

# Climate Science Curriculum in Agriculture

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## Introduction and Goals

The purpose of this project is to gain a better understanding of climate change and agriculture curriculum as it relates to 9-12 grade science students, and to identify gaps and develop activities or curriculum accordingly. The goals are to:

- Develop a template for climate change modules
- Inventory existing 9-12 curriculum for agriculture and/or climate workshops
- Develop 9-12 module for teaching agriculture and climate concepts
- Transform the 9-12 module into an online professional development module for CEU credit

## Methods

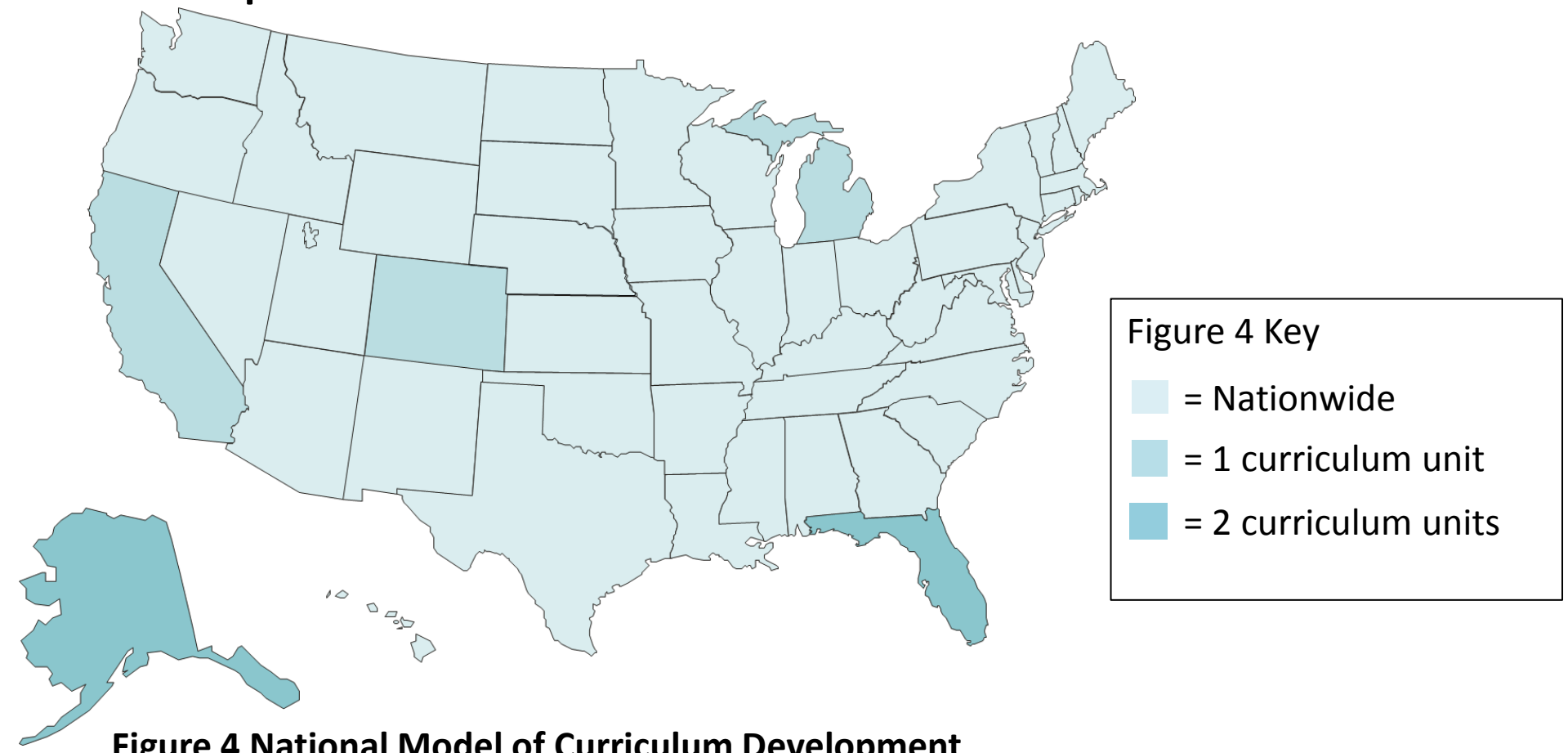
I spent a majority of my time completing a nationwide search for climate change curriculum related to agriculture. The results were put into an Excel spreadsheet to create a database and compare with other results (**Table 1**). These comparisons included standards addressed, the length of lesson, and how or if it related to agriculture. Regional teacher workshops from SD, MN, IA, MO, WI, IL, MI, IN and OH on climate change were also researched. This Excel spreadsheet had 16 categories that were compared, such as length of workshop, time of year held, CEU credits offered and the structure of the workshop, for a total of 256 data cells.

Curriculum	Category	Workshop
X	# of Class periods	
X	Author	
	CEU offered?	X
X	Changing Weather Activity	
	College credit or only workshop credit	X
X	Cost	
X	Crops	
	Do participants receive curriculum?	X
X	Focus	
	Focus of Workshop	X
	Free, cost, or stipend?	X
X	Geographic Region	
X	Grade Level	X
	Hosted by	X
X	Keywords Used	
X	Land use	
X	Length (# of lessons or pages, time)	
	Length of Workshop	X
X	Material Format	
X	Related to Ag?	X
X	Search Date	X
X	Soil	
X	Source	
X	Standards Met	
	State	X
	State Specific or general	X
X	Title	X
	Type of workshop	X
X	Water	
X	Website	X
	Workshop Calendar	X
X	Year Produced	

**Table 1 Curriculum and Workshop Categories**  
Listed above are the categories that were used in the search of curriculum modules and workshops.

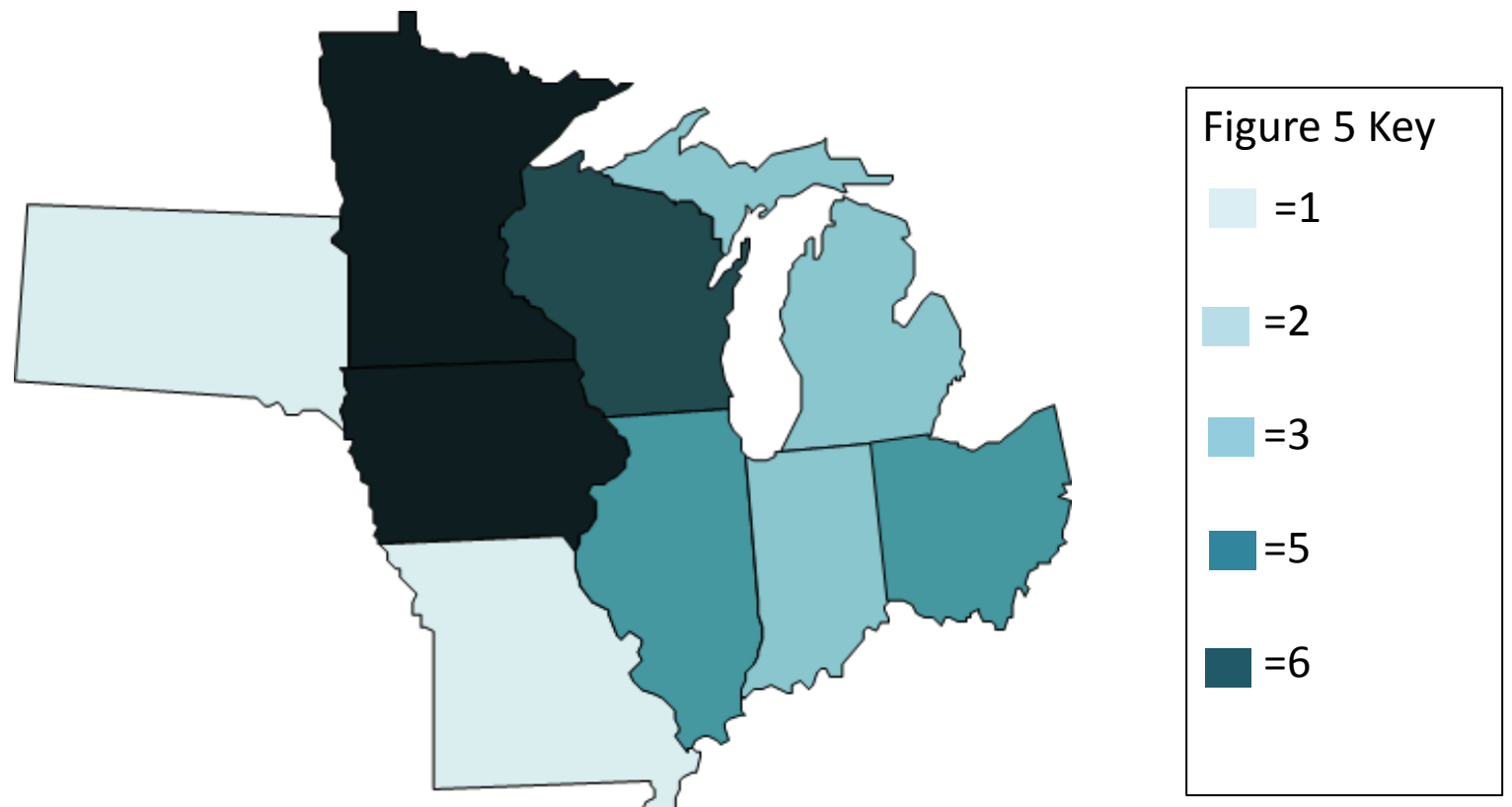
## Results

- Significant findings from the 27 modules (**Figure 1**) showed that some have no relation to agriculture (focus is on changing long-term weather activity and results of the changing climate), others have some relation to agriculture, and one is focused on ecological and wetland restoration
- A large majority of the lessons from the curriculum can be completed within 2 to 5 class periods (**Figure 2**).
- Out of the 15 workshops identified, (**Figure 3**) the majority of the workshops were structured in a hands on manner, with the least being lecture based and field experiments.
- The United States map (**Figure 4**) shows where the curriculum is developed and the regional workshop map (**Figure 5**) shows the amount of workshops offered in each of the nine states.
- **Table 1** lists the categories that were used in the search of workshops and curriculum.



**Figure 4 National Model of Curriculum Development**

The United States map shows the states that have climate change curriculum available to them. The states that have the most state specific climate change curriculum in Alaska and Florida with two sets each.



**Figure 5 Regional Model of Teacher Workshops**

This research is part of a regional collaborative project supported by the USDA-NIFA, Award No. 2011-68002-30190 "Cropping Systems Coordinated Agricultural Project (CAP): Climate Change, Mitigation, and Adaptation in Corn-based Cropping Systems" sustainablecorn.org and the Iowa State University Science with Practice program.

## Conclusions

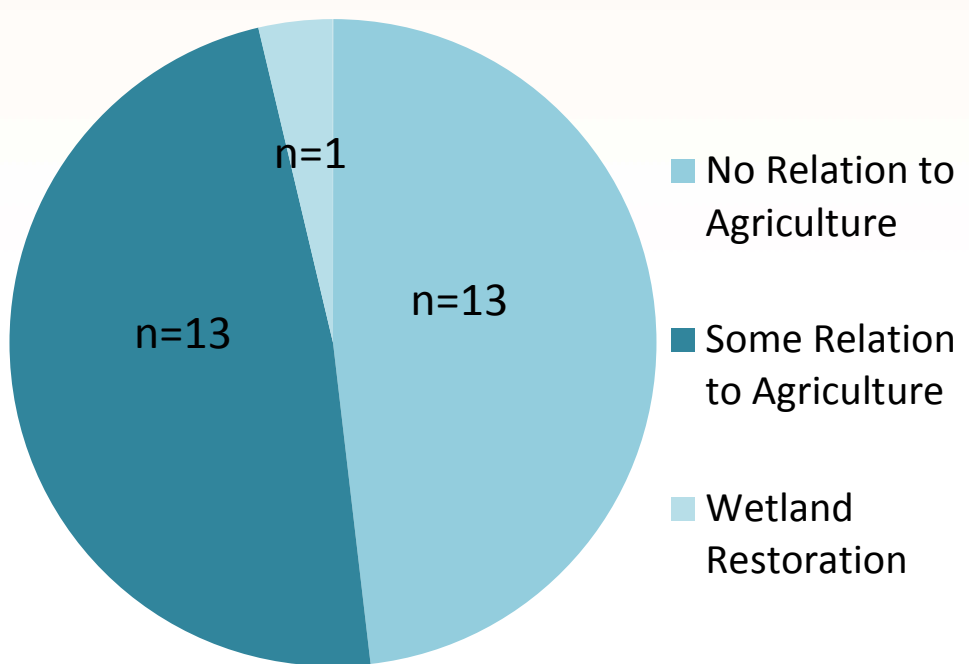
There is not curriculum related to climate science with a specific emphasis in agriculture for 9-12 grade teachers. Workshops within the nine state region exist for teachers regarding long term climate science, with application to agriculture. In the nine state region, climate change workshops with emphasis in agriculture do not exist. When all of the curriculum and workshops had been researched and analyzed, summaries were constructed off of the findings. The spreadsheets and summaries were given to the education team to make decisions for the next steps of the project. Time constraints did not allow me to complete the work on the modules and will be continued on in fall semester.

## Next Steps

Future goals for the continuation of this project are to develop agriculture exercises and applications to key climate modules in the fall semester of 2013. I will also investigate opportunities to incorporate my databases into existing educational websites so it can be found and accessible by educators for their reference.

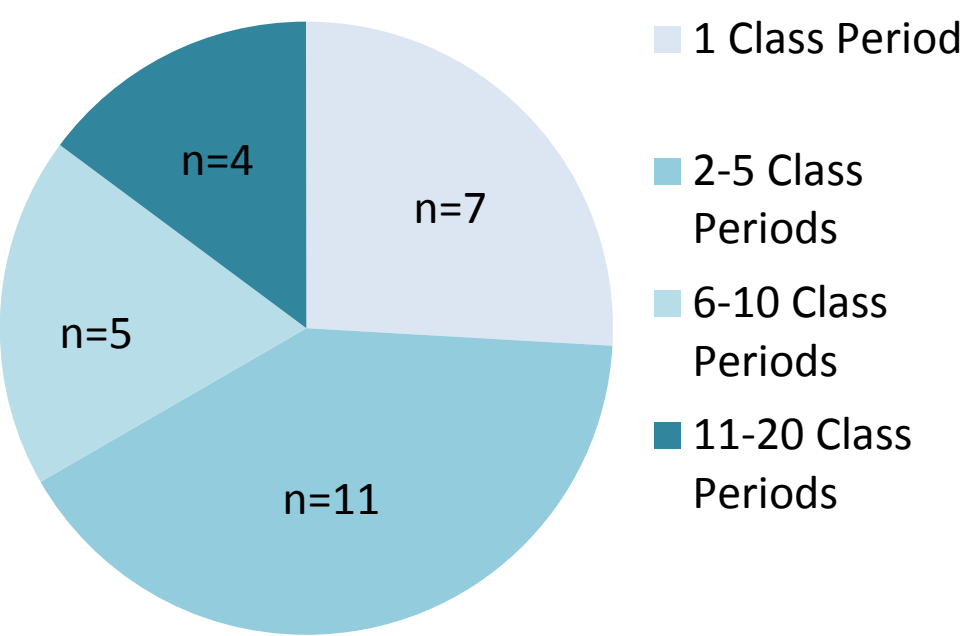
## Impact of SWP

This Science with Practice project will have significant impact on my future career as an agricultural educator. It has become clear that there is an abundance of curriculum available regarding climate change, but it will be my job to adapt the curriculum to what is best for my classroom and goals.



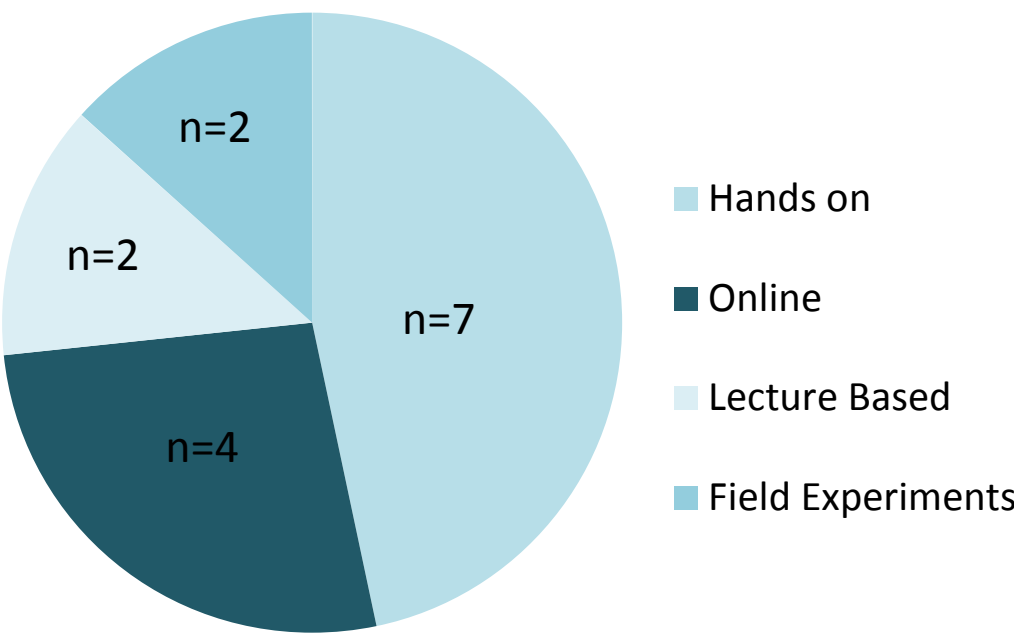
**Figure 1 Curriculum**

13 curriculum modules have no relation to agriculture, 13 have some relation to agriculture and one has a focus on ecological and wetland restoration.



**Figure 2 Class Periods Needed to Complete Lessons**

This graph shows that 7 lessons can be completed within 1 class period, 11 are completed in 2 to 5 class periods, 5 are completed in 6 to 10 periods and 4 take from 2 to 4 weeks to complete.



**Figure 3 Workshop Structure**

This graph shows the design of the workshops. Seven workshops were hands on, 4 were online, 2 were lecture based and 2 focused on field experiments.