NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Plant and Soil Science Notes-Unit 1 Intro –Mrs. Weimer

Lesson 1-Introduction

Intro 1: Mind Map

1. What is Plant Science?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What are the three main categories of plant science?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_

3. What are plants used for? Draw some icons to represent plant use.

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4. List some plant uses (6)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.

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| Direct Plant Uses Definition | Indirect Plant Uses Definition |
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6. Ag Issues Contention-Vegetarianism:

* There is a contention that it is more efficient to have direct or indirect plant sources produced. Do you agree or disagree with this statement?

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| Agreement Points | Disagreement Points |
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* Group Task 2:
	+ Defending your position: Students prepare a position DEBATE on the different sides of being a vegetarian, and how this impacts the efficiency of production and use of plant science products.
	+ You will be assigned a position, no choosing sides
	+ You will debate and defend the position
	+ You have 10 minutes to collect your data
	+ Remember, you are for or against the position, not the person!!



Notes for the assignment:

Lesson 2-Plant Kingdom

1. What is an autotroph?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Auto=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Trophe=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Why do we consume energy products?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What do deer, bison, owls and humans all have in common? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is a heterotroph?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hetero=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_trophe=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Three types of heterotrophs\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Label the food chain:

7. What is a food chain?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What are the levels of the food chain called?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Draw an ecological pyramid and provide the amount of energy transfer with each level.

10. Assessment questions with your group

1. Where do all living things get energy from?

 2. What is a producer?

 3. What do the arrows mean?

 4. What is a first order consumer? Give an example of a first order consumer.

 5. What is a second order consumer? Give an example of a second order consumer.

 6. What is a top order consumer? Give an example of a top order consumer.

 7. If an organism does not get posted what will happen to it?

 9. What is a food web?

10. What does a food web tell us about life?

Lesson 3-Plant Classification

1. Intro-5 Questions (yes or no)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is classification?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What is taxonomy?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Who developed the first classification system?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Classification into 2 groups\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Plants classified into 3 groups\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What problems would occur for such a broad grouping?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Who was the botanist who made this system better?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What is his system based on?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. What is a 2 system classification called?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. In system classifies\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Example: (humans)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. K=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 P=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 C=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 O=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 F=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 G=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 S=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. Classification Group Task 2

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| --- | --- | --- | --- | --- | --- |
|  | Common Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Common Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Common Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Common Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Common Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Kingdom |  |  |  |  |  |
| Phylum |  |  |  |  |  |
| Class |  |  |  |  |  |
| Order |  |  |  |  |  |
| Family |  |  |  |  |  |
| Genus |  |  |  |  |  |
| Species  |  |  |  |  |  |

Lesson 4-PA Ag Production

1. Intro: Why are plants important to you? How does crop production impact those in the communities that we live?

2. Top plant commodities\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Top animal commodities\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Group 1: <https://www.nass.usda.gov/Statistics_by_State/Pennsylvania/index.php> (Go to County Estimates) different agriculture products (Diversity) the amount of production (Scope) and the dollars sold (Value) for our county

5. Group 2: <https://www.nass.usda.gov/Statistics_by_State/Pennsylvania/index.php> (Go to Quick Stats) the entire state of PA, find the county that is the highest in the production of all of the commodities that we have talked about today. Create a color key and color in the counties that are highest in production.

Color Key



Lesson 5-Importance of Field Crops

1. *Write down each thing that you have eaten since you got up this morning, excluding those things that I just gave you. What percentage of food that you consumed contained grain, or the by-product of a grain crop?*

2. When did cultivation begin?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. How many acres are dedicated to crops in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. How much of the US population is involved in making those crops (farming)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What are the three categories of field crops?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. What is a grain?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Family?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Seed?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What are the three major grain crops in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What are the three small grain crops in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What are oilseed crops?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. What are the primary oilseed crops in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. What are the oilseed crops in PA?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. What is a specialty crop?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. What is the primary fiber crop in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_harvesting?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. What are forage crops?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. GROUP DISCUSSION: Why is roughage necessary for livestock?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. What are the sugar crops in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Primary stimulant crop in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Why are stimulant crops difficult to grow in the US?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. GROUP DISCUSSION: What climatic conditions are necessary for high quality tobacco (why)?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Group Task: What factors would you consider on your farm to grow crops?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

21. 7 tips for crop production\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lesson 6-Intro to Horticulture

1. Group Task: Define HORTICULTURE

2. Define Horticulture-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. Define Agriculture-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. What are the two types of horticulture?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Diversity Project Notes:

Lesson 7-Biodiversity

1. GROUP TASK 1- Observation Moment

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2. What is biodiversity?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Group Discussion: Where would you expect the greatest biodiversity to be located? Why?

4. Why is biodiversity important?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. When biodiversity is threatened, three things can happen.

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| --- | --- | --- | --- |
| Thing that can happen |  |  |  |
| Impact/Definition |  |  |  |

6. Southern States Article https://www.southernstates.com/articles/monoculture-vs-crop-rotation.aspx:

# Monoculture Crop vs. Crop Rotation Systems

Which system is best for you?

Farming is a holistic endeavor. For example, the crops planted in the ground this year have multiple effects on the crops planted in the next year and the years beyond. What type of effect depends on the type of crop planted and a number of other circumstances.

Throughout history, growers have used one of two methods when planning their farming systems: either monoculture or crop rotation.

Growers, when deciding which method to employ, consider a large number of factors beforehand: desired yields; any physical, chemical, and biological soil properties; insects; disease; nematodes; weed pressure; labor and equipment availability; fertilization; irrigation availability; environmental issues; sustainability; and economics. In a rotation system, growers must also consider the length of the rotation and their ability to rotate with high-value crops.

Crop rotation is more common and typically has more long-term benefits, but advantages and disadvantages exist for each farming method.

## Monoculture methods

The monoculture farming method, or single crop system, involves the repeated planting of one type of crop on the same field. Mono-cropping is not common, except for certain high-value specialty crops, but there are a few advantages to this way of farming.

First of all, monoculture farming may not require a high level of planning or management. Growing only one type of plant requires knowledge and practical experience of that plant alone, versus the know-how needed for many different crops in a crop rotation method. Having only one crop to plan for can simplify things.

In addition, mono-cropping requires a smaller variety of equipment, which could cut costs. Also, the chance of soil compaction tends to decrease with monoculture crops. In most farming situations, however, the benefits of monoculture systems are short-term.

## Crop rotation systems

The United States Department of Agriculture defines crop rotation as the growing of multiple crops in a planned sequence on the same field. Research has proven many benefits exist for this method of farming, including increasing pest resistance, improving soil health and nutrient levels, and reducing effects on the environment.

First, crop rotation greatly improves a field's pest resistance. Insect pests and diseases have a tendency to brutally attack some types of plants while completely ignoring others. Growing one crop in the same field repeatedly often means inadvertently nurturing pests associated with that crop. Planting other types of crops helps to ward off diseases and insects specific to one plant. And there’s a cost benefit: Growers save money with crop rotation by not having to purchase as many chemicals as their only way to battle pests.

Crop rotation also promotes soil health. For instance, soil tends to erode less on rotated fields because rotated crops produce more biomass, or crop residue, compared with monoculture systems.

Also, nutrient levels remain higher on fields that have been rotated. One type of crop takes up the same set of nutrients year after year. In a crop rotation system, different varieties take different nutrients out of the soil, leaving some for the next crop, or in the case of legumes, even adding the nutrient nitrogen.

Take peanuts for example. Peanuts have high calcium needs. Growing only peanuts will require growers to supply additional calcium to the soil each year since last year’s peanuts will have consumed most of the calcium already. Adding corn to the rotation would benefit the soil as corn does not use as much calcium. The residues left by the corn will help to replenish some of the calcium in the soil for future peanut crops.

Rotating crops in a field also helps to reduce the environmental effects on the land. Using fewer chemicals for insect control, disease control and fertilization means less chance for adverse affects such as runoff or drift. In addition, less erosion from increased soil health means less water runoff.

## Putting it all together

Yield can vary depending on the farming method employed. In a crop rotation, one or more rotated plants could actually yield less than in a monoculture system, while the other rotated would in turn yield more. Growers need to decide from which crop they need their highest yield.

For more information on monoculture crop and crop rotation, please consult your [Southern States Agronomy Professional](https://www.southernstates.com/Commercial-Agriculture/southern-states-specialists.aspx) or local extension agency.

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| Benefits of Monoculture | Risks of Monoculture |
|  |  |
| Benefits of Polyculture | Risks of Polyculture |
|  |  |