On Jun 28, 2018, at 9:41 PM, Environmental Management (EMVM) <[em@editorialmanager.com](mailto:em@editorialmanager.com)> wrote:  
>   
> CC: [em\_eic@baylor.edu](mailto:em_eic@baylor.edu), [jacob\_stanley@baylor.edu](mailto:jacob_stanley@baylor.edu)  
>   
> Dear Professor Paudel,  
>   
> We have received peer reviews of your manuscript entitled "Adoption of Sustainable Agriculture Practices among Kentucky Farmers", which was submitted to Environmental Management. Based on these reviews, your manuscript could be reconsidered for publication should you be prepared to incorporate major revisions.    
>   
> When preparing your revised manuscript, you are asked to carefully consider the reviewer comments that are attached, and submit a list of responses to these comments, indicating the page and line numbers of each comment. If you disagree with any specific reviewer comment, provide a justification for your decision to not make these changes.  All changes in the revised manuscript must be highlighted in Word to assist checking of revisions by the editorial staff. Please make sure to submit your manuscript as editable source files (i.e. Word, TeX).    
>   
> Please also submit your responses to the reviewers' comments as a separate submission item.  
>   
> In addition, all papers need an acknowledgment section that gives information on all financial and in-kind support for the project.

**Page 24, line 503 to 506.**

**Acknowledgement**

This research was funded by National Institute of Food and Agriculture (NIFA), United States Department of Agriculture, Grant Number 2014-6800621865. Small Farm Diversification in Kentucky.

>   
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>   
> With kind regards,  
> Environmental Management Office  
> Environmental Management  
>   
> Comments for the Author(s) :  
> Editorial comments: The title of the article should insert ", USA" after "Kentucky" in the revised submission.   
> Addressed. New Title: **Adoption of Sustainable Agriculture Practices among Kentucky, USA Farmers.**  
> Reviewer #1:   
> The paper studies one of the oldest problem in the field of agricultural studies: the adoption of new practices by farmers. It has been studied in particular during the green revolution in order to understand how innovation are diffusing, and since then in many different studies concerning the adoption of so called sustainable practices by farmers. The originality of the paper does not lie on the theme, but on the survey that has been applied to support the authors’ conclusions. This survey is impressive and its results are correctly analyzed. Some findings are interesting (particularly the fact that agricultural innovation are localized), even if not surprising.   
> Nevertheless, I found three major problems with this paper:  
>   
> First, the bibliography review gives the impression that the study of agricultural innovation diffusion only started in the last few years. It is far from true, of course, and there are many different approaches of such a problem:

**Page 4, line 48 to 54.**

The concerned on the issue of sustainable agriculture can be traced back to 1950s when general public started to raise environmental concern (Pretty, 2007). National Research Council also sustainable published reports *Alternative Agriculture* in 1989 and *Towards Sustainable Agricultural Systems in the 21st Century* (Kornegay et al., 2010). Also, Baumgart-Getz et al. (2012) and Prokopy et al. (2008) studied literature related to sustainable agriculture practices adoption among US farmers from 1982 to 2007. Despite its long history, the issue is still one of the most debatable issue to address in the modern world as well.

I think in particular that spatial studies should have been taken into account to explain one of the major finding of the paper (see below).

Answer/Justification: We tried to take an account of spatial factor in the paper. However, USDA/NASS data policy did not allow us to go to the smaller level than the Agriculture District. We tried to run the analysis in Zip Code level and district level. However, both of them were not approved by NASS. Since the data collection was done by NASS and they have control of data, we need to comply their data release policy.

Furthermore, studies that make links between innovation and public policies, or farm development, are not really used in the bibliography review, which explains that there is not any independent variable that uses policy factors, access to agricultural extension webs, etc. Even if the survey cannot be done again included such factors, they must be taken into account in the discussion to underlie the limits of the study.

**Page 18, line 375 to 385**

Several studies about sustainable agriculture practices shows that policy factors plays an important role in the adoption process. This is also true among Kentucky Farmers. A research conducted by Zhong and Hu (2015) and Da Costa et al. (2012) also found that Kentucky farmers who participated in the conservation program from USDA are more likely to adopt best management practices. Also, Da Costa et al. (2012) also mentioned that the possible penalties for not complying with the Agriculture Water Quality Act might influence the SAP adoption and participation in conservation programs in Kentucky. These literature and research evidences suggests that policy factor is equally important to consider in the study of adoption of SAPs. However, this research study was unable to study impact of other policies except TBP. The impact of governmental and non-governmental policies in the adoption of SAPs can be another complete and in-depth study in Kentucky.

> Second, the discussion makes assertions that are not demonstrated, nor by statistical analysis neither by field studies (doing interviews with farmers for instance). For instance, when authors try to explain why districts have different incident rate of adopting SAPs, their explanations can be contradicted by other bibliographical studies (p. 18, l. 38 to 48: large cities use to influence positively the adoption of sustainable practices) or be contradictory with assertions made in the same papers (the conclusion p. 19, l. 29-39 are opposite to those of p. 18).

Answer: Two paragraph in two different places are brought in one place and provided more clear interpretation of the results for three agricultural regions. Updated paragraph is in GREEN color below:

**Page 20 and 21, line 431 to 446**

Districts 3 and 5 are known for having large acres of farmland and large number of farmers. Also, two major cities—Lexington and Louisville,—and the capital city, Frankfort, and other several small and medium-size growing towns lies inside this geographical region. Due to the large and growing market of agriculture commodities, farmers might be more focused on commercial farming and increased revenue. Farmers might be seeing the economic benefit associated with the farming and ignoring the sustainability aspects of agriculture as they are also responsible for unsustainable agriculture behavior not only the victim.

However, agriculture district 4 is in between two large cities: Louisville and Cincinnati, Ohio. The negative impact in the environment is coming from two large cities that are neighbor to, but not located inside the agriculture district, unlike in the agriculture districts 3 and 5, where negative impacts are coming mainly from inside agriculture districts, but not from outside. In other words, farmers from the agriculture district 4 are more victims and less generators of environment degradation. Therefore, small farmers in the agriculture district 4 might have felt the importance of (adopting) SAPs unlike farmers from agriculture districts 3 and 5, who does not. The economic benefit and income from farming weighted heavy for farmers from agriculture districts 3 and 5, unlike environmental health for farmers from agriculture district 4.

> Last, all SAP innovation are considered as having the same importance in the paper while they don't have the same impact. **I suggest that authors make a distinction between innovation, and studying particularly those that are more important for sustainable agriculture.**

Justification and Modification:

**Page 5, line 81.**

The overall objective of this research was to investigate factors that affect adoption intensity of sustainable agriculture that were identified as commonly adopted practices among Kentucky farmers. This was achieved by conducting a farmers’ survey which provided the required data to develop a predictive model of SAP adoption.

**Page 22, line 461 to 473**

This research included practices that are found to be commonly adopted by Kentucky farmers. However, there are several practices that have been adopted by Kentucky farmers, but not included in this study. Also the same practices may weight differently for different farmers based on their farming types, landscape, enterprises and interests due to site specific nature of sustainable agriculture practices (Lashagarara, 2011). For example, Zhong and Hu (2015) studied riparian buffers, fencing off animals, waste water storage which are not included in this research. However no-tillage and nutrient management from same research were included in this research. We selected sustainable agriculture practices that are generally considered as commonly adopted practices by farmers and our target research population identified through workshops and group discussions. Thus, this research provides a general perspective on the intensity of adoption, but not on the practice specific study. This research is very important in the context of Kentucky as a very few researches has been conducted focusing on this aspect of sustainable agriculture in the era when the sustainable development debate is on the peak.

>   
> Reviewer #2: This piece is a timely study on the determinants of the adoption of more sustainable agricultural practices in Kentucky. The study clearly has relevance, and the authors do a fine analysis. Below are some more detailed considerations, but in a nutshell I believe further revision is needed primarily to better contextualize the research and present the results in a way that highlight their novelty value a bit more.  
> Answer: I added why this research is important in the context of Kentucky addressing the suggestion of previous reviewer.

**Page 5, line 73 to 79 including table 1. Table 1 is on page 32.**

> The Introduction currently is a bit black-and-white and it black-boxes what is labeled as "Sustainable Agriculture Practices". Techniques such as conservation tillage or "cover crops" are mentioned without ever being explained. I think this needs to be fleshed out; you can't assume all readers know the details and characteristics of these practices you cite. Moreover, some of these techniques have pros and cons. No-till agriculture, for instance, usually means an increase in the use of herbicides. So clearly it is not black-and-white as sometimes presented. It is a matter of nuancing what the authors are saying and giving a bit more detail while cutting on the repetition. If a point is made, you don't need to carry on repeating it.

> The beginning spends perhaps too long lauding the merits of Sustainable Agriculture Practices without ever going in much depth about them. It becomes repetitive without being too informative. This can be easily redressed by cutting back on the "laudation" of the importance and benefits of sustainability in agriculture (which can really take no more than a paragraph or two, as it is a pretty consensual point) and devote more space to fleshing out the problems of (1) unsustainable agriculture to date and (2) of explaining, as illustrative examples, particular techniques you deem important and characteristic of sustainable agriculture in the Kentucky context. Some better contextualization ought to be given, particularly for readers who may not be too familiar with the Kentucky context.

Justifications:

In my view, each paragraph has its own importance. First paragraph talks about the definition of sustainable agriculture by US Congress, which is not laudation. In second paragraph, I am linking how sustainable agriculture practices is associated with “practices”. I added a paragraph (third in this paper from line 48 to 54 to talk about how old is the issue and when the discussion started. Fourth paragraph only discuss about the benefits of SAPs. And 5th paragraph says why this research is important in KY and also included what practices are “commonly adopted practices” as found by this research. The introduction section ended with objectives and how this paper is organized.

Also some of it has been explained in the description of study area under method section. (Page 10 and 11, line 201 to 209)

**Page 5, line 77 to 79**

….. Practices included in this research as commonly adopted SAPs among Kentucky farmers are listed below.

**<< Insert Table 1 >>**

**Added Table:**

**Page 32 and 33.**

**Table 1: Commonly Adopted Sustainable Agriculture Practices among Kentucky Farmers**

***Alley Cropping:*** Planting trees or shrubs with agronomic, horticultural or forage crops cultivated in the alleys between woody plants (Kornegay *et al.*, 2010).

***Animal for Land Reclamation:*** Small mammals such as mouse help to loosen the mined surface which favors quick succession (Larkin *et al.,* 2008).

***Biological Pest Control:*** Pest are suppressed by their natural enemies (Filho *et al.*, 1999).

***Composting:*** Waste recycling technique converting waste into nutrient rich humus with high soil organic matter using microbes (Filho et al., 1999).

***Conservation Tillage:*** Tillage and cultivation practice that incorporate crop residue into the field (Hobbs, Sayre, & Gupta, 2008).

***Controlled Grazing:***The grazing of animals is controlled by rotating and striping field letting field to recover before successive round of grazing (White & Wolf, 2009).

***Cover Crops and Green Manuring****:* Use of legumes such as clover, vetch and non-legumes such as rye, wheat to improve soil fertility and reduce erosion and incorporate into soil as green manure (Kornegay et al., 2010).

***Crop and Livestock Production System Integration:*** An integrated system where crop and livestock enterprise are combined and benefitted from each other (Kornegay et al., 2010).

***Crop Rotation:*** System of rotating legumes and non-legumes crops in same field to maintain soil fertility (Kornegay et al., 2010).

***Cultural Pest Control:*** Managing the crop, weed, disease and pest complex by manipulating cultural practices (Kornegay et al., 2010).

***Fallow Management:*** The use of fallow period to conserve rainfall as stored soil water and reduce soil erosion (Kornegay et al., 2010).

***Farm Machinery Adjustment:*** Adjustment in planting, spraying and harvesting farm machinery operation, calibration, repair, and their safety (Kornegay et al., 2010).

***Forest Stewardship:*** Forest conservation and development of forest in own farm land.

***Improved Water Management:*** improve irrigation facility to reduce irrigation water losses (Kornegay et al., 2010).

***Increase Biodiversity:*** Diversify flora and fauna in farm (Kornegay et al., 2010).

***Integrated Pest Management:*** A pest management strategy using biological, chemical and physical, cultural production cost and protect the environment (Kornegay et al., 2010).

***Land Reforming:***Forming terrace, reducing slope, and other slope stabilizing technologies to reduce surface run off of water and top soil.

***Local or Native Crops:*** Locally available crops or local varieties (Kornegay et al., 2010).

***Mulching:*** A shallow layer of grass or crop residues at the soil/air interface to improve soil quality and moisture retention (Filho *et al.*, 1999).

***Multi-species Grazing:*** Grazing more than one species of livestock such as chicken, duck, goat and horse in same land (Kornegay *et al.*, 2010).

***Poly-culture Farming:*** Different and less competitive crops grown together to optimize biomass yield and improve environmental quality (Kornegay *et al.*, 2010).

***Precision Agriculture:*** Observation, measurement and response based farm management strategy to address inter and intra-field variability in crops and increase farm efficiency, productivity and economic returns (Kornegay *et al.*, 2010).

***Reduced Chemical Fertilizer Use:*** Reduced in the use of chemical fertilizers (Kornegay *et al.*, 2010).

***Reduced Chemical Pesticide Use:*** Reduce in the use of chemical pesticides (Kornegay *et al.*, 2010).

***Reforestation:*** Reestablishing forest in barren land or farm land.

***Ridge Tillage:*** Scalping and planting on ridges built during cultivation (Kornegay et al., 2010).

***Sprayer Calibration (and Application Accuracy):***Calibrate sprayers to use optimum amount of chemicals as well as other spraying inputs in farm.

***Varietal Mixture of Single Crop:***Mixing different variety of same crops. Also known as Cultivar Mixtures (Kornegay et al., 2010).

***Windbreaks and Shelterbelts:***Create wind barriers and provide shelter to crops by planting tall, dense and strong trees along the edge of farmland (Kornegay et al., 2010).

**Page 10 and 11, line 201 to 209 (In Study Area Section)**

The adoption of sustainable agriculture practices also varies with the agriculture district in Kentucky. Western Kentucky is well known for the commercial agriculture production and flat plain agriculture lands. So use of precision agriculture, computer and large farm machinery are some of the most commonly adopted practices adopted in that region. However, Eastern Kentucky is well known for coal mining. So practices such as use of animal for land reclamation is more applicable to Eastern Kentucky (Larkin et al., 2008). Some sustainable agriculture practices which has common application such as reduced use of chemicals, cover cropping and green manuring, use of manure as fertilizer, controlled grazing are some of the most commonly used practiced throughout the state.

(Some of these techniques do get talked about from p.11 on, but they should be mentioned early, not just in the results section. By then the readers should already know what you are talking about  
> when referring to SAPs)

Answer: **Page 3 to 5, line 39 to 104.** Reduced some text from introduction section that looks like repetition.

Sentence Modified:

**Page 4, line 59**

Soil and water conservation related SAPs help to maintain the water table, increase carbon sequestration, improves soil fertility, and protects land from erosion reducing sediments load from agriculture lands (Knowler and Bradshaw, 2007).

**Page 5, line 71 to 77**

Being specific to this research, very less research has been conducted in Kentucky addressing the socioeconomic and behavioral aspect of sustainable agriculture practices adoption. This leaves a huge research gap giving big opportunities to conduct research on this aspect. We included thirty one different sustainable agriculture practices commonly adopted among Kentucky farmers to understand how farmers respond to the adoption of set of sustainable agriculture practices. So, the originality of paper lies on the study of adoption of set of practices from social and economic aspects in relation to the context of Kentucky.

> The section "Literature Review" could receive a more attractive title. More importantly, it would greatly benefit from a summarizing table. The authors cite a number of studies that seem to point to the relevance of multiple factors, but it is challenging for the reader to keep track of all those. A table, containing the various factors as well as the references to the studies that discuss them, should not be too hard to put together and would substantially increase the usefulness of this section. It would also add value to the lit review work you have done.

**Page 9, lines 167 to 170.**

A table of relevant literature cited in this paper is tabulated below summarizing their major findings:

**<< Insert Table 2 >>**

**Table is in Page: 34, lines 660**

**Table 2:** Relevant Literature cited in this Paper Summarizing their Major Findings:

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **SAPs Types** | **Study Area** | **Findings relevant to Paper** |
| Awan et al. (2015) | SAPs/ BMPs in Cotton. | Punjab, India. | Level of Adoption was higher among licensed farmers with the better understanding of sustainable cotton program. Education, land holding size, have positive impact whereas age and farming experiences have negative. |
| Barungi et al. (2012) | Soil Erosion Control Technologies | Eastern Uganda | Increase in access to extension service, amount of land owned, and diversity of farm tools increase technology adoption. |
| \*Baumgart-Getz (2012) | BMPs | USA | Access to and quality of information, financial capacity, connection with extension agents and farmer’s network have largest impact on adoption. |
| \*Carlisle (2016) | Soil health practices | USA | Combining education, research, policy, measure to overcome equipment barriers, and addressing farm and food system context increase the adoption of soil health practices. |
| Da Costa (2012) | Watershed Conservation | Kentucky, USA | Counties with more farms and larger farms are more likely to participate in conservation program. The adoption depends upon land characteristics of individual plots. |
| Filho et al. (1999) | Sustainable Agriculture Technologies | Espirito Santo, Brazil | The adoption increase with the increase in the awareness of negative impacts of chemicals, family labor availability, better soil condition but decrease with the increase in farm size. |
| Gillespie et al. (2007) | 16 BMPs in Cattle Industry | Louisiana, USA | Farmers does not adopt technologies because of unfamiliarity, non-applicability, high cost, preference towards technologies. Education and extension activities are important to improve adoption of BMPs. |
| Greiner et al. (2009) | BMPs reducing diffuse source pollution from agriculture land | Queensland, Australia | Understanding of farmer’s motivation, risks, and attitudes is required to improve environmental quality in agriculture sector. Farmers’ positive attitude towards environment conservation, healthy lifestyle improves adoption of BMPs. Also, external initiatives motivates economically and financially motivated farmers to adopt sustainable management technologies. |
| Hall et al. (2009) | Sustainable Floriculture Practices | USA | The concerns about the implementation (eg. easiness), and risk associated with the implement are two major important factor affecting adoption of SAPs beside location and farm size. |
| \*Kabii and Horwitz (2006) | Conservation Easement Programs |  | Landlords’ demographics, land tenure nature, knowledge and awareness about the program, financial circumstances, and participation risk perception, benefit of programs, incentives and compensation are important factors that affect the participation of conservation programs. |
| \*Knowler and Bradshaw (2007) | Conservation Agriculture |  | The variable explaining the adoption of conservation practices is also localized alike conservation practices themselves. So, policy development and planning, attempts to improve adoption should be localized to address location specific needs and demands. |
| Lashgarara (2011) | Wheat related SAPs | Lorestan, Iran | Education, social engagement, market access, use of media, extension classes, knowledge and attitudes (positive) about SAPs improves adoption. |
| Mullendore et al. (2015) | Conservation Behavior | Midwest USA | The sense of place or place attachment and the place identity have significant effect on the specific conservation behavior but not in the overall. |
| \*Prokopy et al. (2008) | Best Management Practices | United States | Education level, income, farm size, access to information, positive environmental attitudes, environmental awareness, and utilization of networking has more often positive relation with the adoption of best management practices. |
| Singer et al. (2007) | Cover Crop | US Corn Belt: IL, IN, IA, MN | Crop diversification plays an important role in the adoption of cover crops and availability of cost share program would enhance use of cover crop among corn belt farmers. |
| Wilson et al. (2014) | Nutrient Management Practice | Ohio, USA | The attitude towards the adoption of practice to improve nutrient management is driven by farmer’s attitudes, perceived risks and response towards the negative impact of nutrient losses from farm in the environment. Younger farmers are already engaged in and have more positive attitudes towards management practices. |
| Yang and Sharp (2017) | BMPs for Water Protection | Waikato, New Zealand | Farmers closer to each other has similar choice of BMPs. Availability of information is the most important factor followed by financial problems for the adoption of BMPs. Spatial effects is also an important factor in decision making towards the adoption of BMPs. |
| Zhong and Hu (2014) | BMPs via Water Quality Trading Program | Kentucky, USA | Farmers who participate in conservation program are more likely to adopt BMPs. Attitude of farmers towards BMPs and conservation practices are more important when adopting BMPs among farmers. |

> The sections 3 and 4 could also receive better titles that aren't just bare and basic as "Conceptual Framework". Moreover, this may be a misnomer. The authors do not really discuss or set \*concepts\* in there. I think this section belongs much better merged with what currently is 4, as a "Methodology" section.  
> Answer: Merged with the Method Section, Removed Title “Conceptual Framework” and moved to “Econometric/Emperical Model section”. See **Page 14, line 277 to 2291**

> The authors should highlight a bit better the relevance of Kentucky as a traditional farming state also within the broader USA context, not just within the state per se. It would also be very useful to get a bit more context; currently the authors hardly even give us the background of farming in Kentucky or what the farmers there grow and the relevance of that for the state economy, for livelihoods, etc.  
**Page 10 and 11, line 201 to209 (In Study Area Section)**

The adoption of sustainable agriculture practices also varies with the agriculture district in Kentucky. Western Kentucky is well known for the commercial agriculture production and flat plain agriculture lands. So use of precision agriculture, computer and large farm machinery are some of the most commonly adopted practices adopted in that region. However, Eastern Kentucky is well known for coal mining. So practices such as use of animal for land reclamation is more applicable to Eastern Kentucky (Larkin et al., 2008). Some sustainable agriculture practices which has common application such as reduced use of chemicals, cover cropping and green manuring, use of manure as fertilizer, controlled grazing are some of the most commonly used practiced throughout the state.

Further Justification: I included some researches from different states of USA to give a perspective of what types of practices have been considered in different states and the world in literature review section (See page 8, lines 148 to 166).

> In section 5, it would be extremely useful to have a synthesis of the findings on a table or figure. The authors discuss many variables in sequence. A synthesis at the end of the section would be really handy.  
> I am not sure what this means? Reviewer wants a table with what is the result: positive, negative, significant and not significant? (I already have a regression table which shows all results).

> The authors should be much more objective in their Conclusions section. Right now there is too much recap, and restatement of general considerations that everyone already knows (e.g. farmers make decisions on the basis of multiple factors). Instead, the authors should state their conclusions more objectively and emphasizing the novelty value of their research findings on top of what was already known from the literature. 

> Answer: Last paragraph removed.

The removed paragraph was as follow:

Making the decision to adopt—and deciding how many practices to adopt—is a complex process. Therefore, farmers make decisions in the broader context by considering several factors, such as economy, income, alternative opportunities, government policies, their attitude and behaviors, socioeconomic conditions, farm and farming conditions, location, and several other factors. This study should be helpful in developing extension and outreach efforts focusing on variations in demographics, farm size, education, and technology adoption attributes.

> A few more specific remarks below:  
>   
> P.5  
> L.46: "Age is found to have a negative effect". Be specific. If you mean that older farmers are less likely to change their practices, say it explicitly.  
> L.47: "THE education" sounds odd if you are not referring to specific type of education but just to schooling in general.

**Page 6, lines 103 to 106**

Older farmers are less likely to adopt new practices which they are not very familiar with (Awan et al. 2015; Baumgart-Getz et al. 2012; Kabii and Horwitz, 2006). But, farmers are positive and more likely to adopt sustainable agriculture practices as they achieve higher level of formal education (Soule, 2001; Upadhyayet al*.* 2003).

> P.8  
> L.41: The motivation behind adoption of SAPs cannot be presented as "either/or". Surely there are farmers who adopt SAPs \*both\* due to environmental considerations and economic expectations.

This section was moved to page 14.

**Page 14, lines 280 to 281.**

Also there are farmers who adopt SAPs considering economic and environmental benefits.