UNIT 2

ENGLISH: TRANSFORMATIONS IN TRADITIONAL MEALS

LESSON DESCRIPTION

This lesson will allow the students to learn about their family's traditional foods and the effects of climate change on food. These can apply the skills of oral communication, comprehension and comparison.

Fuente: Aproximando Ciência e Pessoas on VisualHunt / CC BY

APPLICATION OF THE LESSON PLAN

The lesson plan corresponds to Unit 1.2 of English. The lesson plan can be used after the discussion of the topics: family, heritage and community.

STANDARDS AND INDICATORS

- Speaking: Responds to conversations, readings aloud, texts and oral presentations using a large number of general academic words and specific content, and relies less on physical actions or other forms of non-verbal communication. (1.S.3)
- Reading: Identify the central topic and specific details in informational texts that are read aloud. (1. R.2I)

LEARNING OBJECTIVES

- Remember the phenomenon of drought as an effect of climate change.
- Identify the traditional foods of families and / or communities.
- Illustrate changes in the availability of crops that are used in traditional meals of families and / or communities.

TIMING

Day 1

Start (15 minutes)	**Development** (40 minutes)	**Closing** (5 minutes)

Day 2

Start (5 minutes)	**Development** (40 minutes)	**Closing** (15 minutes)

MATERIALS

- Photocopy of homework sheet (for each student)
- Photocopy of worksheet (for each student)
- Board
- Chalk or whiteboard marker

VOCABULARY

- Drought: is a period of drier-than-normal conditions that results in water-related problems.
- Food insecurity: climate change affects crop quality and quantity, and increases the price of food. Under these condition people with lower income have less access to meet their nutritional requirements.

CLASS GUIDE

BEFORE THE LESSON

- The teacher will hand out a homework sheet to each student and explain the instructions (see Appendix 2).

  Instructions of the task:

  1. Each student will interview a relative or adult neighbor (preferably a grandparent or neighbor over 55).
  2. For the interview, the student will use the task sheet as a guide.
  3. On the task sheet they will write:
     - Relationship with the person interviewed (example: grandfather, neighbor)
     - Name of the town and community where the person interviewed was raised
     - Traditional food of the community of the person interviewed
     - Name of the main ingredients of the traditional food (example: banana, heart, etc.)
     - Identify the ingredients that were grown, fished, raised or that were obtained in grocery stores in the community of the person interviewed (in the period of childhood or early adulthood)
     - Identify which of the ingredients are not currently grown, fished, raised or obtained in the community
     - Draw a picture or get an image of the product that is not grown or obtained in the community
     - The person interviewed will express a reason why the product is not currently grown or obtained in the community

DAY 1: START

- Timing: 15 min
- The teacher conducts a conversation with the students. (Consult Appendix 1):

  Conversation guide:

  1. The teacher will explore with the students how the 2015 drought event affected their communities.
  2. The teacher will explain what a drought event in relation to climate change is.
  3. The teacher will explain the effects of the drought on agriculture and the food security of people in Puerto Rico.
  4. The teacher will establish a transition for instructional activity.

DAY 1: DEVELOPMENT
Instructional Activity
Oral report: 40 min • Each student will make a presentation about the findings in their interview. • As the presentations are made, the teacher will make a table with two columns: in a column the teacher will identify the names of fruits, plants or Puerto Rican foods (not from another country, imported) that are not currently cultivated, fished or raised, or are obtained in the grocery stores of the community where the person interviewed comes from. In the second column the teacher will identify the frequency in which a fruit, plant or food is mentioned.
DÍA 1: CLOSING
• Timing: 5 min • The teacher and the students will offer a summary about what was learned in the lesson.
DÍA 2: START
• Timing: 5 min • The teacher will review what was learned and done in the lesson on day 1.
DÍA 2: DEVELOPMENT
Instructional Activity

Application work: 40 min
• Before beginning the lesson, the teacher must draw on the board the table developed on day 1.
  • The teacher will give each student a worksheet (see Appendix 3).
  • The teacher will read the instructions. He/She will build the base of the pictorial graphic and will model an example to initiate the development of this.
  • Each student will complete the worksheet individually.

DÍA 2: CLOSING
• Timing: 15 min • Once the students finish the worksheet, the teacher and the students will discuss it. The teacher will encourage the students to make a comparison between the results of the pictorial chart and the topics discussed in the discussion at the beginning of the lesson on day 1. • The teacher and the students will offer a summary of what was learned in the lesson. • The teacher will clarify the doubts of the students.

ATTACHMENTS

Attachment 1. Educational resource for the teacher

Source: https://www3.epa.gov/climatechange/impacts/agriculture.html

Secure | https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply_.html

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Climate Impacts on Agriculture and Food Supply

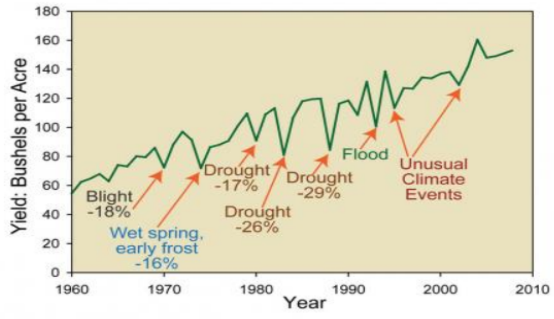
On This Page:

Overview

Agriculture is an important sector of the U.S. economy. The crops, livestock, and seafood produced in the United States contribute more than $300 billion to the economy each year.[1] When food-service and other agriculture-related industries are included, the agricultural and food sectors contribute more than $750 billion to the gross domestic product.[2]

Agriculture and fisheries are highly dependent on the climate. Increases in temperature and carbon dioxide (CO_2) can increase some crop yields in some places. But to realize these benefits, nutrient levels, soil moisture, water availability, and other conditions must also be met. Changes in the frequency and severity of droughts and floods could pose challenges for farmers and ranchers and threaten food safety.[3] Meanwhile, warmer water temperatures are likely to cause the habitat ranges of many fish and shellfish species to shift, which could disrupt ecosystems. Overall, climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places as we have done in the past. The effects of climate change also need to be considered along with other evolving factors that affect agricultural production, such as changes in farming practices and technology.

Impacts on Crops



Despite technological improvements that increase corn yields, extreme weather events have caused significant yield reductions in some years. Source: USGCRP (2009)

Click the image to view a larger version.

Crops grown in the United States are critical for the food supply here and around the world. U.S. farms supply nearly 25% of all grains (such as wheat, corn, and rice) on the global market.[4] Changes in temperature, atmospheric carbon dioxide (CO_2), and the frequency and intensity of extreme weather could have significant impacts on crop yields.

For any particular crop, the effect of increased temperature will depend on the crop's optimal temperature for growth and reproduction.[1] In some areas, warming may benefit the types of crops that are typically planted there, or allow farmers to shift to crops that are currently grown in warmer areas. Conversely, if the higher temperature exceeds a crop's optimum temperature, yields will decline.

- Higher CO_2 levels can affect crop yields. Some laboratory experiments suggest that elevated CO_2 levels can increase plant growth. However, other factors, such as changing temperatures, ozone, and water and nutrient constraints, may counteract these potential increases in yield. For example, if temperature exceeds a crop's optimal level, if sufficient water and nutrients are not available, yield increases may be reduced or reversed. Elevated CO_2 has been associated with reduced protein and nitrogen content in alfalfa and soybean plants, resulting in a loss of quality. Reduced grain and forage quality can reduce the ability of pasture and rangeland to support grazing livestock.[1]
- More extreme temperature and precipitation can prevent crops from growing. Extreme events, especially floods and droughts, can harm crops and reduce yields. For example, in 2010 and 2012, high nighttime temperatures affected corn yields across the U.S. Corn Belt, and premature budding due to a warm winter caused $220 million in losses of Michigan cherries in 2012.[1]
- Dealing with drought could become a challenge in areas where rising summer temperatures cause soils to become drier. Although increased irrigation might be possible in some places, in other places water supplies may also be reduced, leaving less water available for irrigation when more is needed.
- Many weeds, pests, and fungi thrive under warmer temperatures, wetter climates, and increased CO_2 levels. Currently, U.S. farmers spend more than $11 billion per year to fight weeds, which compete with crops for light, water, and nutrients.[1] The ranges and distribution of weeds and pests are likely to increase with climate change. This could cause new problems for farmers' crops previously unexposed to these species.
- Though rising CO_2 can stimulate plant growth, it also reduces the nutritional value of most food crops. Rising levels of atmospheric carbon dioxide reduce the concentrations of protein and essential minerals in most plant species, including wheat, soybeans, and rice. This direct effect of rising CO_2 on the nutritional value of crops represents a potential threat to human health. Human health is also threatened by increased pesticide use due to increased pest pressures and reductions in the efficacy of pesticides.[3]

Related Links

EPA
- National Agriculture Center
- Student's Guide to Climate Change: Agriculture

Other:
- National Climate Assessment: Agriculture
- USDA: Agriculture and Climate Change
- IPCC: Fifth Assessment Report - Food Security and Food Production Systems

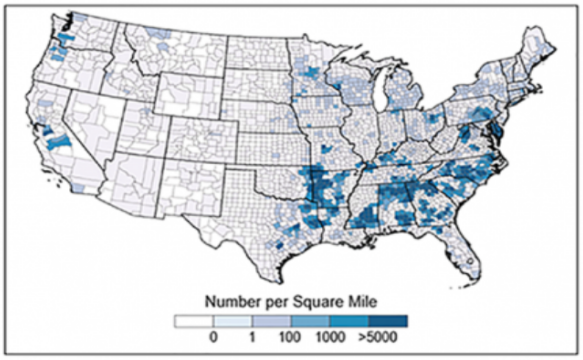
Impacts on Livestock

Americans consume more than 36 million metric tons of meat and poultry annually.[4] Livestock and poultry account for over half of U.S. agricultural cash receipts, often over $100 billion per year.[5] Changes in climate could affect animals both directly and indirectly.

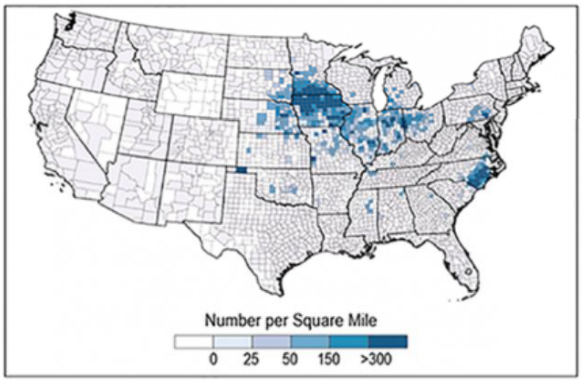
- Heat waves, which are projected to increase under climate change, could directly threaten livestock. In 2011, exposure to high temperature events caused over $1 billion in heat-related losses to agricultural producers.[1] Heat stress affects animals both directly and indirectly. Over time, heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production.
- Drought may threaten pasture and feed supplies. Drought reduces the amount of quality forage available to grazing livestock. Some areas could experience longer, more intense droughts, resulting from higher summer temperatures and reduced precipitation. For animals that rely on grain, changes in crop production due to drought could also become a problem.
- Climate change may increase the prevalence of parasites and diseases that affect livestock. The earlier onset of spring and warmer winters could allow some parasites and pathogens to survive more easily. In areas with increased rainfall, moisture-reliant pathogens could thrive.[6]
- Potential changes in veterinary practices, including an increase in the use of parasiticides and other animal health

Locations of Livestock

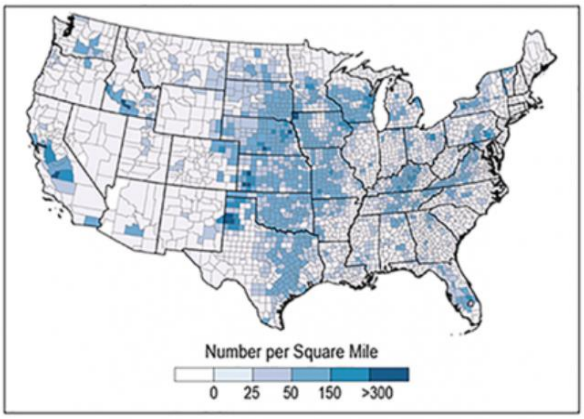
Number of Broilers and Other Meat-Type Chickens per Square Mile, 2012



Number of Hogs and Pigs per Square Mile, 2012



Number of Cattle and Calves per Square Mile, 2012



treatments, are likely to be adopted to maintain livestock health in response to climate-induced changes in pests, parasites, and microbes. This could increase the risk of pesticides entering the food chain or lead to evolution of pesticide resistance, with subsequent implications for the safety, distribution, and consumption of livestock and aquaculture products. [3]

Livestock locations in the continental United States. Source: USGCRP (2016)

Click the image to view a larger version.

- Increases in carbon dioxide (CO_2) may increase the productivity of pastures, but may also decrease their quality. Increases in atmospheric CO_2 can increase the productivity of plants on which livestock feed. However, the quality of some of the forage found in pasturelands decreases with higher CO_2. As a result, cattle would need to eat more to get the same nutritional benefits.

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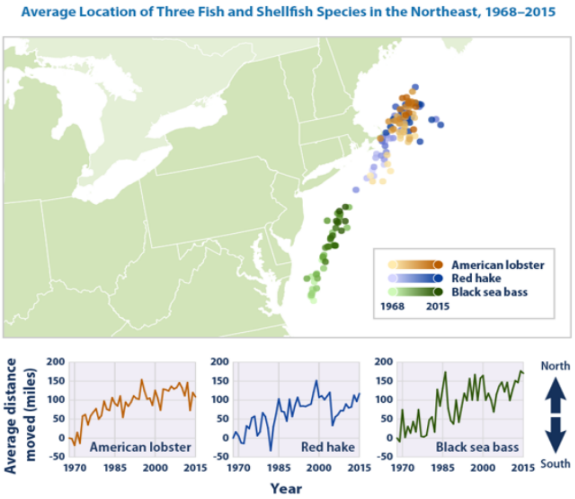
Impacts on Fisheries

American fishermen catch or harvest five million metric tons of fish and shellfish each year.[7] U.S. fisheries contribute more than $1.55 billion to the economy annually (as of 2012).[8] Many fisheries already face multiple stresses, including overfishing and water pollution. Climate change may worsen these stresses. In particular, temperature changes could lead to significant impacts.

The ranges of many fish and shellfish species may change. In waters off the northeastern United States, several economically important species have shifted northward since the late 1960s. The three species shown in [the figure to the left] (American lobster, red hake, and black sea bass) have moved northward by an average of 119 miles. [9]



This map shows the annual centers of biomass for three species in the northeastern United States from 1968 to 2015. Dots are shaded from light to dark to show change over time. Source: US EPA (2016). *Climate Change Indicators in the United States: Marine Species Distribution*. Data Source: NOAA (2016). OceanAdapt.

- Many aquatic species can find colder areas of streams and lakes or move north along the coast or in the ocean. Nevertheless, moving into new areas may put these species into competition with other species over food and other resources, as explained on the Ecosystems Impacts page.
- Some marine disease outbreaks have been

linked with changing climate. Higher water temperatures and higher estuarine salinities have enabled an oyster parasite to spread farther north along the Atlantic coast. Winter warming in the Arctic is contributing to salmon diseases in the Bering Sea and a resulting reduction in the Yukon Chinook Salmon, Finally, warmer temperatures have caused disease outbreaks in coral, eelgrass, and abalone.[3],[10]

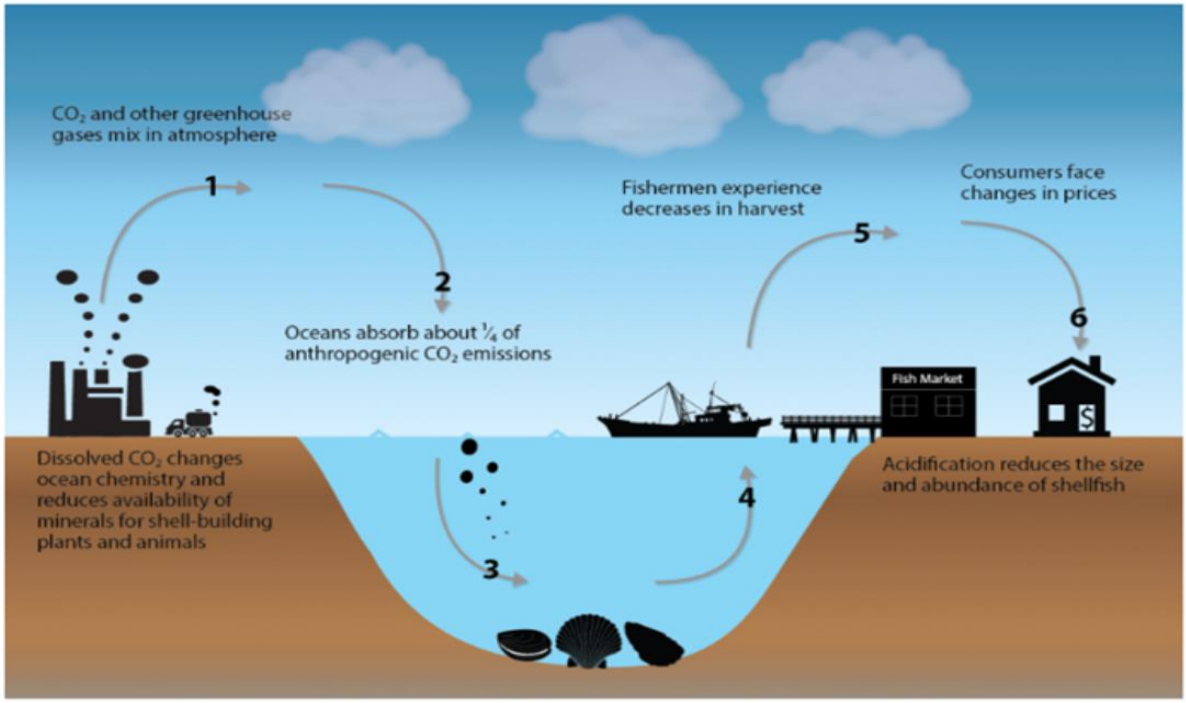
EXIT

Click the image to view a larger version.

- Changes in temperature and seasons can affect the timing of reproduction and migration. Many steps within an aquatic animal's lifecycle are controlled by temperature and the changing of the seasons. For example, in the Northwest warmer water temperatures may affect the lifecycle of salmon and increase the likelihood of disease. Combined with other climate impacts, these effects are projected to lead to large declines in salmon populations.[1],[11],[12]

In addition to warming, the world's oceans are gradually becoming more acidic due to increases in atmospheric carbon dioxide (CO_2). Increasing acidity could harm shellfish by weakening their shells, which are created by removing calcium from seawater. [10] Acidification also threatens the structures of sensitive ecosystems upon which some fish and shellfish rely. [1],[13]

Figure 1. Ocean Acidification Impact Pathway for Shellfish



This diagram shows the impact pathway of carbon dioxide emissions on the shellfish market. Carbon dioxide is absorbed by oceans, resulting in ocean acidification. Acidification reduces the size and abundance of shellfish, which in turn leads to decreased harvest and eventually to changes in prices for consumers. Source: US EPA (2015). *Climate Change in the United States: Benefits of Global Action*

International Impacts

Climate change is very likely to affect food security at the global, regional, and local level. Climate change can disrupt food availability, reduce access to food, and affect food quality.[14] For example, projected increases in temperatures, changes in precipitation patterns, changes in extreme weather events, and reductions in water availability may all result in reduced agricultural productivity. Increases in the frequency and severity extreme weather events can also interrupt food delivery, and resulting spikes in food prices after extreme events are expected to be more frequent in the future. Increasing temperatures can contribute to spoilage and contamination.

Internationally, these effects of climate change on agriculture and food supply are likely to be similar to those seen in the United States. However, other stressors such as population growth may magnify the effects of climate change on food security. In developing countries, adaptation options like changes in crop-management or ranching practices, or improvements to irrigation are more limited than in the United States and other industrialized nations.

Any climate-related disturbance to food distribution and transport, internationally or domestically, may have significant impacts not only on safety and quality but also on food access. For example, the food transportation system in the United States frequently moves large volumes of grain by water. In the case of an extreme weather event affecting a waterway, there are few, if any, alternate pathways for transport. High temperatures and a shortage of rain in the summer of 2012 led to one of the most severe summer droughts the nation has seen and posed serious impacts to the Mississippi River watershed, a major transcontinental shipping route for Midwestern agriculture. This drought resulted in significant food and economic losses due to reductions in barge traffic, the volume of goods carried, and the number of Americans employed by the tugboat industry. The 2012 drought was immediately followed by flooding throughout the Mississippi in the spring of 2013, which also resulted in disruptions of barge traffic and food transport.[3] Transportation changes such as these reduce the ability of farmers to export their grains to international markets, and can affect global food prices.

Impacts to the global food supply concern the United States because food shortages can cause humanitarian crises and national security concerns. They also can increase domestic food prices.

Additional sources of information:

- Impact of climate change on tropical islands: https://www3.epa.gov/climatechange/impacts/islands.html
- Climate risk in the Caribbean: http://www.climatehubs.oce.usda.gov/sites/default/files/CaribbeanFactSheet.pdf
- Climate change and agriculture in the Americas: http://blogs.usda.gov/2016/05/06/climate-change-and-agriculture-in-the-americas/
- Climate change and food security: https://www.wfp.org/climate-change/climate-impacts
- Drought in Puerto Rico: http://pr.water.usgs.gov/drought/drought_conditions.html
- Climate change and drought in Puerto Rico: http://caribbeanclimatehub.org/resources-and-tols-2nd-draft/
- Forgotten fruits of Puerto Rico: http://edicionesdigitales.info/frutasolvidadas/frutasolvidadas.pdf
- Contribution of the cultivation of coffee in shadow to the conservation of biodiversity: http://www.metro.pr/noticias/mostraran-efectos-de-la-sequia-en-el-cultivo-del-cafe/pGXojl!JjYrG3FKFHWWQ/

Attachment 2. Worksheet

Traditional meals

Name: _____ Date:_____

Fill the blanks with the information provided in the interview.

1. I interviewed my _____.

2. When my _____ was little, she/he lived in _____.
   (person interviewed) (name of the county and the community)

3. The traditional meal in _____ was _____.
   (name of the community) (name of the meal)

4. _____ is made
   (name of the meal)
   with_____.
   (meal's key ingredients)

5. The ingredients that could be found in the community were

   _____.

6. The ingredients that can't be found in the community in these days are

   _____.

7. Draw or paste a picture of one of the ingredients that cannot be found in the community.

8. _____ thinks that _____ can't be found in the
   (name of the person) (name of the ingredient)

   community because_____.

Attachment 3. Worksheet

Traditional meals

Name: _____ Date:_____

Draw a pictorial graph using the results of the table discuss in class.

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