# Capstone Project Stage 3:

# Soil, crop, and pest management and climate change (Modules 7-9)

At this stage you should have collected quite a bit of data related to the physical environment of your region (water, soils and climate) as well as related to the regional food system, including the history of the regional food system and which crops are grown in your region. You may also have discovered some impacts that the regional food system is having on soil and water resources in the region.



## What to do for Stage 3?

* Complete the *Stage 3* worksheet table (see below) summarizing the data you’ll need to collect to complete this stage. Remember, you need to think deeply about each response and write responses that reflect the depth of your thought as informed by your research.
* Add questions and continue to research the questions in your worksheet files.
* Keep track of all of the resources and references you use. Please include at least 3 peer reviewed academic sources.
* Add relevant data, maps and figures to your PowerPoint file.
* Revise your CHNS diagram and/or create a new one incorporating topics from Modules 7, 8 and 9.
* Individual Assessment:
	+ Write a one-page summary based on the data and information you’ve collected so far explaining what you think will be the major issues to address and focus on in your capstone presentation. To write this summary, you’ll need to look back on your worksheets from Stages 1, 2 and 3 and the PowerPoint you’ve been working on. In your summary, you need to synthesize the information you’ve collected so far and to identify the topics you will want to focus on during your final paper.
	+ Use citations to reference the sources of material you use in your summary. Your list of references is not counted in the one-page requirement. The reference list should span to a second page.
	+ You might note in your summary conclusion if there are any major questions that you haven’t been able to answer about your region’s food systems.
	+ Submit your summary on Canvas with your other documents as a pdf.

## Rubric for Stage 3 Individual Assessment

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| **Criteria** | **Possible Points** |
| Summary submitted by deadline, one-page in length with reasonable margins and font size. | 5 |
| Summary is organized logically and arguments are presented clearly. | 5 |
| Important regional issues and topics related to climate, water resources, soil resources, nutrients, crop types, and other topics to be covered in the final presentation are identified and explained clearly and succinctly. | 10 |
| References are cited properly and demonstrate that appropriate research has been accomplished. | 5 |
| Summary is written with correct grammar and spelling. | 5 |
| **Total possible points** | **30** |

# Capstone Project Overview: Where do you stand?

Upon completion of Stage 3, you should have a good understanding of the connections between the physical environment (soil, water, and climate) and the regional food system, including which crops are grown in the region. In addition, you should be considering how resilient or vulnerable the existing food systems are.

Upon completion of stage 3, you should have at this point:

1. Continued research and data compilation in the Stages 1, 2 and 3 tables in the associated Stages 1, 2 and 3 worksheets.
	1. Stage 1: Regional food setting, history of regional food systems, soil types
	2. Stage 2: Water resources, soils and crops
	3. Stage 3: Soil health and conservation, pests, and climate
2. Add to your PowerPoint file containing the data that you are collecting about the food system of your assigned region. Information you may have:
	1. Labeled map of your region
	2. Soil map of your region
	3. Precipitation and temperature map of your region
	4. Major crops and crop families grown in your region
	5. Information about soil health and conservation practices
	6. Information about pests and pest management strategies
	7. Types of irrigation systems in the region and water pollution impacts
	8. Data, information, figures, maps and images to support your assessment of the resilience or vulnerability of your regional food system.
3. Continued to record citations for all references and resources you are using in your research. This is a critical step. Every figure, map, piece of data and bit of information you collect from the web, a book, a person, a journal or any other source must be attributed to the source.
4. Added to your list of questions you have about your region related to key course topics and initiated significant efforts to answer.
5. Created one or more draft CHNS diagrams to illustrated how the natural system in your region is coupled to the human food system, including responses and feedbacks.

# CHNS Diagram

Continue to build the CHNS diagram with information from Modules 7-9. Add new lines, boxes, connections, and text in the diagram to illustrate the components of the human-natural system and their relationships. *Put your CHNS diagram(s) both here and in the powerpoint file.*

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| Stage 3: Soil/crop management, pests and climate change  |
| **Region Name** | **Country** | **State/Province** |
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| **Soil Conservation Practices (Module 7)**Describe the soil conservation and practices used in your region to promote soil health. * What are the techniques that farmers use to build soil?
* Are there different approaches being used to conserve soil at different scales or in different contexts? Describe different types of soil management practices in your region.

*Tips to Start** For US regions, see [USDA/NASS Census of Agriculture Data](http://www.nass.usda.gov/Statistics_by_State/) for the most recent year for the State or States in your region. Select your state on the Map and then Look for the Table Labeled: “Land Use Practices” it is often Table 50.
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| Pest Management (Module 8)Describe the pest management strategies that are currently employed in your assigned region.* What pests are common in the top 5 cropping systems in your region?
	+ List 3 major pests of the 5 dominant crops in your region. At least one should be an insect and one a weed. Write a brief description of pest. What taxonomic group of species is it? What is the life cycle of each pest?
* What management strategies are currently employed in your assigned region? Describe some examples for different cropping systems and include pictures or graphics if possible.

*Tips to Start** For US regions, go to the land grant university website in your region and find crop and pest management practices for your region. Also check out Pesticide Use in [U.S. Agriculture: 21 Selected Crops, 1960-2008](https://www.ers.usda.gov/webdocs/publications/43854/46734_eib124.pdf). However, pests change fast, so you will want more recent information!
* For international regions, see the [Global Climate Change Viewer](https://www2.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp) (if working!)
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| Future Climate (Module 9)Discuss projections for temperature change in your region and potential impacts on agriculture.* What impacts will rising temperature and increased evaporation have on food production in your region?
* What temperature increases are projected in your assigned region as a result of human-induced climate change?
* What impacts those changes may have on the food system in your region?

*Tips to Start** For US regions, find your assigned region on the NCCV <https://www2.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp> and refer back to the worksheet from the formative assessment in Module 6.1 for instructions). Explore the data available for your region. Clip any graphs or maps that you think might be useful for your final presentation and paste them into your PowerPoint. Download the summary document from the NCCV and extract appropriate figures into your PowerPoint. Identify the changes in key climate variables for your assigned region other than the projected changes in minimum and maximum monthly temperatures in your assigned region.
* Think about the likely impacts of future climate changes that you have identified on the key crops and animals in your assigned region.
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| Questions about your region? What additional information do you still need to find? Where might you find this information (add future references below)? |
| Future References and Key ResourcesInclude citations to newspaper articles, primary literature, databases, personal communications, etc. to information that might be useful in the future and aren’t already cited below.  |
| References Remember to use APA Format. |