

Alaskan Farms on the Table

Alaska FFA Association and USDA Northwest Climate Hub

Adapted from USDA Southwest Climate Hub's "Farm on the Table" Lesson Plan created by the Asombro Institute for Science Education

Grade Levels 6-12



Sun Circle Farms, Palmer, Alaska—NRCS

DESCRIPTION

To learn about the challenges associated with agricultural production under climate change conditions in Alaska, students play a game in which they make adaptation management decisions for a farm and evaluate the economic effects.

OBJECTIVES

1. Evaluate the importance of agriculture and agricultural producers in our society.
2. Synthesize the effects climate change can have on agriculture and food sources.
3. Understand and implement climate-related agricultural decisions.

MATERIALS NEEDED

1. Alaskan Farms on the Table handout (1 per student)
2. PowerPoint presentation
3. Dice (1 for every 2-3 students)
4. [Farms on the Table instructional video](#) (optional introduction to the game for the instructor)

BACKGROUND

Climate change will continue to result in increased global temperatures and changes in atmospheric conditions. In Alaska, the last decade was the warmest on record, and 2019 was the warmest year on record. Heavy precipitation and extreme heat events are increasing in frequency, while extreme events like drought and floods are predicted to increase. Extreme events can decrease crop productivity, degrade soil quality, and increase the prevalence of invasive or unwanted species, disease, and pests. Global food security, particularly food security within Alaska, could be severely impacted by reduced crop yields and increased food prices, potentially leading to food shortages.

Throughout Alaska, increased temperatures, precipitation, and flooding are predicted to increase. Adaptation strategies can improve the resiliency of agriculture to climate-related impacts. These strategies can include simple improvements to equipment, such as repairing leaking pipes to eliminate waste, or more involved strategies, including changes in planting practices (e.g., no-till planting).

ACTIVITY

Preparation

1. Watch the [Farms on the Table instructional video](#) for an introduction to the game (this video can also be used to introduce students to the game, though it does differ slightly from the content here, as the video is geared towards the southwest US).
2. Set up a computer and projector and display the PowerPoint presentation.

Procedures

1. Give a short introduction about climate change and agriculture using the PowerPoint presentation.
2. **Slide 1:** We are going to play a game that introduces the effects of climate on agriculture in Alaska and what we can do to help prevent and alleviate these effects.
3. **Slide 2:** Global warming is the increase in Earth's average temperature. Climate change is the long-term change in Earth's climate or the climate of a region. Climate change encompasses global warming because it includes temperature changes, but it also includes other long-term changes in atmospheric conditions, such as precipitation changes. What is the trend of this graph? [Answer: Earth's average surface temperature has been increasing.]
4. **Slide 3:** Many climate change models predict more extreme weather events like floods and drought. In Alaska, researchers predict: increasing temperatures which could lead to sea-ice loss, coastal erosion, permafrost thaw, and increased risk of wildfire, disease, and pest outbreaks.
5. **Slide 4:** How will this affect Alaskan agriculture? Some of the effects could be positive, like a longer-growing season, increased crop production and variety, and more precipitation. Some, however, could be negative: increased pressure from weeds and invasives, increased agricultural pests and diseases, and more extreme weather events like floods, which can cause soil erosion and damage to crops.

Alaskan Farms on the Table Game

1. Pass out a **Farms on the Table** handout to each student.
2. Introduce the game using the PowerPoint presentation.
3. **Slide 5:** In this game, you will play the role of a farmer dealing with the effects of climate change on your farm. You will make decisions about how your farm will be managed on a year-to-year basis with the goal of staying "in the black" (or making money) instead of "being in the red" (or losing money).
 - a. Each farm will start off with an output rating of 100. During the game, if you stay at ≥ 100 you are in the black; if you drop to ≤ 99 you are in the red. The goal of the game is to make choices that will keep you in the black or get you back into the black.
 - b. Look at page 1 of the handout. Choose one of the regions listed in table 1 and circle it. Most students like to choose the region that is closest to their location. This is the location of your new farm.
 - c. The first thing you will do is customize your farm by choosing climate adaptations. You will be able to choose to take as many, or as few, of these actions as you would like on your farm. In this case, an adaptation is something you can do that will help to lessen the impacts of climate change on your farm.
4. **Slide 6:** Option one is **no-till planting**, a type of planting where the seeds are inserted directly into the soil, instead of the traditional planting style of turning over the soil (tilling) before inserting the seeds. This style of planting can be advantageous because it has lower labor equipment and fuel costs. A tractor only has to go over the field once to plant the seeds (versus multiple times with traditional planting, which includes many passes for tilling and then planting). This practice also reduces water runoff from precipitation and irrigation because it slows down water, allowing it to soak into the ground. Thus, no-till decreases the chance of chemical crop treatments contaminating groundwater and streams. This method promotes healthier soil by limiting wind erosion of soil, increasing the organic matter layer in the soil, and limiting soil compaction. The biggest drawbacks to this method are the high upfront equipment costs and that it may require the use of herbicides and fungicides due to higher soil moisture.
5. **Slide 7: hedgerows & windrows** are rows of wild or planted shrubs bordering a road or field. They create a barrier around the field, helping with the effects of wind and water erosion. They create pollinator and predator habitat (for example, birds) which prevents some spread of insect and fungal diseases. The major drawback is that hedgerows

require maintenance and reduce space for planting crops.

6. **Slide 8: water collection and storage** units collect rainfall from roofs or runoff from fields to be used later for irrigation of crops. By collecting this water, a farmer will have a water source available during droughts for irrigation purposes. Installation can be expensive and water storage units can take up a large amount of space. It can take a while to gather water to help mitigate the effects of a serious drought, but once the water is collected, it will be available for use.
7. **Slide 9: monitoring soil moisture** in a field can help a farmer determine the best time to irrigate crops, thus allowing them to eliminate unnecessary watering. The equipment can range from relatively inexpensive to very expensive. The cost of equipment is related to the amount of labor that is needed. Less expensive equipment tends to require more labor.
8. **Slide 10:** many species of bees are declining because of loss of habitat, increased temperatures, changes in growing seasons, and insecticide use. Farmers rely on bees to pollinate their crops, and without them, many crops would not be able to fruit. If **you choose to have beehives and plant flower strips among your crops**, you help to ensure that you have reliable pollination of your crops by bees and other pollinators. A drawback to this action is that you will not be able to use insecticides on your crops due to the harm they inflict on bee colonies.
9. **Slide 11:** take a moment to decide what adaptations you would like to implement on your farm. You may choose as many adaptations as you would like. There is a cost associated with each, but they may save you money in the long term, depending on the weather conditions that year. In table 2 on page 2 of the handout, place a checkmark under each of your selected adaptations, and write the cost of each in the last column of the table. Once you have finished, add up the cost of all the adaptations you have chosen and enter the Total Cost at the bottom of table 2. Then, subtract your Total Cost from 100 to calculate the Starting Output Factor, which will be needed for the next part of the game.
10. **Ask students to turn to page 3 of the handout.** Students will choose their planting practices for Year 1 on this page. Instruct students to transfer their Starting Output Factor calculated on page 2 to the Starting Output Factor blank in the top right corner.
11. **Pass out the dice.** Students can share the die. Pass out the calculators (if using); students can share calculators. Use the PowerPoint presentation to explain how students will set up the first year on their farm.

Year 1:

12. **Slide 12:** In year 1, you will choose at least two of nine planting practices and crop treatments, which we will discuss momentarily. As in real life, the success of your farm will be partially based on chance because you are choosing your options before knowing how the weather will be this year. The weather conditions will be revealed at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black, which means having an Output Factor that is ≥ 100 . Each option has an associated cost, but you may be rewarded for your investment. The impact of each option can be positive or negative, depending on the conditions this year, especially the weather. After the first year, you will then have the option to invest in any of these practices and treatments each year for the six total years that we will play this game.

9 Potential Treatments:

13. **Slide 13:** your first options are **two different crop varieties**. Over many years, farmers and researchers have been able to breed crops that grow more successfully in certain environments. For example, there are different varieties of wheat that grow well in drier or wetter than average conditions and varieties that are immune to insect and fungal diseases. For our game, you have the option to choose between drought-resistant or flood-resistant varieties of crops.
14. **Slide 14: Interplanting** is planting two crops together in a field in alternating rows. By using this method, you can decrease the need for crop treatments, such as pesticides and herbicides. This option also creates less economic risk for you in case there is a crop-fail year. You may have to spend more time planning up front to carry out this practice.

15. **Slide 15: crop rotation** is a planting system where different crops are planted in the same field year after year. This style of planting has been used for centuries because it helps preserve soil nutrients. It will also help control weeds, disease, and other pests. Many pests are plant specific, so by moving the plants to a different field every year, it will reduce the chance that the pest will be able to follow them. You may have to spend more time planning up front to carry out this practice.
16. **Slide 16: spread spacing** is increasing the amount of space between the planted rows of crops. This practice can reduce the need for crop treatments because there is less competition for resources from the plants. There will be a lower crop yield per acre because of fewer rows in a single field.
17. **Slide 17:** most fertilizer contains nitrogen, phosphorus, and potassium. By adding more of these nutrients to what already occurs naturally in the soil, crops will grow larger, faster. **Annual application of fertilizer** has been shown to deplete the natural soil fertility, causing an annual reliance on it. If you choose to do this on your farm, you will have to reapply it every year.
18. **Slide 18: herbicide** sprays destroy unwanted vegetation or weeds (non-crops) in a field. Spraying a field with herbicide can greatly reduce loss from unwanted plants, but the herbicide becomes less effective with continual use. For example, this is a common agricultural weed called pigweed. For many years, the standard way of removing pigweed was to spray it with herbicides. Now, after many years of herbicide treatments, pigweed is resistant to herbicides in some areas, and the only way to remove it from agriculture fields in these areas is by manual removal (typically pulling it out by hand).
19. **Slide 19: insecticide sprays** are designed to stop herbivorous (plant-eating) insects, and they can greatly reduce loss from insect pests, but they will harm natural pollinators and beneficial insects. You should not choose this option if you have beehives and flower strips on your farm. Like herbicides, they will also become less effective with continual use.
20. **Slide 20: fungicide sprays** are designed to destroy unwanted fungal pathogens, and fungicide can reduce the loss from pathogens. Unlike other treatments, you cannot use a wait-and-see approach, because if the fungicide is not applied before infection, it will not be effective.
21. **Give students a few minutes to decide** what practices and/or treatments they would like to use on their farm for year 1 and instruct them to place check marks under at least two options in the table and write the cost of each in the Chosen Costs column of the table. Emphasize that they need to think about their farm and local climate when deciding what strategies would be the most effective under those conditions.
22. Ask students to look at the bottom of page 3 of the handout and use the PowerPoint to explain how to finish with year 1.
23. **Slide 21:** write your Starting Output Factor into the first blank at the bottom of the page. Then calculate the cost of your planting practices and crop treatments, and write the Total Cost at the bottom of the table and in the second blank at the bottom of page 3 of the handout.
24. **Slide 22:** roll the die once for each checked item that you selected. Roll the die and assign the number rolled to the first checked item in the table. Roll the die again and assign that number to the second checked item, and repeat this for all the items you selected.
 - i. You **may not** roll the die and assign that number to whichever checked item you would like, and you **may not** roll the die until you get a number that you like. The purpose of the die is to be random, so that some practices and treatments will affect your farm more positively or negatively than others, that the effect varies year to year, and different farms are affected in different ways. This is like the way it works in the real world.
25. **Slide 23: the weather for year 1 was historically normal.** Record the weather in the blank near the bottom of page 3 of your handout.
 - i. During historically normal weather, some of the practices and treatments that you chose will give you a positive return, and some will give you a negative return. The list on the left is positive investments. The practices on this list were helpful during the weather that we had this year, and they resulted in increased profits. Place a **plus sign** next to the die roll number for the practices and treatments from this list that you chose (and **only** the practices and treatments that you chose).

- ii. The list on the right is negative investments. The practices on this list were not helpful during the weather that we had this year, and they did not result in increased profits to offset their costs. Place a **minus sign** next to the die roll number for the practices and treatments from the list that you chose.
 - iii. When you customized your farm, you may have chosen one or more of the options in table 2 on page 2 of the handout. Turn back to table 2 on page 2 for reference. If you chose any of the farm adaptations listed at the bottom of the slide, your investments paid off this year. The adaptations on this list were helpful during the weather that we experienced. For each adaptation that you chose from this list, you will receive **three Farm Adaptation Bonus points**. **For example**, if you implemented two of the five adaptations that helped mitigate the effects of the weather, you would receive three points for each, for a total bonus of six points.
 - iv. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 3.
26. **Slide 24:** add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Most players will be adding positive and negative numbers; do not just add them all up as if they were all positive. Once you have the total, write it at the bottom of the table and in the Output Change Total blank at the bottom of the page. This number may be negative.
- i. Finally, combine all the blanks to calculate your new Starting Output Factor. Be sure to **pay attention to the sign**.

Year 2:

27. Ask students to turn to page 4 of their handout and **transfer the new Starting Output Factor from Year 1** (calculated on the previous page) into the blank in the top right corner. Continue the game for years 2-6 using the PowerPoint presentation.
28. **Slide 25:** in year 2, you will again choose at least two of the nine practices and treatments. I will reveal the weather conditions at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black. Take a moment to place check marks under at least two options in the table and write the cost of each in the Chosen Costs column of the table.
- i. Write your Starting Output Factor into the first blank at the bottom of page 4 of the handout. Then calculate the cost of your planting practices and crop treatments and write the Total Cost at the bottom of the table and in the second blank at the bottom of the page.
 - ii. Roll the die once for each checked item that you selected. Assign the number rolled to the first checked item in the table and roll it again until you have written a die roll number in the table for every practice and treatment that you selected.
29. **Slide 26: the weather for Year 2 was a drought.** Record the weather in the blank near the bottom of page 4 of your handout.
- i. Look at the list of positive investments, and place a **plus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - ii. Look at the list of negative investments, and place a **minus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - iii. Add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Write it in the Output Change Total space in the table and the blank at the bottom of the page.
 - iv. Look back at the selections that you made when customizing your farm in table 2 on page 2 of the handout; for each adaptation that you chose from the list at the bottom of this slide, you will receive **three Farm Adaptation Bonus points**. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 4.
 - v. Finally, combine all the blanks to calculate your new Starting Output Factor. Be sure to **pay attention to the sign**.
 - vi. Turn to page 5 of the handout and transfer the new Starting Output Factor from Year 2 (calculated on the previous page) into the blank in the top right corner.

Year 3:

30. **Slide 27:** in year 3, you will again choose at least two of the nine practices and treatments. I will reveal the weather conditions at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black. Take a moment to place check marks under at least two

options in the table and write the cost of each in the Chosen Costs column of the table.

- i. Write your Starting Output Factor into the first blank at the bottom of page 5 of the handout. Then calculate the cost of your planting practices and crop treatments and write the Total Cost at the bottom of the table and in the second blank at the bottom of the page.
 - ii. Roll the die once for each checked item that you selected. Assign the number rolled to the first checked item in the table and roll it again until you have written a die roll number in the table for every practice and treatment that you selected.
31. **Slide 28:** the weather for **Year 3 was a heat wave**. Record the weather in the blank near the bottom of page 5 of your handout.
 - i. Look at the list of positive investments, and place a **plus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - ii. Look at the list of negative investments, and place a **minus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - iii. Add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Write it in the Output Change Total space in the table and the blank at the bottom of the page.
 - iv. Look back at the selections that you made when customizing your farm in table 2 on page 2 of the handout; for each adaptation that you chose from the list at the bottom of this slide, you will receive **three Farm Adaptation Bonus points**. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 5.
32. **SUBSIDY YEARS** – There are two years in which students will receive a government Subsidy Bonus if they have implemented certain practices, **year 3 and year 6**. Use the PowerPoint presentation to explain the Subsidy Bonus for this year.
33. **Slide 29:** this year, the government issued a subsidy for agricultural producers who installed beehives on their farms. A subsidy is a cash rebate or tax reduction given by the government to incentivize an action or help an economic sector. As mentioned earlier, many bee species populations are in decline. Pollination of crops by bees has been estimated to be worth \$14 billion per year, and without them, many of our favorite foods would not exist. Look at the list on the right side of the slide. Does it include any foods that you like to eat?
 - i. If you chose to invest in beehives and flower strips at the beginning of the game, you will receive 10 Subsidy Bonus points for doing so. If you did, write a 10 in the Subsidy Bonus blank at the bottom of page 5 of the handout, if you did not, write a 0 in that blank.
 - ii. Combine all the blanks to calculate your new Starting Output Factor. Be sure to **pay attention to the sign**.
 - iii. Turn to page 6 of the handout and transfer the new Starting Output Factor from Year 3 (calculated on the previous page) into the blank in the top right corner.

Year 4:

34. **Slide 30:** in year 4, you will again choose at least two of the nine practices and treatments. I will reveal the weather conditions at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black. Take a moment to place check marks under at least two options in the table and write the cost of each in the Chosen Costs column of the table.
 - i. Write your Starting Output Factor into the first blank at the bottom of page 6 of the handout. Then calculate the cost of your planting practices and crop treatments and write the Total Cost at the bottom of the table and in the second blank at the bottom of the page.
 - ii. Roll the die once for each checked item that you selected. Assign the number rolled to the first checked item in the table and roll it again until you have written a die roll number in the table for every practice and treatment that you selected.
35. **Slide 31:** the weather for **Year 4 was windy**. Record the weather in the blank near the bottom of page 6 of your handout.
 - i. Look at the list of positive investments, and place a **plus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - ii. Look at the list of negative investments, and place a **minus sign** next to the die roll number for the practices and treatments from this list that you chose.

- iii. Add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Write it in the Output Change Total space in the table and the blank at the bottom of the page.
- iv. Look back at the selections that you made when customizing your farm in table 2 on page 2 of the handout; for each adaptation that you chose from the list at the bottom of this slide, you will receive **three Farm Adaptation Bonus points**. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 6.
- v. Finally, combine all the blanks to calculate your new Starting Output Factor. Be sure to **pay attention to the sign**.
- vi. Turn to page 7 of the handout and transfer the new Starting Output Factor from Year 4 (calculated on the previous page) into the blank in the top right corner.

Year 5:

- 36. **Slide 32:** in year 5, you will again choose at least two of the nine practices and treatments. I will reveal the weather conditions at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black. Take a moment to place check marks under at least two options in the table, and write the cost of each in the Chosen Costs column of the table.
 - i. Write your Starting Output Factor into the first blank at the bottom of page 7 of the handout. Then calculate the cost of your planting practices and crop treatments and write the Total Cost at the bottom of the table and in the second blank at the bottom of the page.
 - ii. Roll the die once for each checked item that you selected. Assign the number rolled to the first checked item in the table, and roll it again until you have written a die roll number in the table for every practice and treatment that you selected.
- 37. **Slide 33:** the weather for **Year 5 included increased precipitation**. Record the weather in the blank near the bottom of page 7 of your handout.
 - i. Look at the list of positive investments, and place a **plus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - ii. Look at the list of negative investments, and place a **minus sign** next to the die roll number for the practices and treatments from this list that you chose.
 - iii. Add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Write it in the Output Change Total space in the table and the blank at the bottom of the page.
 - iv. Look back at the selections that you made when customizing your farm in table 2 on page 2 of the handout; for each adaptation that you chose from the list at the bottom of this slide, you will receive **three Farm Adaptation Bonus points**. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 7.
 - v. Finally, combine all the blanks to calculate your new Starting Output Factor. Be sure to **pay attention to the sign**.
 - vi. Turn to page 8 of the handout and transfer the new Starting Output Factor from Year 5 (calculated on the previous page) into the blank in the top right corner.

Year 6:

- 38. **Slide 34:** in year 6, our final year, you will again choose at least two of the nine practices and treatments. I will reveal the weather conditions at the end of the year, and the success of your choices will be dependent on the conditions that you experienced. Remember, you are trying to stay in the black. Take a moment to place check marks under at least two options in the table and write the cost of each in the Chosen Costs column of the table.
 - i. Write your Starting Output Factor into the first blank at the bottom of page 8 of the handout. Then calculate the cost of your planting practices and crop treatments and write the Total Cost at the bottom of the table and in the second blank at the bottom of the page.
 - ii. Roll the die once for each checked item that you selected. Assign the number rolled to the first checked item in the table and roll it again until you have written a die roll number in the table for every practice and treatment that you selected.
- 39. **Slide 35:** the weather for **Year 6 was another heat wave**. Record the weather in the blank near the bottom of page 8 of your handout.
 - i. Look at the list of positive investments, and place a **plus sign** next to the die roll number for the practices and

treatments from this list that you chose.

ii. Look at the list of negative investments, and place a **minus sign** next to the die roll number for the practices and treatments from this list that you chose.

iii. Add up all the positive and negative investments to calculate the Output Change Total. Be sure to **pay attention to the sign**. Write it in the Output Change Total space in the table and the blank at the bottom of the page.

iv. Look back at the selections that you made when customizing your farm in table 2 on page 2 of the handout; for each adaptation that you chose from the list at the bottom of this slide, you will receive **three Farm Adaptation Bonus points**. Add up how many Farm Adaptation Bonus points you received and write that number in the appropriate blank at the bottom of page 8.

40. **Slide 36:** the government issued **another subsidy this year; this time, it is for water conservation**. Water conservation involves using only the water needed for crops. Due to the more prolonged and intense droughts resulting from climate change, smart water usage by agriculture has become imperative.

i. If you invested in soil moisture monitoring you will receive a 5-point Subsidy Bonus. If you invested in water collection and storage you will receive a 10-point Subsidy Bonus. If you invested in both, you receive a 15-point Subsidy Bonus.

ii. Combine all the blanks to calculate your final output factor. Be sure to **pay attention to the sign**.

Results and Conclusions

Instruct students to turn to the results and conclusions questions on page 9 of the handout. Answer the questions together if possible.

1. How many years were you able to keep your farm in the black? Did you end the game in the red or in the black?

(When answering question 1, remember that for this game, being in the black is having a final output factor of 100 or more, and being in the red is having an output factor of less than 100.)

2. Were there certain practices or treatments that seemed to be a positive investment more than others? Were there certain practices or treatments that seemed to be a negative investment more than others? Why do you think that is the case?

(For question 2, think back to the positive investments at the end of each year. Were there any practices or treatments that seemed to result in a positive investment more than others?)

[Answer: interplanting and crop rotation were a positive investment every year.]

[Answer: flood resistant crop varieties and fungicide resulted in a negative investment most often.]

[Answer: interplanting and crop rotation promote soil health and overall plant health by protecting them from pathogens without causing additional harm to the environment.]

3. In question 3, think critically about how you would play the game differently if you were to play it again. What are some of your ideas?

EXTENSIONS

1. Add more years to the game. Make additional copies of pages 3-8 of the handout. If you would like to include student input, ask students to help decide several years of weather conditions and which treatments and practices would be positive or negative, given the weather. Then choose which of their conditions to implement, adding more slides to the PowerPoint presentation if possible.
2. Add a catastrophic event, such as a wildfire, flood, or earthquake, into one of the rounds. Decide if any of the crops could have survived the natural disaster. If not, all practices and treatments chosen by students would be negative investments. If some crops did survive, decide which practices and treatments, if any, could have helped with their survival, such as flood resistant crops being planted in an area that received a flood. List any practices and treatments that could have helped with survival as positive investments.