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# Food and Agriculture Organization

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Berkeley Model United Nations



Dear Delegates,

Hi my name is Manu Vaish and I am a senior majoring in Conservation and Resource Studies and Applied Mathematics. I love jellyfish and all things ocean. I am excited for this conference and everything else about it. This will be my 8th and final BMUN; let's make it great! Following will be an introduction to the other vice-chairs in my committee who will also be assisting me throughout this weekend:

Hey guys! My name is Adam Umemoto and I am a third year at UC Berkeley studying Molecular Environmental Biology. I'm an international student from Malaysia and I've been involved in Model United Nations for the last nine years. We're going to have a lot of fun in the FAO committee this year and I hope you guys are just as excited/pumped as I am! If any of you have questions about MUN or anything at all, please don't hesitate to contact me and I'll be more than happy to help you guys out! See you all soon!

Hello, everyone! My name is Jacob Hands and I am currently a freshman majoring in business and economics. I participated in Model U.N. throughout high school, and have actually participated in BMUN twice previously. Academics aside, I am actively involved in the stock market and worked on a boat for nearly a decade.

Hey Delegates! My name is Emily Yan and I'm a freshman at Cal, hoping to double major in Environmental Science and Sustainable Environmental Design. MUN was such an integral part of high school for me, so I'm thrilled to be one of your vice chairs for BMUN 64. In my free time, I enjoy playing guitar and piano, spending time in the beautiful outdoors, and baking.

Best,

Manu Vaish



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# Climate Change Induced Agricultural Disasters

## Introduction and Background

Our actions and decisions as a species have forever changed the planet we live on. Through generations of emitting carbon, nutrient dumping, deforestation, and other environmentally harmful actions our world has inextricably changed. Climate change and climate variability has resulted in both higher frequency and intensity of natural disasters. These disasters have had their most severe impacts on food security and in turn the livelihoods of many populations who are dependent on agriculture as their main source of income and survival.

Between 2000 and 2007 over 230 million people were affected by disasters in general, more alarmingly 98 percent of these disasters were climate-related hazards (CRED Crunch). These hazards range from floods and windstorms which are then followed by droughts, resulting in fires.

The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report states that “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global sea level” (IPCC 4<sup>th</sup>).

These climate disasters are what will drive a huge change in food production and our ecosystems as a whole. Climate change will impact every dimension of food security: food availability, food accessibility, food utilization and food systems stability (FAO). Most at risk are countries in the global south. These countries rely heavily on agriculture as their main sources of employment and revenue. They are also most at risk for floods, desertification, and other detriments caused by climate change.

Historically speaking, global temperatures have been rising since 1850 due to the constant accumulation of greenhouse gases in our atmosphere. This is due to the constant burning of fossil fuels that are needed to meet the increasing energy demand coupled with agricultural emissions, and many other human caused disasters. Climate change as a whole is being driven and intensified by human actions.



Since its inception, FAO has worked to eliminate hunger, food insecurity, and malnutrition; boost the productivity and sustainability of agriculture, forestry, and fisheries; alleviate rural poverty; enable inclusive and efficient agri-food systems; and bolster the resilience of livelihoods to disaster (FAO, What We Do). These goals are pursued in a variety of ways, most prominently through the Organization's collection, analysis, and subsequent dissemination of information relating to food, agriculture, and nutrition. Further, the Organization promotes and recommends national and international action in the fields of scientific and technological research, the promotion of public knowledge, conservation of natural resources, agricultural efficiency, the equity and sustainability of food distribution, and international agreements in the agricultural commodity arena (FAO 2013).

In order to combat many of these issues humanity has taken to controlling the forces of nature and managing our environment in order to artificial microclimates as long as the economic returns justify the costs (FAO). The goal of the FAO is to ensure food security for the entirety of the globe. Climate change induced agricultural disasters puts this goal at a high risk.

Before coming into this committee there are a few key terms which should be defined and universally understood:

### ***Food Security***

The FAO defines food security when “all people at all times have physical or economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO 1996). The FAO also has stated that in order to effectively evaluate potential impacts of climate change on food security , you must look at not just “the impacts on domestic production in food-insecure countries. One also needs to

- (i) assess climate change impacts on foreign exchange earnings;
- (ii) determine the ability of food surplus countries to increase their commercial exports or food aid; and
- (iii) analyse how the incomes of the poor will be affected by climate change” (FAO 1996).



## ***Food Systems***

According to the Global Environmental Change and Food Systems project or GECAFS food systems are defined as:

- (i) activities related to the production, processing, distribution, preparation and consumption of food; and
- (ii) the outcomes of these activities contributing to food security (food availability, with elements related to production, distribution and exchange; food access, with elements related to affordability, allocation and preference; and food use, with elements related to nutritional value, social value and food safety). The outcomes also contribute to environmental and other securities (e.g. income). Interactions between and within biogeophysical and human environments influence both the activities and the outcomes” (GECAFS)

The concept of the food system allows for investigating causal relationships and feedback loops that allow for policy makers to make recommendations using these technical analyses.

## ***Food Chain***

The sum of all the processes in a food system is referred to as the food chain. This process is what is colloquially known as “from farm to fork.” It is a linear pathway from production to consumption.

The food chain and food system are specialized ways of looking at how food is produced and processed and breaks down how food security can be looked it properly.

Finally, food security plays in with both climate and agriculture. Agriculture produces the food people eat as well as provides the livelihood for over 36 percent of the world’s total workforce. In Asia as well as sub-saharan Africa these numbers rise to 40 percent to up to almost 66% (ILO 2007). Therefore as our climate changes and causes more agricultural disasters, food security itself is threatened.

Food security, food systems, and food chains are three integral parts of the agricultural system. Climate change will cause the destruction of each of these. Food



security will go with lower food supplies, food systems will collapse due to destruction of lands, and food chains will dismantle with no way to distribute.

## UN Involvement

The FAO has come up with its own strategic approach to how it will address climate change, which involves adapting to the situation. The Intergovernmental Panel on Climate Change defines adaptation as an “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC 2000). This idea of adaptation is two fold encompassing both risk management as well as climate management.

The following is taken from the FAO’s strategic approach on how to avoid climate induced agricultural disasters:

Protecting local food supplies, assets and livelihoods against the effects of increasing weather variability and increased frequency and intensity of extreme events, through:

general risk management;

management of risks specific to different ecosystems – marine, coastal, inland water and floodplain, forest, dryland, island, mountain, polar, cultivated; research and dissemination of crop varieties and breeds adapted to changing climatic conditions;

introducing tree crops to provide food, fodder and energy and enhance cash incomes.

Avoiding disruptions or declines in global and local food supplies due to changes in temperature and precipitation regimes, through:

more efficient agricultural water management in general;

more efficient management of irrigation water on rice paddies; improved management of cultivated land; improved livestock management; use of new, more energy-efficient technologies by agro-industries.



Protecting ecosystems, through provision of such environmental services as:  
use of degraded or marginal lands for productive planted forests or other  
cellulose biomass for alternative fuels; Clean Development Mechanism  
(CDM) carbon sink tree plantings;  
watershed protection;  
prevention of land degradation;  
protection of coastal areas from cyclones and other coastal hazards;  
preservation of mangroves and their contribution to coastal fisheries;  
biodiversity conservation” (FAO)

This approach is the FAO’s general attack plan on all things climate related. However, this general framework should be further specified and tailored to each individual region it would be applied to.

Aside from this the FAO possesses technical expertise that is relevant to climate change adaptation in many different ecosystems. Since 2002, the FAO has been promoting National and Regional Programmes for Food Security which helps countries enhance their productivity as well as diversify their livelihoods. The FAO also assists countries in integrating forest-related climate change mitigation and other adaptation measures into their policy.

FAO combats hunger under the framework of food security. This approach, employed by many humanitarian and social service organizations, seeks to mainstream more equitable and sustainable food production and distribution systems into existing market structures. The food security approach presumes that more environmentally responsible and socially just alternatives can set new industrial standards. This can be accomplished through international incentive-based certification (e.g. fair trade, sustainable fisheries, organic), transnational agricultural subsidies, and corporate self-regulation (Holt-Gimenez 2011). FAO explicitly follows the food security framework through its focus on market-based development, evidenced by the Organization’s partnerships with multinational agribusinesses. The Organization aims to mainstream principles of corporate social and environmental responsibility by developing voluntary standards, facilitating private investments in value chains that include smallholders, and





strengthening collaboration between multinational corporations (MNCs) and national governments to promote inclusive technology adoption and fair markets (FAO, Enable inclusive and efficient agricultural and food systems).

Further, FAO is tightly linked to UN organizations that adhere to the *food enterprise* governing framework, such as WFP, the World Trade Organization (WTO), and the World Bank. The foundations of this anti-hunger approach arise from the presumption that market-based development, in the form of expanding global markets and increasing output through technological innovations, can eradicate hunger. This trend allows for overproduction and corporate monopolization of the food system, as international institutions and wealthy governments push for further liberalization of global markets and technological solutions to hunger (Holt-Gimenez 2011).

### Case Study 1: Darfur

The conflict in Darfur is one of the first acts of brutality that can be drawn to an issue in agriculture as well as creating in large amounts of refugees being due to climate change. In February 2003 the Sudanese government launched an ethnic cleansing of non-Arabs in response to efforts by multiple rebel groups due to unhappiness with the current regime. The crisis has been attributed to partially by a decline in rainfall over the past 30 years as the region's population began to grow exponentially almost doubling which caused conflict over any sort of arable land. In fact arable land was not the only thing missing from the Darfur area, one of the largest obstacles to posting peacekeepers to Darfur is a lack of a water supply for them, which can shed light on the severity of the water crisis in Darfur (Crisis in the Drylands).

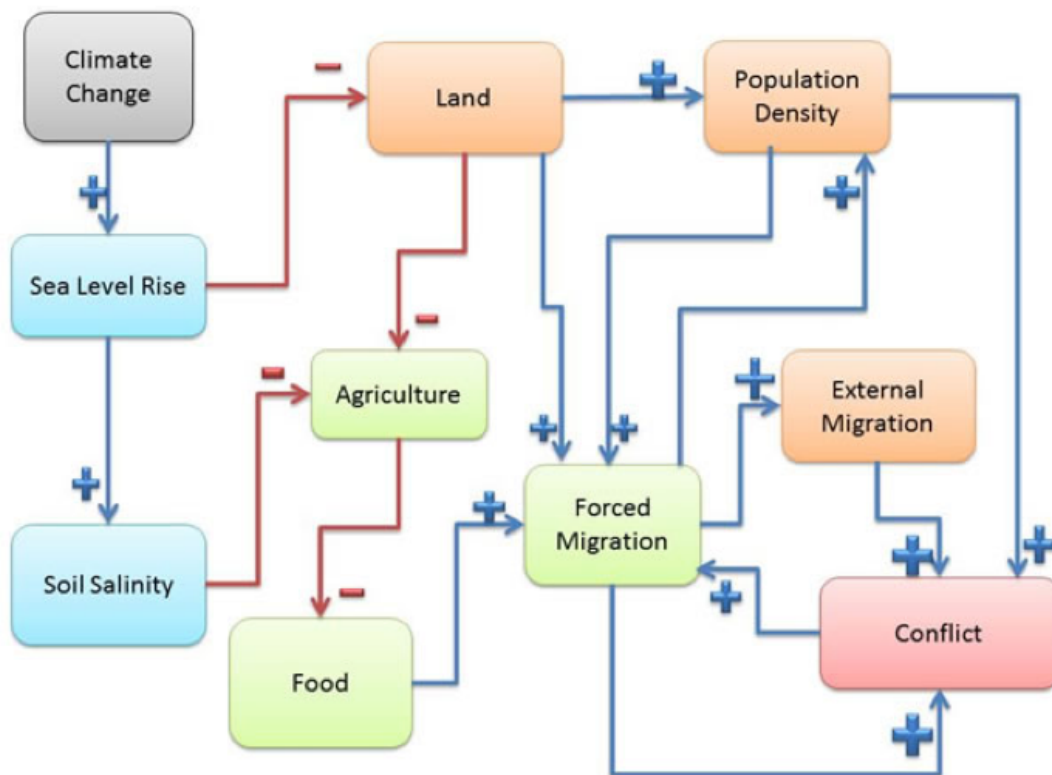
It has been found that civil wars are much more likely to happen in warmer than average years, with one degree Celsius warmer temperatures in a given year result in an almost 50 percent higher likelihood of conflict in that year (Scientific American). With lower rainfall, temperatures rise as well resulting in more and more fuel for a war to break out. The Darfur conflict resulted in hundreds of thousands of civilians displaced and dislocated. Climate change does more to our society than purely change the climate; the effects extend far beyond just our environment and things we consider outside of our



anthropocentric lives. It manages to infiltrate into our society in ways we could not previously imagine. With the lack of rainfall comes a lack of food production. This food production and lack of water spurred much of the resentment within the nation eventually pushing it towards a war. The Darfur conflict is a perfect example of a situation in which climate change affected not only an environment but also a group of people who began to compete for land and resources resulting in an increase in violence, death, and refugees; refugees with no home to call their own and no place to run to.

## Case Study 2: Bangladesh

Aside from the conflict in Darfur, there are other areas that face issues of violence spurred by a loss of arable land due to climate change induced agricultural disasters. Below is a causal diagram that displays how climate change creates and facilitates agricultural disasters and loss of food supply:



Looking at this causal diagram we can see there are two different forces that will impact the agricultural production centers of Bangladesh: sea level rise and soil salinity.



Both of these forces will be driven by climate change. Sea level rise will cause the loss of land and therefore the loss of arable land, and an increase in the levels of soil salinity will also reduce arable land.

Bangladesh is “80% flatlands, and 20% [of its] land is 1 meter or less above sea level” meaning that it is very exposed and vulnerable to sea level rise (Litchfield). One of the largest deltas in the world is also within Bangladesh’s borders. Due to sea level rise this will cause extreme flooding and continue again to ruin arable land.

Together this will lead to rising food prices and an unstable food economy within Bangladesh’s borders. Currently there are no real solutions in place for the inevitable disaster that looms in front of Bangladesh and the only real international response is a fence preventing migration from Bangladesh into India (installed by India). With the loss of all this arable land it can only be expected that violence will break out over limited resources.



## Major Questions

1. How can we repair the land that is already been affected by climate change, and how can we prevent future arable land and ocean destruction?
2. Who should bear the burden of fixing this situation? Developed nations or developing nations and how should this responsibility be shared across nations?
3. How does the global aspect of this food system change the way we must view fixing this situation?



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# Prevention and Mitigation of Foodborne Illnesses

## Introduction and Background

The first estimates of the global burden of foodborne illnesses report that 1 in 10 people a year fall sick from food related diseases and about 420,000 of those people die as a result. Children under 5 years of age are most at risk of contracting a foodborne illness with 125,000 children dying annually.

Current Center for Disease Control (CDC) metrics suggest that Foodborne Disease (FBD) adversely affect roughly 48 million persons in the US alone each year, of which 128,000 will be hospitalized. Estimated costs of this crisis total nearly \$4.3 billion in medical treatment. Despite efforts taken to eliminate this unnecessary evil, 3,000 people ultimately perish at the hands of a completely preventable ailment.

The U.N. writes that, *“Foodborne diseases result from the ingestion of contaminated foods and food products and include a broad group of illnesses caused by parasites, chemicals and pathogens which contaminate food at different points in the food production and preparation process.”* Although certain sectors of the populous have reported a decline in FBD’s, global reports illuminate an insidious rise in the totality of FBD cases. Contributing factors to this epidemic range from increased migration, to growing population densities, and widespread poverty.

Pathogens resulting in FBD cases commonly arise from ill-prepared meats, poultry, and vegetables. In fact, the most common FBD’s result from manifestations of the Norovirus, Salmonella, Clostridium perfringens, and Campylobacter- all of which can be avoided through sanitary preparation. As part of their Millennium Development Goals (MDGs), the U.N. and its subsidiary bodies have pledged to combat FBD’s in an effort to better absolve the burden of global poverty.

Considering FBD’s play a decisively more impactful role in the morbidity of impoverished nations, it is safe to assume that there is a correlation. However, the extent to which FBD’s wreak havoc on endemic populations is still not entirely known. As a result, the General Assembly recommended the creation of the “Foodborne Disease Burden Epidemiology Reference Group (FERG)” to operate as a functional research and



consultation body. By better clarifying the magnitude and scope of this issue at hand, WHO and its constituents contend they will be able to better target relief efforts.

Solutions to this crisis hinge on the eradication of the aforementioned factors, including rampant displacement, overcrowding, and global poverty. In tandem with current and future actions aimed at alleviating many of these societal ills, WHO, FAO, and its International Partners have vocalized a variety of short-term solutions. One of the most instrumental tools to eviscerate FBD's resides in the ability to more rapidly detect infection. Many pathogens that lead to gastrointestinal distress, neurological decline, or internal decomposition can lie dormant in the body for protracted periods of time before they reveal themselves- leaving time to infect others around them, especially in close quarters. Consequently the bulwark of transmissions arise from anthropogenic sources. Detection aside, prevention is a necessity. The U.S. and many other developed nations have recently implemented "Phage Therapy." This practice consists of spraying uncured meat, poultry, and vegetables with a variety of natural biological agents that sanitize and dually cure these unprocessed goods.

A paramount concern of the World Health Organization, Food and Agriculture Organization, and INFOSAN has been the ability to promptly mobilize following these frequent outbreaks. In 2004, this triad convened to establish an action plan for such an event: *"Promoting the rapid exchange of information during food safety events; Sharing information on important food safety issues of global interest; Promoting partnership and collaboration between countries; and Helping countries strengthen their capacity to manage food safety risks."* Through these steps, the U.N. and other NGO's exude confidence in their ability to supplement current undertakings designed at eradicating this pervasive dilemma.





## UN Involvement

There are many organs in the United Nations that deal with the issues of Food Safety and Health. From WHO to the FAO the UN has done much to combat this issue. When it comes to WHO, their aim is to facilitate global prevention, detection and response to different public health threats associated with food safety. In order to do this, WHO assists member states by:

- “providing independent scientific assessments on microbiological and chemical hazards that form the basis for international food standards, guidelines and recommendations, known as the Codex Alimentarius, to ensure food is safe wherever it originates;

- assessing the safety of new technologies used in food production, such as genetic modification and nanotechnology;

- helping improve national food systems and legal frameworks, and implement adequate infrastructure to manage food safety risks;

The International Food Safety Authorities Network (INFOSAN) was developed by WHO and the UN Food and Agriculture Organization (FAO) to rapidly share information during food safety emergencies;

- promoting safe food handling through systematic disease prevention and awareness programmes, through the WHO Five Keys to Safer Food message and training materials;

- and advocating for food safety as an important component of health security and for integrating food safety into national policies and programmes in line with the International Health Regulations (IHR - 2005).” (WHO)

Working with the FAO, WHO ensures food safety from production to consumption. The FAO also has made significant strides in ensuring food safety. Their efforts to help member states are the following:

- “Strengthening national food control regulatory frameworks, and enhancing member country participation in Codex;



Providing independent scientific advice through the JECFA and JEMRA expert bodies to support the standard setting work of Codex;

Enhancing food safety management along food chains to prevent diseases and trade disruptions;

Promoting food safety emergency preparedness to build resilient agri-food chains;

Developing online platforms for global networking, databases for information sharing and tools to support food safety management.” (FAO)

Together, FAO and WHO utilize prevention, practice, and education methods to mitigate the effects of food-borne illnesses.

### Case Study: Taeniasis

Taeniasis is an infection caused by the consumption of raw or uncooked meat and has been diagnosed in patients worldwide. Specifically, two species of tapeworms, *Taenia saginata* and *Taenia solium*, are known to cause taeniasis in the intestines. This disease can often go undiagnosed because the symptoms are mild or nonexistent. *T. saginata* has no significant effect on human health, but *T. solium* can be severely damaging when tapeworm larvae form in the muscles, skin, eyes, and central nervous system. In worst cases, cysts can form in the brain, causing neurocysticercosis, the most frequent preventable cause of epilepsy (WHO, “Taeniasis/cysticercosis”).

*T. saginata* has been rare in countries like the United States, except where cattle and people are concentrated. *T. solium* has been found to be most prevalent in developing nations where there is poor sanitation and people live in close proximities to poorly managed pig farms. This species in particular has caused 30% of epilepsy cases in endemic areas where pigs and people come into close contact frequently. Higher rates of taeniasis has been documented in countries like Latin America, Eastern Europe, sub-Saharan Africa, Asia, and India (CDC, “Parasites – Taeniasis). It’s estimated that *T. solium*-caused neurocysticercosis has affected between 11 and 29 million people in Latin America, as well as being prevalent in Africa and Asia. Roughly 1,500 to 2,000 people in



the US are affected with neurocysticercosis as well (Stone, “Tapeworms – It’s Not Just Cancer That Should Worry You”). The occurrence of *T. solium* infections has progressively increased in European nations and the US due to immigration and travel.

The World Health Organization (WHO) has focused on combatting the spread of *T. solium* in highly vulnerable areas. Currently, WHO is working on a strategy to control taeniasis and neurocysticercosis by 2015 and expanding this strategy to affected countries by 2020. This plan emphasizes working with veterinary and food safety authorities to reduce the burden of the disease. Brazil, China, and Madagascar have started working with WHO to conduct research on measuring the effects of *T. solium* and taeniasis in their nations (WHO, “Taeniasis/cysticercosis). WHO has also teamed up with the Food and Agricultural Organization (FAO) to properly inform civilians in endemic countries so they are able to identify infected pork meat and cysts. The FAO has also proposed to improve meat inspections and farm management to prevent neurocysticercosis from forming in humans and in animals. Proper training for meat inspections is crucial in preventing the spread of *T. solium*. Farmers must also be informed of the risks of exposing pigs to human feces and sewage, especially using human feces to fertilize pasture land (Murrell, “Capacity Building for Surveillance and Control of *Taenia solium*/cysticercosis).

Despite the great risk certain communities face for *T. solium* infection due to poor sanitation and living conditions, the international community has recognized the onset of taeniasis and neurocysticercosis as a problem that must be controlled and tackled with a multilevel approach.

### **Case Study: *Cryptosporidium parvum***

A single celled, protozoa, *Cryptosporidium parvum* is perhaps one of the most ubiquitous and pervasive parasites globally present. Resulting from water contaminated with fecal matter, the protozoa thrives in the intestinal tracts of most mammals, including humans. Actual side effects of the parasite include: severe diarrhea, nausea, vomiting, and even death. WHO defines,



“Cryptosporidium as a small protozoan parasite that infects the microvillous region of epithelial cells in the digestive and respiratory tract of vertebrates. It is an obligate intracellular parasite of man and other mammals, birds, reptiles and fish. It requires its host to multiply. Environmentally robust oocysts are shed by infected hosts into the environment. These oocysts can survive the adverse conditions on the environment for months until it is ingested by a new suitable host.”

While present throughout the world at large, the preponderance of outbreaks have revealed themselves in many developed nations- including the United States. Approximately 750,000 cases of Cryptosporidiosis occur annually, causing an estimated \$46 million in medical treatment. It is vital to note, however, that less than 2% of cases are reported, and an even lesser degree are scientifically confirmed. The organism, itself, resides in many recreational bodies of water such as: non-chlorinated pools, contaminated drinking water, and water fountains etc. Outbreaks are most often associated with insufficient chlorination.

In terms of solving the crisis, the CDC reports that, “Future research is needed to address the evolving epidemiology of cryptosporidiosis cases, with a specific focus on the increase in non confirmed cases and increasing incidence rates among elderly adults.” In its infant stages of research, scientists presumed this gastro-intestinal virus was opportunistic, considering its most affected audience was the HIV bearing community. In fact, due to several major outbreaks in 2009-2010, Cryptosporidium was the leading cause of waterborne illness in the United States.

In 2006, the U.N. issued a potable water report, outlining various pathogens and their origination. Additionally, they proposed the implementation of drinkability standards to eliminate the severity and multiplicity of illnesses resulting these aforementioned microorganisms. One of the main tenets suggested to combat Cryptosporidium, involved the improvement of current sanitation facilities and pipe-systems constructed before 1974. Furthermore, WHO, FAO, and its subsidiaries emphasized the need for improved early detection tests.

During the U.S. outbreak of Cryptosporidium in 1993, the CDC paired up with WHO in evaluating and finding the source of contamination. Over the course of 3 months, these bodies traced the source of this Milwaukee based outbreak to a



malfunctioning filter. All told, 403,000 persons were infected by the parasite. As a result of this catastrophe, the CDC and the EPA teamed up to draft national water standards that were to be put into effect immediately.



## Major Questions

1. Who bears responsibility of the food borne illness, the producing country, the manufacturing country, or the consuming country?
2. How should countries work together in terms of sharing technology to prevent illnesses, seeing as such technology could be industrially classified?
3. What is the ideal solution to dealing with diseases that affect the entire globe rather than just a region of the world?



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