed foods, access to healthy food is a serious problem for many American children. As a result, childhood obesity has grown rapidly over recent decades—especially for low-income and minority children—with long-term health consequences that will shorten lives and send health care costs soaring.

In this grim food landscape, there’s one oasis for millions of kids: the school cafeteria.

The National School Lunch Program (NSLP), created by Congress in 1946 and shaped by additional legislation over the following decades, provides support—mostly in the form of cash subsidies—for schools to provide meals to students. Participating schools must serve lunches that adhere to federal nutrition standards, and they must offer free or reduced price (FRP) lunches to children who qualify.

For many students, NSLP meals are a crucial source of healthy foods that their families may not have the access, money, or time to provide during the rest of the day. The program also turns lunchtime into an opportunity for nutrition education: by showing students what a healthy diet looks like, the school can provide a counterpoint to the steady stream of messages promoting unhealthy, processed foods to children and their parents.

In the Healthy, Hunger-Free Kids Act of 2010 (HHFKA), Congress improved the program’s nutritional standards, bringing them into better alignment with current federal dietary guidelines. Although there is considerable evidence that HHFKA is working, it has provoked a backlash from some school nutrition professionals, who claim that it has resulted in increased waste and negative attitudes toward healthy food.

To assess how well subsidized school lunches, succeed at putting healthier food in kids’ mouths, UCS analyzed data from a Department of Education study that tracked the eating behavior of a cohort of students. The study surveyed the group as fifth graders in 2004 and again as eighth graders in 2007.

The resulting report, [Lessons from the Lunchroom](http://www.ucsusa.org/node/5429), shows that federally subsidized school lunches do make a difference: children who were FRP lunch recipients ate more fruits and vegetables than their peers who were not. However, the report also confirms the challenges that school lunch programs face in the larger food environment: FRP students consumed more fast food and sugary drinks than non-FRP students, and they were more likely to be obese, a difference that increased between fifth and eighth grade.

In 2015, the Healthy Hunger-Free Kids Act is up for renewal. This is a crucial opportunity to strengthen what is working about current federal school lunch policy and to provide support for schools that have struggled to implement HHFKA successfully.

Our policy brief, [Healthy School Meals, Healthy Children](http://www.ucsusa.org/node/5426), offers several specific recommendations that Congress should incorporate into a renewed HHFKA—including increased reimbursement funding, better nutrition education, investment in cafeteria equipment, and increased support for Farm to School programs.

Ultimately, both the successes and the challenges of school lunch programs point us back to the bigger picture: the need for [a comprehensive national food and well-being policy](http://www.ucsusa.org/food-agriculture/fixing-our-broken-food-system-plate-of-the-union-initiative) that will align food-related public policy initiatives around a consistent set of priorities, with the goal of ensuring access to healthy, sustainably grown food for every American. UCS has begun working with a broad range of allies to build a movement that will make such a national food policy a reality.

#### National School Lunch Program solves – federally coordinated policies are key to solve

Marcus, Reuters Health Reporter, 10

[Marcus, November 23, 2010, Reuters, “School lunch programs might break poverty cycle”,<http://www.reuters.com/article/us-school-lunch-idUSTRE6AM5PE20101123>, accessed: 7/1/17, SK]

(Reuters Health) - Teens who live in households where food is scarce suffer academically, but a new study has found that government programs to provide meals in schools can reverse this effect.

According to the researchers, the findings suggest that school programs aimed at reducing so-called food insecurity can break an insidious cycle of poverty: poor children go hungry, get bad grades, don't go on to college and fail to rise out of their socioeconomic status -- raising children whose lives follow the same unfortunate narrative.

"Food insecurity is more problematic in the long term if it occurs prior to adolescence, but it doesn't mean that adolescents are more resilient than younger children," said study leader Christelle Roustit, of the Research Group on the Social Determinants of Health and Healthcare, in Paris, France. The researchers reported their findings in the medical journal Pediatrics.

The severe recession has taken a toll on food security. In the United States, a recent report by the Department of Agriculture found that nearly 15% of American households faced food insecurity at some point in 2009, the highest level since officials began tracking the measure in 1995.

Food insecurity in childhood is thought to undercut scholastic achievement in at least two ways. It deprives the body of nutrients necessary for proper mental and physical development, and it creates an atmosphere of stress and uncertainty that saps a kid's desire to attend school and to perform well.

In the new study, Roustit and her colleagues analyzed questionnaires given to 2,346 public high school students in Quebec, Canada, along with nearly 2,000 of their parents. The surveys asked about issues of school performance and socioeconomic status and included several questions addressing food security at home. These included whether a lack of money prevented the family from eating enough, or from buying a sufficient variety of foods.

Just over 11 percent of teens in the study experienced food insecurity at home, according to the researchers. Of those, two-thirds attended schools that offered free or low-cost breakfast, lunch or snacks, allowing the researchers to look for an effect of the meals program on academic performance.

The study revealed that food insecurity was strongly associated with problems in school. However, children with food insecurity at home performed significantly better academically if their school offered meal assistance. They were much less likely to be held back a year, to score badly in language testing or to rate their overall academic performance as poor.

Although the data come from the 1990s, Roustit said a new survey of Quebec adolescents is now in progress. "We would be able to compare the results of 1999 to 2009 in few years," she said.

Nicola Edwards, a dietician and food policy expert at California Food Policy Advocates, an Oakland-based nonprofit, said the results of the study are unsurprising. If children are hungry they cannot learn, Edwards said. "There is a direct correlation between food insecurity and academic performance," she said.

In the United States, teachers and school administrators report that children who take advantage of food assistance programs in schools have improved behavior, fewer absences and better test scores, Edwards added.

Under the federal Child Nutrition Act, more than 31 million American school children receive free or inexpensive lunches through the National School Lunch Program. Children from families with incomes at or below 130 percent of the poverty level ($28,665 for a family of four) are eligible for free meals. Those with incomes between 130 percent and 185 percent of the poverty level ($40,793 for a family of four) are eligible to receive lunch for a cost of no more than 40 cents.

According to the U.S. Department of Agriculture, the National School Lunch Program cost $9.8 billion in 2009. A study of this program that was published earlier this year supports the Canadian findings. Dr. Peter Hinrichs at Georgetown University in Washington DC reported in the Journal of Policy Analysis and Management that for children who participate in the National School Lunch Program, "the effects on educational attainment are sizable."

#### School lunch programs are working now, but progress is slow – federal funding and policies are necessary to maintain growth

Union of Concerned Scientists 15

[February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom: Childhood Obesity, School Lunch, and the Way to a Healthier Future”, <http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/lessons-lunchroom-childhood-obesity-school-lunch#.WVgzxNMrK1t>, accessed: 7/1/17, SK]

Children need healthy food. This should go without saying, but the current U.S. food system makes it hard to ensure that kids get the kinds of foods they need to grow into healthy adults. The average U.S. child eats only one-third of the fruits and vegetables recommended by the Dietary Guidelines for Americans.

This problem is especially acute for children from lower-income and racial and ethnic minority families. These children often lack adequate access to fresh, healthy food, while unhealthy processed foods—made artificially cheap in part by federal subsidies—are readily available. Coupled with environmental factors, this leads to a predictable result: high obesity rates.

Obesity rates among children nearly tripled between 1970 and 2000; today approximately 16% of American’s youth are classified as obese. Obesity has disproportionately affected minority children, especially in recent years: since 2000, the rise in obesity rates has leveled off for white children, but it continues to climb for African-American and Hispanic children.

Obese children are 10 times more likely than their peers to become obese adults—and adult obesity has serious health consequences, including increased risk of type II diabetes, hypertension, and other chronic diseases. These impacts not only mean shorter and less fulfilling lives for millions of Americans; they also carry a heavy price tag in health care costs.

Childhood obesity also plays a key role in a cycle that can trap low-income children: poor health and missed school days result in lower academic achievement, which leads to lower-paying jobs—and low incomes make it harder to maintain healthy lifestyles.

Healthy school lunches can be a key factor in breaking this cycle by improving kids’ diets. Children consume about half of their daily calories at school; for low-income children, school lunch may be their only real meal of the day. And the foods kids eat at school influence their lifelong eating habits.

For decades, the U.S. Department of Agriculture (USDA) has administered school meal programs that provide funding to support free and reduced-price (FRP) meals for students who meet income eligibility criteria. Meals offered under the program must meet nutritional standards.

In recent decades, subsidized school meals had tilted toward processed foods high in fat, sugar, and sodium. In response to these trends, Congress passed the Healthy, Hunger-Free Kids Act (HHFKA) of 2010, which required the USDA to update its standards for school meals to align with the Dietary Guidelines for Americans. Schools began implementing these new standards in 2012.

The report shows that school lunch programs have a positive impact on the eating habits of students. Fifth grade FRP meal participants ate fruits and vegetables 22.2 times per week on average, versus 18.9 times for non-FRP participants. While both groups ate fewer fruits and vegetables in eighth grade, FRP meal participants continued to eat them more often than their non-FRP peers (19.2 vs. 17.6 times per week).

Unfortunately, the positive impact of school food programs is not strong enough to overcome other unhealthy influences on children’s diet. Our analysis found that FRP meal participants drank more sugary beverages and ate more fast food than their peers, and they were more likely to be obese—gaps that widened between 5th and 8th grade.

Starting in 2012, schools began to implement the stronger nutrition standards mandated by HFFKA. While researchers are still in the early stages of evaluating the effectiveness of the updated standards, the evidence so far is promising. For example, a 2014 Harvard School of Health study found that vegetable consumption increased by 16.2 percent in the first year of implementation at four low-income schools. Other studies have shown that changes to the way healthy foods are presented and marketed in the cafeteria can have significant benefits.

Stronger school lunch policies have made a positive difference in children’s diets—and Congress needs to build on these gains by improving those policies further. The report has several specific recommendations for Congress as it renews the HHFKA in 2015:

Protect gains made in 2010

Increase the federal meal reimbursement rate

Improve nutrition education

Finance school cafeteria kitchen equipment

Prioritize fruits and vegetables

Increase funding for the Farm to School grant program

Not allow politics to trump science

#### Effective federal policies improve children’s diets and reduce obesity – studies prove

Johnson, et al., University of Washington Center for Public Health Nutrition associate director, 16

[Donna, Mary Podrabsky, Anita Rocha, January 4, 2016, The Jama Network “Effect of the Healthy Hunger- Free Kids Act on the Nutritional Quality of Meals Selected by Students and School Lunch Participation Rates”, <http://jamanetwork.com/journals/jamapediatrics/article-abstract/2478057>, accessed: 7/1/17, SK]

Importance: Effective policies have potential to improve diet and reduce obesity. School food policies reach most children in the United States.

OBJECTIVE:

To assess the nutritional quality of foods chosen by students and meal participation rates before and after the implementation of new school meal standards authorized through the Healthy Hunger-Free Kids Act.

DESIGN, SETTING, AND PARTICIPANTS:

This descriptive, longitudinal study examined changes in the nutritional quality of 1,741,630 school meals at 3 middle schools and 3 high schools in an urban school district in Washington state. Seventy-two hundred students are enrolled in the district; 54% are eligible for free and reduced-price meals. Student food selection data were collected daily from January 2011 through January 2014 during the 16 months prior to and the 15 months after implementation of the Healthy Hunger-Free Kids Act.

EXPOSURE:

The Healthy Hunger-Free Kids Act.

MAIN OUTCOMES AND MEASURES:

Nutritional quality was assessed by calculating monthly mean adequacy ratio and energy density of the foods selected by students each day. Six nutrients were included in the mean adequacy ratio calculations: calcium, vitamin C, vitamin A, iron, fiber, and protein. Monthly school meal participation was calculated as the mean number of daily meals served divided by student enrollment. Mean monthly values of mean adequacy ratio, energy density, and participation were compared before and after policy implementation.

RESULTS:

After implementation of the Healthy Hunger-Free Kids Act, change was associated with significant improvement in the nutritional quality of foods chosen by students, as measured by increased mean adequacy ratio from a mean of 58.7 (range, 49.6-63.1) prior to policy implementation to 75.6 (range, 68.7-81.8) after policy implementation and decreased energy density from in a mean of 1.65 (range, 1.53-1.82) to 1.44 (range, 1.29-1.61), respectively. There was negligible difference student meal participation following implementation of the new meal standards with 47% meal participation (range, 40.4%-49.5%) meal participation prior to the implemented policy and 46% participation (range, 39.1%-48.2%) afterward.

CONCLUSIONS AND RELEVANCE:

Food policy in the form of improved nutrition standards was associated with the selection of foods that are higher in nutrients that are of importance in adolescence and lower in energy density. Implementation of the new meal standards was not associated with a negative effect on student meal participation. In this district, meal standards effectively changed the quality of foods selected by children.

#### Federal prioritization key to preserving school nutrition programming

Edelman, Children’s Defense Fund President, 17

[Marian, President of the Children's Defense Fund and its Action Council whose Leave No Child Behind mission is to ensure every child a Healthy Start, a Head Start, a Fair Start, a Safe Start, and a Moral Start in life and successful passage to adulthood, 5/22/17, Huffington Post , “Summertime, When The Livin’ Is Hard For Hungry Children”, <http://www.huffingtonpost.com/entry/summertime-when-the-livin-is-hard-for-hungry-children_us_59232bbfe4b0b28a33f62e76>, accessed 7/1/17, JBC]

Ella Fitzgerald knew a lot about the haves and have nots. She grew up poor and at 17 had been homeless and hungry for a year before she was “discovered” at The Apollo in Harlem in 1934. Think of the millions of hungry children in rich America today who might never be “discovered” or are kept from realizing their talents. And for them summertime is very hard with bouts of hunger. On the last day of school they’ll leave behind more than teachers and friends. They lose access to the school breakfasts, lunches, and after-school snacks that help keep them healthy and ready to learn during the school year. For many children these are their best or only meals of the day.

The 100 percent federally-funded Summer Food Service Program will once again this year be a food lifeline for millions of low-income hungry children during the long hot summer. Right now many community sponsors, including school districts, local government agencies, camps, and private nonprofit organizations are working through their state agencies to be ready to serve healthy meals to millions of children this summer. The Summer Food Service Program tries to meet the need and helps to deliver the dollars to pay for the basic nutrition every child needs every day. For communities that use it, the benefits are enormous. It not only feeds children but provides much needed summer jobs for youth and adults often in communities where jobs are scarce — including cafeteria workers, bus drivers and many others who enable children to stave off summer hunger.

The tragedy is too few of the children who receive school breakfasts or lunches get free meals in the summer. Many more go hungry. The Food Research & Action Center (FRAC) notes more than 20 million children received free or reduced-price school lunch during the 2014-2015 school year, but only 3.2 million of them — one in six — received meals during summer 2015.

No states come close to reaching all their hungry children during the summer. In 2015 only nine states and the District of Columbia served summer meals to more than 20 percent of children who participated in free or reduced-price lunch programs during the school year. Eleven states served summer meals to fewer than one in 10 of their low-income children. But some good news is that state efforts are slowly growing: 29 states did better in summer 2015 than in summer 2014.

States and localities can and must do far more to stop summer hunger. It’s unconscionable that states and communities are leaving millions of dollars on the table that could be used to feed hungry children right now and create jobs supporting summer feeding programs in communities that desperately need them. No communities should be allowed to ignore these funds. As Coretta Scott King once said: “I must remind you that starving a child is violence.”Mrs.

The first step, of course, is to make sure federal, state and local summer nutrition programs remain a budget priority and do not lose ground or go backwards. When more than one million households with children have no income but benefits from the Supplemental Nutrition Assistance Program (SNAP, or food stamps as I still call it), and there is talk of threats to even that critical piece of the safety net, every eligible community must find a way to ensure their children are fed. Find out where the summer feeding sites are in your community. Check with other organizations in your community that provide summer activities for children to help them find ways to add meals. They may need a little help from local foundations or community donations to cover extra expenses like refrigerators or coolers. Smaller programs may be able to link to other food programs in their community to get meals to feed the children in their care. If transportation to summer feeding sites is a problem for children, as it is in a number of states, mobile food vans may be an option with help from local bus or other transportation services.

Summer feeding programs could become the hub for other child-focused activities. Adding programs and services and keeping sites open longer could not only reduce summer hunger but help communities create some desperately-needed jobs and implement greatly needed quality out-of-school-time programs — a win-win. Other communities are testing electronic benefit transfer (EBT) cards to help families purchase extra food for children during the summer. We should be using the Summer Food Service Program as effectively as possible with the achievable goal of ending summer child hunger in every community.

### Congressional Action Key

#### Congressional funding needed for student health and nutrition

**Gurley, J.D., Harvard Law School, 16**

[Kristie, B.S., Georgia Institute of Technology, 1/20/16, Harvard Journal on Legislation, “FOR THE HEALTH OF IT: HOW THE QUANTIFIED HEALTH BENEFITS OF THE USDA NUTRITION STANDARDS JUSTIFY REAUTHORIZATION AND INCREASED FUNDING FOR SCHOOL MEAL REIMBURSEMENT”, <http://harvardjol.com/wp-content/uploads/2016/02/HLL104_crop.pdf>, pg. 411-415, accessed 7/1/17, JBC]

By the fall of 2013, just a year-and-a-half after the final nutrition standards were promulgated, schools had already made great progress implementing the standards. Dr. Janey Thornton, Deputy Under Secretary for the USDA’s Food, Nutrition and Consumer Services, reported that “[s]chools across the country are increasing their efforts to prevent childhood obesity by serving healthier school meals providing more time for physical activity, and helping kids learn about proper nutrition.”160 Dr. Thornton discussed early USDA survey results showing an eighty percent success rate overall, with some states reporting a one-hundred percent transition rate to the new meal standards.161 Additionally, the “Kids’ Safe and Healthful Foods Project” found that in 2012 ninety-four percent of U.S. school districts were on track to meet the updated nutrition standards.162 The survey also showed that only 0.15% of schools cited difficulty in complying with the new standards.163

Unfortunately, it is unclear whether this success will be maintained.164 An appropriations rider in the fiscal year 2015 Consolidated and Further Continuing Appropriations Act provided a waiver option for states to allow their schools to opt out of the whole grain-rich requirement, and it also suspended sodium reductions planned in the 2012 nutrition standards.165 In debates leading up to the Child Nutrition Program reauthorization in 2015, many commentators concerned with the cost of the nutrition standards called on Congress to reduce whole grain and fruit and vegetable requirements.166 At the time of writing, it is unclear whether Congress will respond to or resist these concerns.167

Yet, as demonstrated above, the USDA nutrition standards offer numerous benefits that likely would have justified the higher cost of the proposed rule, and most certainly justify the far lower cost of the final rule. One of the primary advantages of conducting a cost-benefit analysis is that it permits policymakers to assess the pros and cons of a rule across a baseline of monetized values. While this advantage is most evident at the agency level, as most agencies are required to explicitly assess the costs and benefits of any proposed economically significant rules, the advantages can be applied more broadly. Congress may look to the costs and benefits of a given rule in making budget decisions or modifying statutes.168 And the public may demand congressional or agency action based on explicit cost and benefit comparisons.169

This broader application of cost-benefit analyses is highly relevant for the USDA nutrition standards in order to defend them against cost-based attacks. First, critics allege that many students dislike the foods offered under the new menus,170 creating increased food waste as well as decreased participation, thus leading to decreased funding for schools through fewer student-purchases and federal reimbursements.171 Second, critics assert that the increased costs of food, labor, and administration of the programs—as well as decreases in funding because of student participation declines— cause schools to reduce staffing or meal variety in order to meet the new standards, which may harm student participation even further.172

While the validity of these cost-based attacks is contested,173 the central tenor of the debate remains focused on cost. However, this Note has argued for an analogous focus on benefits. As demonstrated above, **the quantified benefits of the nutrition standards—both in their proposed and final forms— outweigh the overall costs, even with possible declines in student participation or schools dropping out of the school meal programs**.174 **The free-standing benefits to children’s health are incredibly high, and a breakeven analysis—even on just one benefit output—demonstrates that the rule is cost-justified**.175 Subsequent research finding positive correlations between the nutrition standards and student health provide additional evidence of the benefits of the rule.176 Quantification of these benefits—even years after their promulgation—should inform future action in maintaining the nutrition standards in their most robust form.

Yet if the cost-based attacks on the nutrition standards are valid, an important implication remains. While the benefits of healthier school meals will be felt at the federal, state, and local levels, the burden is most directly borne by individual schools that must struggle to implement the nutrition standards on constrained school budgets. The HHFKA did provide schools with a six-cent per meal increase for lunches (not breakfasts) that met the higher nutrition standards.177 Additionally, the USDA has provided some funding via grants for schools to purchase needed equipment and to invest in training of kitchen personnel.178 Nevertheless, many object that federal funding is insufficient to cover the cost of new burdens imposed by the nutrition standards.179

Because the benefits of the nutrition standards are so large, Congress must play a more significant role in bearing the increased costs. Proponents of the standards have called on Congress to increase its reimbursement rates, as well as provide additional funding for equipment and training.180 Such an increase could incentivize school compliance with the nutrition standards and ensure their prolonged health impact across the nation. For example, the School Nutrition Association has noted widespread concern over school meal program deficits, and it recently recommended federal reimbursements increase by thirty-five cents per meal (including both lunch and breakfast) to cover the cost of complying with the nutrition standards.181

The federal response to funding requests will depend in large part on available sources of funding. However, consideration of these requests should be viewed in light of the clear benefits of the nutrition standards. Availability of healthy school meals is a national issue with long-ranging benefits, which, when even modestly quantified, clearly justify their costs. Still, the costs of these programs cannot be placed on schools via an un- funded mandate. Congress should continue to seek ways to assist schools in complying with the nutrition standards. Increased federal assistance for students in the short-term could lead to dramatic cost-savings in the long-term—a solution Congress should embrace.

V. CONCLUSION Although the costs—and especially the benefits—of the USDA’s nutrition standards were not appropriately quantified, further analysis shows the great promise of the final rule in bringing significant health benefits to American school children. While these benefits do come with significant costs, those costs are clearly justified. For future reauthorizations of and appropriations to the Child Nutrition Programs, Congress should maintain the nutrition standards as finalized by the USDA. Because the costs of these standards are borne by individual schools, Congress should also increase its reimbursement rates for the school meal programs, as well as training and equipment grants. Increased federal assistance will not only offset the cost of improved meals for students, but also incentivize more schools to remain in or join the school nutrition programs. **By improving healthy food offerings at school, Congress can satisfy the dual purposes of the child nutrition programs: to provide a steady market for American agriculture, and—more importantly—provide for the health of America’s youngest and most vulnerable.**

#### Congressional mandate of USDA to control junk food solves - key to set definitions of FMNV

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

The definition of FMNV must be updated; if the USDA will not exercise its authority, then legislation must direct the agency to do so. Also, to exercise that authority meaningfully, the congressional mandate must clearly provide time and place regulatory powers to the USDA. Nutritional standards must be applied in all school venues throughout the entire school day.

One cogent analysis (predating the act but still relevant to an analysis of competitive food) was offered by Carol Tucker Foreman, the administrator central to the proceedings that established the USDA definition of FMNV.130

Foreman was appointed assistant secretary of agriculture for food and consumer services by President Carter and served in that capacity from 1977 to 1981. During her tenure, Congress shifted authority over junk food from local control back to the USDA through a 1977 amendment to the Child Nutrition Act requiring competitive foods be approved by the USDA.131 The return of regulatory powers directed the secretary to disallow only those foods that did “not make a positive nutritional contribution in terms of their overall impact on children’s diets and dietary habits.”132 The secretary was not given further direction on how to determine the standards to apply in identifying foods destined to be banned or restricted in schools that participated in the NSLP. By comparison, the 2006 Child Nutrition Promotion and School Lunch Protection Act offered several measures for the secretary to consider when viewing the entire nutritional picture. Even with the additional directives detailed in the bill, determining new nutritional standards requires the exercise of some discretion; this is one area in which regulators’ decisions are potentially most vulnerable to challenge. The congressional directives, however, are intended to ensure that the USDA broadens the scope of the FMNV definition and employs a strong science-based approach while attempting to stave off industry attacks on the methodology as arbitrary and capricious.

[Note: FMNV = Foods of Minimal Nutritional Value]

### Comprehensive Fed Policy Solves

#### Federally coordinated policies are failing now – reformation of agricultural policies is key- only cooperation across federal agencies can solve

Union of Concerned Scientists 16

[January 2016, Union of Concerned Scientists, “The Case for Presidential Action to Reform our Farm and Food System”, <http://www.ucsusa.org/food-agriculture/strengthen-healthy-farm-policy/case-presidential-action-reform-farm-food-system#.WVgzQNMrK1t>, accessed: 7/1/17, SK]

The current food system isn't working for Americans.

Too many of us lack access to affordable, healthy food, as evidenced by sharply climbing rates of diet-related illnesses like diabetes and hypertension, especially in communities of color.

Mid-sized family farms are dwindling, rural communities are hurting, and food system jobs are among the lowest-paying in the nation.

Outdated industrial food production methods are exhausting soil, causing costly environmental damage, and leaving farmers ever more vulnerable to climate change impacts like flooding and drought.

These problems are all made worse by the tangled mess of current federal food and farm policy, in which policies often work against each other. For example, on the one hand we spend considerable resources trying to encourage people to eat healthier food—and on the other, we invest billions of dollars in junk food by funneling the lion's share of farm subsidies to commodity crop producers.

The president could play a key leadership role in transforming this dysfunctional food system.

For decades, taxpayers have paid for federal policies that have produced an abundance of commodity crops, but have failed to promote the health and well-being of all Americans. Special interests that profit from the status quo have exerted their influence to maintain it, blocking policy reforms that could bring about the kind of transformative change our food system badly needs.

By taking action to promote such reforms, the president could show true leadership. Here are some steps that could begin the process:

1. In the administration's first year, take action on these priorities, which will benefit both rural and urban Americans and save taxpayer dollars:

Reform agricultural polices, subsidies, and supports to ensure fair markets and pricing for diverse farms of all sizes.

Increase children's access to healthy food and curtail junk food marketing to kids.

Support sustainable, diversified, and organic farming in all communities

End Fair Labor Standards exemptions for farmworkers.

Ban the practice of feeding antibiotics to animals that are not sick.

2. Coordinate efforts across federal agencies to reduce inefficiency, increase productivity, and develop policies that ensure every American has equal access to healthy, affordable food whose production is fair to workers and good for the environment, and keeps farmers on their land.

The administration's leadership on this front will strengthen the health and well-being of Americans across the economic spectrum, improve farmers' and workers' lives and rural economies' vitality, and enhance the nation's overall prosperity.

#### A comprehensive federal policy is key to solve the growing issue of obesity and rising health care costs

Neal, University of Dayton Law Review Comment Editor, 14

[Gabrielle, March 2014, University of Daytona, “Childhood Obesity: Why The Federal Government Should Enact Legislation To Meet The Goals Of The Affordable Care Act By Resolving A Growing Issue”, <https://udayton.edu/law/_resources/documents/law_review/vol39_no2/childhood_obesity.pdf>, p. 316-17, accessed: 7/1/17, SK]

Even with all of the information and resources available, “the obesity crisis continues to grow in the United States.”102 Consequently, a comprehensive policy must be adopted to impede the growing obesity rate.103 The American Medical Association has provided some guidelines for what a comprehensive policy might look like.104 The most evident reason for this need is that “obesity is contributing substantially to the nation’s exploding expenditures on health care.”105 The ACA gives some focus to nutritional labels and obesity counseling, and the HHFKA implements nutritional standards for all foods sold in school.106 Nevertheless, if weight loss and management require at least a two-pronged approach (healthy diet and physical activity),107 where are the mandates for physical activity? The National Association for Sport and Physical Education and the American Heart Association released their most recent Shape of the Nation Report in 2010.108 The report shows that some improvements have been made in recent years in the number of states that actually require physical education for children.109 However, “no progress has been made in providing daily physical education in all grades K-12.”110 Only five states require physical education in grades K-12 and only two states align with the nationally recommended guidelines for physical education.111 Thirty-two states permit waivers or exemptions from students taking gym class, which is an increase from 2006.112 Perhaps in attempts to deal with mounting pressures to meet expectations, schools have diverted money needed to support physical education programs, therefore resulting in more waivers.113 The No Child Left Behind Act114 placed “emphasis on academic standards and testing[.]”115 Paradoxically, a 2010 CDC report analyzed a large body of evidence linking physical education and school-based physical activity with academic performance, including cognitive skills and attitudes, academic behaviors, and academic achievement.116 In other words, in an effort to improve test scores, schools have cut time and funding for physical education even though students who engage in physical activity achieve higher test scores. Indeed, childhood obesity continues to be a growing issue with innumerable consequences.117 The federal government only scratched the surface by instituting certain preventive healthcare measures in the ACA and by raising nutritional standards in school lunches with the HHFKA.118 However, the piecemeal legislation addressing the obesity issue could be allied by a comprehensive policy to improve physical activity in America’s schools, which will reduce the overall cost of healthcare for the nation.

# \*\*\*\*Off-Case

## Topicality

### AT – Food Program Not Education

#### Food programs are nutrition education – NSLP proves

Union of Concerned Scientists 16

[October 29, 2016, Union of Concerned Scientists, “School Lunch and Beyond: Better Food Policy for Healthier Kids”, <http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/school-lunch-and-beyond-better-food-policy-healthier-kids#.WVgyzdMrK1t>, accessed: 7/1/17, SK]

Our children need—and deserve—healthy food. A diet rich in fruits, vegetables, lean proteins and whole grains, as recommended by the U.S. Department of Agriculture (USDA) and nutrition experts, can help kids grow up physically healthy, mentally alert, and capable of meeting the challenges of adulthood in the 21st century.

But in a food system dominated by unhealthy, artificially cheap processed foods, access to healthy food is a serious problem for many American children. As a result, childhood obesity has grown rapidly over recent decades—especially for low-income and minority children—with long-term health consequences that will shorten lives and send health care costs soaring.

In this grim food landscape, there’s one oasis for millions of kids: the school cafeteria.

The National School Lunch Program (NSLP), created by Congress in 1946 and shaped by additional legislation over the following decades, provides support—mostly in the form of cash subsidies—for schools to provide meals to students. Participating schools must serve lunches that adhere to federal nutrition standards, and they must offer free or reduced price (FRP) lunches to children who qualify.

For many students, NSLP meals are a crucial source of healthy foods that their families may not have the access, money, or time to provide during the rest of the day. The program also turns lunchtime into an opportunity for nutrition education: by showing students what a healthy diet looks like, the school can provide a counterpoint to the steady stream of messages promoting unhealthy, processed foods to children and their parents.

In the Healthy, Hunger-Free Kids Act of 2010 (HHFKA), Congress improved the program’s nutritional standards, bringing them into better alignment with current federal dietary guidelines. Although there is considerable evidence that HHFKA is working, it has provoked a backlash from some school nutrition professionals, who claim that it has resulted in increased waste and negative attitudes toward healthy food.

To assess how well subsidized school lunches, succeed at putting healthier food in kids’ mouths, UCS analyzed data from a Department of Education study that tracked the eating behavior of a cohort of students. The study surveyed the group as fifth graders in 2004 and again as eighth graders in 2007.

The resulting report, [Lessons from the Lunchroom](http://www.ucsusa.org/node/5429), shows that federally subsidized school lunches do make a difference: children who were FRP lunch recipients ate more fruits and vegetables than their peers who were not. However, the report also confirms the challenges that school lunch programs face in the larger food environment: FRP students consumed more fast food and sugary drinks than non-FRP students, and they were more likely to be obese, a difference that increased between fifth and eighth grade.

In 2015, the Healthy Hunger-Free Kids Act is up for renewal. This is a crucial opportunity to strengthen what is working about current federal school lunch policy and to provide support for schools that have struggled to implement HHFKA successfully.

Our policy brief, [Healthy School Meals, Healthy Children](http://www.ucsusa.org/node/5426), offers several specific recommendations that Congress should incorporate into a renewed HHFKA—including increased reimbursement funding, better nutrition education, investment in cafeteria equipment, and increased support for Farm to School programs.

Ultimately, both the successes and the challenges of school lunch programs point us back to the bigger picture: the need for [a comprehensive national food and well-being policy](http://www.ucsusa.org/food-agriculture/fixing-our-broken-food-system-plate-of-the-union-initiative) that will align food-related public policy initiatives around a consistent set of priorities, with the goal of ensuring access to healthy, sustainably grown food for every American. UCS has begun working with a broad range of allies to build a movement that will make such a national food policy a reality.

### AT – Increase Requires Pre-existing

#### Department of Education already funds STEM integration efforts – Plan increases this

Chumbley, Eastern New Mexico University, Agriculture Education, Assistant Professor, 15

(Steven, March/ April 2015, Agricultural Education Magazine, “Taking Advantage of the STEM in Agriscience”, Volume: 87, Number 5, p. 13, ProQuest, Accessed 7/1/17, VB)

An obstacle to STEM integration agriculture science teachers often run into is having enough resources to offer innovative, problem based STEM activities to their students. One way to obtain these resources is through grants and strategic partnerships. As part of the 2015 budget, the Department of Education has set out over $110 million for STEM Innovative Networks. This program will award grants to school districts in partnership with colleges and other regional partners to transform STEM teaching and learning by accelerating the adoption of practices in P-12 education that help to increase the number students who seek out and are well prepared for postsecondary education and careers in STEM fields.

## Criticisms

### AT – Obesity Rhetoric

#### Obesity “national security” rhetoric is key to addressing the problem and/or describing obesity as a choice destroys political support to resolve it

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, 22-23, RK]

America’s obesity problem cannot be resolved without a change in information and image. By shifting the discussion of obesity towards a national security problem, perhaps local, state and federal officials can begin to implement policies aimed at reducing the weight of Americans. That shift will not happen until Americans understand what obesity is and what it isn’t. The dominant narrative is the notion that being overweight or obese is a choice.127 People choose to eat unhealthy and are therefore overweight. If people simply chose to eat “better” and exercise more, there would be no obesity crisis.128 The idea that America’s overweight and obesity problem stems from personal responsibility is incorrect. The larger and more important point, however, is that this line of thinking is counterproductive. It takes the focus away from obesity as a national security concern. Through greater awareness of the obesity crisis, perhaps Americans can begin to see the obesity crisis as something beyond just a personal choice issue.

Thus, America needs to change the narrative, and stop blaming people for being overweight/obese. Obesity is a result of a combination of factors, largely within the government and society’s control to change. But until now change has been slow to happen. Perhaps if the conversation surrounding obesity was one of a national security concern, the issue would gain more traction and more measures could be undertaken to curb it.

Because, “[h]istorically, it has been the role of government to regulate public health, safety, and welfare.”129 States have “police power” and political subdivisions which allows them to enact laws to protect the public.130 This has been happening for more than one hundred years, as evidenced by the creation of the Food and Drug Administration (FDA) and the overall consumer protection regulatory system. 131 “However, government institutions have failed in the face of obesity, relying on attributions of personal responsibility and weak attempts at education while protecting practices such as food marketing that contribute to the problem.” 132 With so few recognizing the enormous national security implications of the obesity crisis, the potential for the law to rectify the problem has yet to be fully explored.133

#### Our reps solve – on the individual level, we have obligations to uproot normalized values to address the structural problems of obesity through messages of inclusion

Williams, Western State College of Law professor, 16

[Ryan T. Williams, The University of Toledo Law Review, “Size Really Does Matter: How Obesity is Undermining America’s National Security,”, Fall, 2016, 48 U. Tol. L. Rev. 21, 23-26, RK]

As free Americans we see ourselves as the masters of our domains. Living in an arguably free, democratic society has devalued the role of outside factors on our behaviors. This has led many Americans “to underestimate the influence of the situation on behavior and overestimate the influence of personal dispositions and choice.”134 This tendency “is so central that social psychologists commonly refer to it as the fundamental attribution error.”135 Fundamental attribution error helps explain the narrative that obese Americans have freely made that choice. Yet this underappreciates the role of outside forces that have lead to 70% of Americans being overweight or obese.136 “Our real problem is that we have an extremely difficult time seeing and understanding the role of unseen features in our environment and within us and too readily attribute responsibility and causation to the more obvious “personal choices” of the obese.”137

Most people view the world through their own lens. Remarkably, most people are unaware of this fact. Instead, most of us feel that the way we see the world, the way we see issues, is the objective way.

Sociologists have dubbed this phenomenon “naïve realism”--the name given to “three related convictions about the relation between [one's] subjective experience and the nature of the phenomena that give rise to that subjective experience.” 138 First, we naïvely believe that the way we view the world is accurate.139 Our perception is the true perception, “through objective, unfiltered lenses.” 140 Second, we assume that others who are intelligent and objective will see the world and it’s problems as we do – i.e., accurately.141

The experience of being confronted with views that conflict with our own, therefore, creates a kind of dissonance, which leads to the third tenet of naïve realism: We relieve such dissonance by attributing the viewpoint gap to a lack of objectivity on the part of the person or entity whose views do not square with our own.142

This is how well intended and intelligent people can often lack objectivity and clarity in making assessments. Since we see things as they truly are, something must be wrong or “distorting the perceptions of those who see things otherwise, and we commonly assume that the source of that bias is a dispositional one--be it laziness, corruption, or lack of intelligence.” 143 Naïve realism is most powerful, however, because it operates even in those of us who sense that we may have some biases. Those of us who recognize we have biases that may shape our perception, tend to congratulate ourselves for so doing, and use the acknowledgment of such bias as further reinforcement of the legitimacy of our thoughts and viewpoints. Recognizing our biases lead us down “the path to authentic insight, while others fell upon the road to distortion.” 144

“This is the source of the power of our biases: We don't believe that we are subject to them (allowing us to trust our own clear vision) and we are extremely quick to see them in others (allowing us to distrust others' obscured vision).” 145 Unfortunately, explaining away this apparent contradiction – that biased do happen and people are influenced, but not us – “is precisely what renders us biased and vulnerable to manipulation--the very qualities that we like to believe we do not have.

Thus, when healthy weight individuals see an overweight individual, they view the latter as having made poor choices, while simultaneously self-affirming their good choices. In other words, I see the world objectively the correct way and I am not subject to marketing campaigns, cheaper prices and whatever other ploys companies employ to make me overweight. I am above all that, I see through that and choose a different, and more righteous path, to be healthy.

For example, 89% of Americans oppose holding fast food corporations legally responsible for the weight related health problems of people who regularly eat at their restaurant chains.147 Notably, overweight individuals are not more likely to blame the fast food industry for their woes than underweight people. 148 Thus, when faced with a perceived threat, non-overweight individuals find that their self-affirming motive (“I make good choices”), group-affirming motive (“I am a member of a group that makes good choices”), and system-affirming motive (“I am part of a system in which people who make good choices end up healthy, attractive, and at the top”) all align to justify their high status position. Overweight individuals, on the other hand, find their self-affirming and group-affirming motives conflicting with their system-affirming motive. Since overweight individuals are not on top--everyday experience shows that they are beleaguered by health problems and disparate treatment--they cannot have made good choices.149

Herein lies a fundamental problem – the personal choice narrative has the selfaffirmative, group affirmative and system affirmative motives behind it to sustain it, even in the face of naïve realism. We want to and condition ourselves to believe that in America, the land of choice and opportunity, we are either making the healthy choices or the unhealthy ones. Until Americans realize there is more going on than this incomplete narrative, it will be difficult to address the obesity crisis in America.

The biggest reason the choice paradigm is flawed, however, is there is too much emphasis on it. The misguided focus on choice distracts from the larger problem – America is too overweight. Thus, even if one believes personal choice is the driving force behind obesity, and if Americans just made better choices the nation would be safe and sustainable, the fact is people have not. Americans are larger than at any time in the nation’s history. As noted earlier, the costs to the military, both directly through troops shortages and indirectly through budgetary concerns, are real and have created a burgeoning national security problem. Simply telling people to make better choices has not worked. As a nation, we must strive to move beyond choice, beyond blame, and towards working on solutions to the crisis.

To that end, adopting a broader message of inclusiveness instead of blame could be constructive.

Note - A lot of “vision references” – ie. “we assume that others who are intelligent and objective will see the world…”

### AT – Security Criticism

#### Threats are real and our predictions are sound - we use long term megatrends and data - prefer aff specific evidence

Shinn, Texas A&M University Borlaug Institute for International Agriculture, Senior Scientist and Professor Emeritus, 15

[Dr. Glen C. Shinn, November-December 2015, “A Silver Mirror and a Crystal Ball - Refl ecting on the Past While Looking to the Future,” The Agricultural Education Magazine, pg. 20-21, <https://www.questia.com/library/journal/1P3-3957034891/a-silver-mirror-and-a-crystal-ball-reflecting-on>, accessed 6.30.2017]//TRossow

Mark Twain said, “It is diffi - cult to make predictions, particularly about the future.” However, consistent with the past, there are **megatrends that signal the future**. Richard Smalley (2003), **a Nobel Prize winning physics laureate**, identified humanity’s top challenges for the next 50 years. Five of these grand challenges; **energy, water, environment, disease, food**; are**associated directly with agricultural education**. Complex problems require collaboration by teams applying science, technology, engineering and mathematics (STEM). Yogi Berra was correct, “The future ain’t what it used to be.”

Population and demographics from 1917 through 2015 indicate continuing population growth in both the U.S. and the world. Add urbanization; now more than half of world population; and the strain increases. **Concerns about food, resources and climate change intensify** as the U.S. population grows to a projected 364 million by 2030 and a world with 8.5 billion. Climate change and food security are infl uenced by science, technology and human behavior.

The plow remains a symbol of labor and tillage of the soil. However, technologies are transforming agriculture and education. A new wave of technological advances create “apps” that change the way we learn, work and live. Without labor and technology neither knowledge nor wisdom can accomplish much. Success also depends on well managed economics and market chains. Global trade, economic reforms and freer movement of capital and technology from the U.S. to the developing world will restructure agriculture and education.

**Addressing these apparent challenges requires our best efforts in leadership, education and communications.**

### AT – Futurism Criticism

#### Futurism is inevitable, doesn’t deny the past, and is good in the context of agricultural education

Martin, Iowa State Agricultural Education and Studies Professor, 15

[Robert, November-December 2015, The Agricultural Education Magazine, “Pathways: Past and Future,” pg. 15-16, <https://www.questia.com/library/journal/1P3-3957034881/pathways-past-and-future>, accessed 6.30.2017]//TRossow

**What we need is a clear outlook of the future and where it is that we are heading**. Agricultural education must chart a future pathway that **builds on** the **previous pathways** keeping the spirit of the past alive as we prepare, plan, and organize programs for the future. The **basic principles and mission of agricultural education** clearly need to remain intact but how we go about getting to the next level is the question.

Perhaps we need to consider the use of information from those people who specialize in not only studying trends but also using those trends to project the future. What implications can we draw from this information for agricultural education as we plan the future direction of the program? Gary Marx (2006) in his book titled Sixteen Trends: Their Profound Impact on Our Future, makes it clear what we face in the society at large has implications to all of us as individuals in addition to agricultural education as a profession. Ten of Marx’s trends have implications to agricultural education.

The next 25 years will provide the opportunity for more growth of agricultural education programs, especially in urban schools. The majority of students will be from a variety of cultures and backgrounds. A major local effort will be launched to recruit and retain teachers of agriculture as communities realize agricultural education programs are programs that apply the basic principles of science, engineering, math and technology to real world situations. In addition, learning will be the major focus of our programs with teachers as facilitators, not just lecturers. And fi nally, agricultural education will grow and develop in a variety of countries around the world and student exchanges will become major activities to provide linkages between and among students.

As we review Marx’s Trends, and contemplate the next 25 years, **it becomes clear that our agricultural education programs have much work to do as we adjust to a new pathway**. How should we title the new pathway? Should it be The Agricultural Education Pathway, The Agricultural Application Pathway or The Agricultural Awareness Pathway? Whatever title we use in this new era, let it be known that our pathway has broadened because our relevancy has increased in a **society that wants to chart a clear path to the future**. Shall we **wait for the future to arrive or plan for the future we want**? **One would hope we will dream the future we want and eventually make it happen.**

So, what do you think about the future?

### AT – Urban Agriculture Criticism

#### Critique of Gardens as neoliberal or colonialist fail to acknowledge overlooks the revolutionary power of urban agriculture.

**Meals, social worker, writer, JD from St. Mary’s 12**

[Kate, 2012, St. Mary's Law Review on Race and Social Justice, “Unearthing the Impact of Institutionalized Racism on Access to Healthy Food in Urban African-American Communities - VI. Institutional Barriers to Urban Land Use,” <http://racism.org/index.php/articles/basic-needs/povertywelfare/1593-accesstohealthyfood?showall=&start=11>, accessed, 7/1/17, KF]

While f**ood justice has a great deal of support as a concept, the movement has been the target of some practical and theoretical challenges**. Some critics have asserted that food justice projects, such as urban gardens are “neoliberal in nature, emphasizing entrepreneurialism and self-betterment while filling gaps left by the rolling back of the state.” They argue that individuals are taking up the slack left by “neoliberal roll-back of state services” and transferring the responsibilities of the state to individuals, “creating self-disciplining ‘neoliberal citizen subjects.”’ Some also claim that “well-intentioned but overzealous” advocates of urban gardening might see it as a cure-all solution to all urban struggles. **Perhaps most threatening to urban communities is the potential for urban agriculture to “manifest as a colonial relationship where [W]hite organizations end up telling communities of color what to do**” as they impose their “external values or visions onto participating communities.” Others have worried that urban pollution is likely to make vegetables grown in our city's gardens unfit for consumption, or that the urban gardens simply are not capable of producing sufficient amounts or varieties of food. Although many well-intended suggestions offered from outside of urban communities of color involve a goal of self-sufficiency, these solutions require access to the means, via business ownership or employment, to overcome the systemic blockades to full economic participation in society. **Despite these important critiques of urban agriculture, “applying this type of fine-grained post-structural analysis wholesale to UA [urban agriculture] programs may overlook their potentially revolutionary power.”**

## Disads

### Uniqueness Answer – Food Program Spending Now

#### USDA funds healthy food initiatives now

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p.2, Accessed 7/1/17, GDI - JMo)

Parents and policymakers alike have employed a variety of strategies to improve children’s diets and their health. One strategy that shows particular promise for reaching a broad swath of the nation’s children—especially lower-income children with the greatest nutritional needs—is improving the quality of foods served in schools. Children consume approximately half of their daily calories in school, and for lower-income children, a school meal may be their only meal of the day. The foods children eat at school influence their lifelong eating habits, so it is essential that school foods are healthy and built around fruits, vegetables, and whole grains.

The U.S. Department of Agriculture (USDA) administers a number of school meal programs and provides schools with funding for free and reduced-price (FRP) meals. In recent decades, those subsidized meals have tilted toward processed foods high in fat, sugar, and sodium. In the midst of the child- hood obesity crisis, Congress passed bipartisan legislation— the Healthy, Hunger-Free Kids Act of 2010 (HHFKA)—to shift public investments in school food toward a stronger focus on healthy foods. The law required the USDA to develop rules to bring school food into accord with the Dietary Guidelines for Americans for fruits and vegetables, whole grains, and salt. Schools nationwide began implementing the updated nutrition standards in 2012.

#### USDA funds school Lunch and meal programs now

Haynes-Maslow, Union of Concerned Scientists Food and Environment Program PhD, MHA food systems and health analyst, and O’Hara, Union of Concerned Scientists PhD agricultural economist, 15

(Lindsey and Jeffrey K. February 2015, Union of Concerned Scientists, “Lessons from the Lunchroom.” <http://www.ucsusa.org/sites/default/files/attach/2015/02/lessons-from-the-lunchroom-report-ucs-2015.pdf>, p. 8 Accessed 7/1/17, GDI - JMo)

Schools are a critical place to introduce and reinforce healthy behaviors that serve as a strong foundation for childhood de- velopment and increase children’s chances of living healthier lives. The school food environment consists of the meals chil- dren eat there as well as foods available in vending machines, student stores, and concession stands. Since children’s eating habits are formed early on and can influence taste preferences later in life (Forestell and Mennella 2007), it is essential that healthier foods are introduced to them at school. Our analysis of data on individual Americans’ diets, BMI, and medical expenditures suggests that creating healthy eating habits early in childhood could prevent higher healthcare costs in adulthood.

Authorized by Congress, the U.S. Department of Agri- culture (USDA) operates several school meal programs that provide food assistance to schools and childcare institutions. The most prominent of these are the National School Lunch Program and the School Breakfast Program, created to feed “nutritionally needy” children (FNS 2013). The National School Lunch Program, the first federally funded school meal program, was founded in 1946 in response to military needs seen during World War II in which 40 percent of recruits were too malnourished to enlist (FNS 2013). Ironically, many of today’s recruits are no longer too underweight to enlist; rather, they are too overweight (Mission Readiness 2012).

Schools participating in federal meal programs plan meal menus and set prices, while receiving cash subsidies and commodity foods, such as meat, dairy, and grains, from the USDA for use in the programs. School meals must meet nutri- tional standards consistent with the Dietary Guidelines for Americans, and meal programs must operate as non-profit programs. (Non-profit programs require a profit to operate; however, any profits must be reinvested in the school meal program.) Schools are allowed to sell “competitive” foods, that is, foods sold in competition with the federal meal pro- gram, through vending machines, student stores, fundraisers, and as á-la-carte items in the cafeteria. Schools often use revenue from competitive foods to help off set losses from low federal reimbursements for meals (Guthrie et al 2013).

Schools choosing to participate in the national school lunch and breakfast programs (nearly all public schools) offer free meals to children from families with incomes at or below 130 percent of the federal poverty level and reduced-price meals to children at or below 185 percent of the federal poverty level. Children from families with incomes greater than 185 per- cent of the federal poverty level can purchase school lunches at the full price. The amount per meal that schools are reimbursed varies based on the percentage of students re- ceiving free, reduced-price, and full-priced meals. In FY 2012, 31.6 million children received lunch through the National School Lunch Program, with approximately 60 percent of these children receiving free and reduced-price (FRP) lunches (FNS 2012).

### AT – Spending Link

#### Normal means of Perkins regulations have states pay for most of it

Dortch, Congressional Analyst in Education Policy, 12

[Cassandria, 12-5-12, Congressional Research Service, Carl D. Perkins Career and Technical Education Act of 2006: Background and Performance, <https://fas.org/sgp/crs/misc/R42863.pdf>, pg. 3, Accessed 6-29-17, RK]

Perkins IV is the main source of specific federal funding for CTE.8 The most recent estimate of the total funds expended on CTE that were federal funds was published in 2004 by ED and estimated that 5% of CTE expenditures were federal funds.9 The remainder is funded by state and local funds.

### AT – Federalism

#### Ag education federalism is dead – our ev is predictive

\*Perkins = thumper

Barrick, University of Florida Agricultural Education and Communications professor, 15

[Dr. R. Kirby Barrick, November/December 2015, Agricultural Education Magazine, “Reflecting on New Directions for Agricultural Education,” <https://www.questia.com/library/journal/1P3-3957034871/reflecting-on-new-directions-for-agricultural-education>, p,. 11, accessed 6.28.2017]//TRossow

State and national program leadership. For years we relied on the “state supervisors” to provide leadership and guidance as they administered programmatic efforts. **That era is past and probably will never return**. While some states have been able to retain leadership positions, **most have not as Perkins funding has essentially by-passed the state agency with direct funding to local programs**. Therefore, teachers, teacher educators, and their respective organizations must step forward to provide the leadership for program change, such as those identified in these musings.

## States CP

### Permutation – Fed & States

#### Perm do both – federal-state ag education cooperation is best

\*check who cited this for recentness

National Research Council, [**American**](https://en.wikipedia.org/wiki/United_States) [**nonprofit**](https://en.wikipedia.org/wiki/Nonprofit_organization), [**non-governmental organization**](https://en.wikipedia.org/wiki/NGO) and research arm of the National Academy of Sciences, 88

[Committee on Agricultural Education in Secondary Schools, Board on Agriculture National Research Council, “Understanding Agriculture: New Directions for Education,” <https://www.nap.edu/download/766>, accessed 6.28.2017]//TRossow

* Programmatic and budgetary policy changes are needed at **both state and federal levels** if comprehensive programs of education in and about agriculture are to be implemented.

The comprehensive program of education in and about agriculture that the committee recommends will be **impossible** to bring about if the program is undertaken solely within the existing policies of the federal and state system of vocational education. The committee does not expect that agricultural literacy initiatives, including programs to foster career exploration and teaching science through agriculture, will emerge solely from the vocational segment of agricultural education. If they do, their acceptability to students and school system leaders is likely to be limited.

Financial support and technical resources must be directed toward new initiatives if progress is to be made in achieving agricultural literacy goals or reforming vocational agriculture programs. The committee emphasizes that it does not advocate or see the need for the redirection of funds from viable vocational agriculture programs to the support of agricultural literacy efforts. The redirection of funds may be permitted from vocational agriculture programs that are undersubscribed, however. Agricultural literacy initiatives warrant public support as a part of the educational reform movement agenda.

* States should establish commissions, preferably appointed by the governor and the chief state school officer, to identify needs and strategies for implementing agricultural literacy programs and reforming vocational agriculture programs.

• Not only teachers and other specialists in agricultural education, but also legislators, school superintendents and board members, principals, and science teachers should provide leadership in the initiation of agricultural literacy efforts and the reformation of vocational agriculture.

State departments of education and officials in leadership positions should acknowledge that leadership for all agricultural education programs need not be under the aegis of vocational agriculture.

• The subject matter of instruction about agriculture and instruction in agriculture must be broadened.

The dominance of production agriculture in the curriculum must give way to a much broader agenda, including the utilization of agricultural commodities, agribusiness marketing and management in a global economy, public policy, environmental and resource management, nutrition, and health.

• **Exemplary programs in local schools that have broadened the curriculum and improved the attractiveness of agricultural education programs should be identified, studied, and emulated.**

**State departments of education, the U.S. Departments of Agriculture and Education**, national professional organizations in agricultural education, and the National Council for Vocational and Technical Education in Agriculture should take leading roles in compiling and disseminating information about successful efforts to develop new programs and strengthen existing ones.

#### Permutation solves – federal action initiates the plan and states providers standards

Dortch, Congressional Analyst in Education Policy, 12

[Cassandria, 12-5-12, Congressional Research Service, Carl D. Perkins Career and Technical Education Act of 2006: Background and Performance, <https://fas.org/sgp/crs/misc/R42863.pdf>, pg. intro, Accessed 6-29-17, RK]

The largest program authorized under Perkins IV is the Basic State Grants program. This program provides formula grants to states to develop, implement, and improve CTE programs, services, and activities. The formula awards proportionally larger grants to states with larger populations that are in the age range traditionally enrolled in high school or within two years of high school graduation and to states with a lower than average per capita income. Incorporated in the formula are certain features that guarantee minimum funding levels. These features are a FY1998 hold harmless and a minimum equal to 0.5% of the total amount available for state grants. Each state is able to decide how much of its federal funds will be dedicated to secondary education and how much to postsecondary education. Once this decision is made, funds must generally be distributed to the local secondary and postsecondary education providers through formulas defined by Perkins IV or the state. Over 12.4 million students enrolled in CTE courses during the 2008-2009 academic year (most recent data available). These courses may or may not be funded with Perkins IV funds.

Two key requirements for receiving funds under the Basic State Grants program are offering CTE programs of study and compliance with accountability requirements. Secondary and postsecondary education providers must adopt the appropriate elements of at least one state-approved CTE program of study. Programs of study incorporate secondary and postsecondary education elements into a coordinated, nonduplicative progression of courses leading to an industry-recognized credential, certificate, or degree. Perkins IV also requires that states and secondary and postsecondary education providers meet targets on statutorily defined performance measures or face sanctions.

#### Perm solves best

Barrick, University of Florida, Agricultural Education and Communications professor, 15

[Dr. R. Kirby Barrick, November/December 2015, Agricultural Education Magazine, “Reflecting on New Directions for Agricultural Education,” <https://www.questia.com/library/journal/1P3-3957034871/reflecting-on-new-directions-for-agricultural-education>, p. 13, accessed 6.28.2017]//TRossow

Curriculum enhancement/ broadening. In recent years it appears that many, or perhaps most, states have devoted considerable effort to address this issue. The movement toward a more defi nitive and hopefully up-to-date curriculum for school-based agricultural education has probably been the result of **various state and federal mandates** for highstakes testing and curriculum reform. **More needs to be done**. As posited by the NRC commission, what are the new programs that have emerged to address new and vibrant areas of a broader agriculture curriculum? How did that occur? Then the profession and stakeholders need to emulate and replicate those efforts. We must keep in mind: it is not production agriculture OR something else. **It must be both/all**.

### States Fail – Agriculture Education

#### CP fails – states lack leadership and authority to reform ag education

\*also a theory impact magnifier - says states historically refused to implement reform -- proves fiat of all 50 isn’t real world

Barrick, University of Florida, Agricultural Education and Communications professor, 15

[Dr. R. Kirby Barrick, November/December 2015, Agricultural Education Magazine, “Reflecting on New Directions for Agricultural Education,” <https://www.questia.com/library/journal/1P3-3957034871/reflecting-on-new-directions-for-agricultural-education>, p. 13, accessed 6.28.2017]//TRossow

State program and budgetary policy. At the national level, the Team AgEd concept appears to be a new direction in providing **leadership** for the entire agricultural education enterprise. The National Council for Agricultural Education serves as a pseudo-governing body to promote cooperation and collaboration among the key groups. However, the NRC report called for a higher level commission to be appointed by the governor and chief state school officer to “identify needs and strategies for implementing agricultural literacy programs and reforming vocational agriculture [sic]” (p. 6). **Few if any states have actually implemented that recommendation.** The internal stakeholders have **only so much authority** for creating and implementing change. For **real change to occur, the effort must be raised to a higher level and must**, as suggested by the NRC commission, **include legislators**, school superintendents and board members, principals, and science teachers. It would be great to see a model such as this implemented for others to emulate.

#### Not all states require agricultural education funding

Bloom, Curriculum for Agricultural Education Science Education Plant Pathway Coordinator & Eddy, Southeast Polk High School agricultural education teacher, 16

(Melanie and Matthew (Southeast Polk High School – Pleasant Hill, Iowa), 5/16/16, The Agricultural Education Magazine,” Securing STEM Dollars for CASE and Agricultural Education.” ProQuest, P. 25, Accessed 6/30/17, GDI JMo)

Iowa is a “local control” state - meaning there are no state-mandated standards or curriculum. Local advisory committees, school districts, and agricultural education instructors set and select all curriculum. In many cases, teachers struggle to develop and maintain current, high-quality programs of study. School budgets limit travel, professional development, and materials and equipment for high- quality, science-based, inquiry instruction.

In 2009, Iowa Association of Agricultural Educators leader- ship began to look for financial support to help teachers attend professional development through the Curriculum for Agricul- tural Science Education (CASE) project. When the first sponsor, Cargill, stepped forward with $25,000, the Iowa FFA Founda- tion served as the fiscal agent and in 2011, 20 agriculture teachers were able to attend the first Iowa CASE institute to complete 80 hours of intense professional de- velopment.

While the original sponsor- ship was a good start, it was not enough. Demand was high and supply low. State leadership be- gan writing a series of grant pro- posals which, while not always successful, opened doors and met and grant agencies, first and fore- most, require that projects meet their goals and criteria. As Iowa worked through USDA and US- DOL grant projects, grant writ- ers had to prove the demand for qualified labor in agriculture in- dustries. Using reports from gov- ernment agencies and educational institutions to supply data and statistics, Iowa Team Ag Ed at- tempted to prove “The CASE for Agricultural Education in Iowa.”

### States Fail – Lunches

#### State action on lunches fails empirics prove - federal action key to change

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

This combination of adverse impacts on children’s health and concern more generally over junk food marketing to children is creating increased political pressure on the federal government to act.31 In the prolonged absence of federal action, many state legislatures have jumped into the fray to try and fix the problem. But the grassroots momentum that has been building,32 bubbling up to the state legislative level, has resulted in little meaningful change so far.33 Some groups are rallying for federal intervention, whereas others are content to let the grassroots momentum build and spread.

### States Fail – Nutrition

#### State action on nutrition leads to nutritional chaos - weakens standards

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

Moreover, the impact of the legislation varies significantly, from setting nutrition standards, to suggesting voluntary action. Our previous analysis of state legislation151 argues that political compromise is creating a form of “nutritional chaos”—a patchwork of laws and regulations that make little sense from a public health perspective. In at least ten states, legislatures passed bills with weaker language than was originally introduced, a result of political lobbying and the inevitable compromise of policymaking. In many other states, the bills introduced were already weak.152 The specific language of each bill also varies significantly.153

#### States fail at nutrition standards – long debates and lobbying prove

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

What are some of the specific challenges that policymakers and advocates are coming up against? Although it may seem like commonsense policy to require that schools not sell unhealthy foodand beverages to children in the wake of an obesity epidemic, these bills have been far from easy to pass.

State legislatures all over the nation have faced fierce industry opposition. For example, in Connecticut, where one of the most heated battles took place, the house debate went on for eight hours, with some politicians making typical industry arguments while displaying bottles of Coke on their desks.154 More than $200,000 was spent to lobby against the bill. The bill finally passed, only to be vetoed by the governor.155 Lobbying has been largely from the soft drink industry, which argues that school boards (“local control”), not state legislatures, should make these decisions.156 In some states, school administrators have also opposed state mandates mainly because they fear loss of revenue.157

#### States fail at nutrition - don’t put children’s health first - don’t cooperate across state lines - have no oversight mechanisms

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

Given that states are setting policies related to competitive foods in various ways, the question arises: is there a preferred or “best” method? Answering this question depends on outcome measures. One measure should be whether the final nutrition standards are in the children’s best health interests. Just as compromises that have no basis in nutrition are made in legislation, the standards that emerge from regulations are far from perfect from a health perspective. For example, why did Illinois leave out high schools? Moreover, why are fruit smoothies allowed at a whopping 400 calorie limit—too much for any child? Clearly, children’s health is still not being put first.

Moreover, comparing standards across states proves problematic because each set has its plusses and minuses, and more information is needed to evaluate them. For example, although it seems that Arkansas has a “good” provision because it does not allow vending in elementary schools, that does not explain the extent to which this was even a problem prior to the law. That the provision passed the state legislature so easily indicates its relatively minor importance.

Also, although Illinois can be criticized for only applying its regulations to kindergarten through eighth grade, it is unclear whether leaving out high schools was a result of the particular policy route that the state chose to take. Indeed, as California demonstrated, it was a political challenge to include high schools via the legislative route as well. Moreover, Illinois was unable to enact any legislation at all, so perhaps some regulation is better than nothing.

Finally, just looking at the nutrition standards on paper does not take into account the enforceability mechanism, which in each of these three case studies is unclear. State education departments often have standard oversight procedures in place for any rules. But how that oversight will be implemented regarding new school vending requirements remains to be seen. Moreover, national school meal nutrition standards, which states are responsible for monitoring, are consistently violated.194 So why would states do a better job of enforcing competitive food regulations?

#### States take too long to implement - disconnects policies from children’s health

Fried, New York University Department of Nutrition, Food Studies & Public Health AND Simon, University of California Hastings College of the Law Assistant Professor & Marin Institute Research and Policy Director, 7

(Ellen and Michele, 7/20/2007, Duke Law Journal, “THE COMPETITIVE FOOD CONUNDRUM: CAN GOVERNMENT REGULATIONS IMPROVE SCHOOL FOOD?” <http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1324&context=dlj>, Volume 56: 1491, Accessed 7/1/17, GDI - JMo)

In summary, although there is much activity in state legislatures, it can take a long time—often years—to get a significant bill and any related regulations passed, in part because this issue remains such a political battlefield. The results are a patchwork of compromised policies, with little connection to children’s health, or sometimes even common sense. Moreover, the potential impact remains to be seen because of looming questions regarding enforcement and accountability.