NURTURE NATURE CENTER
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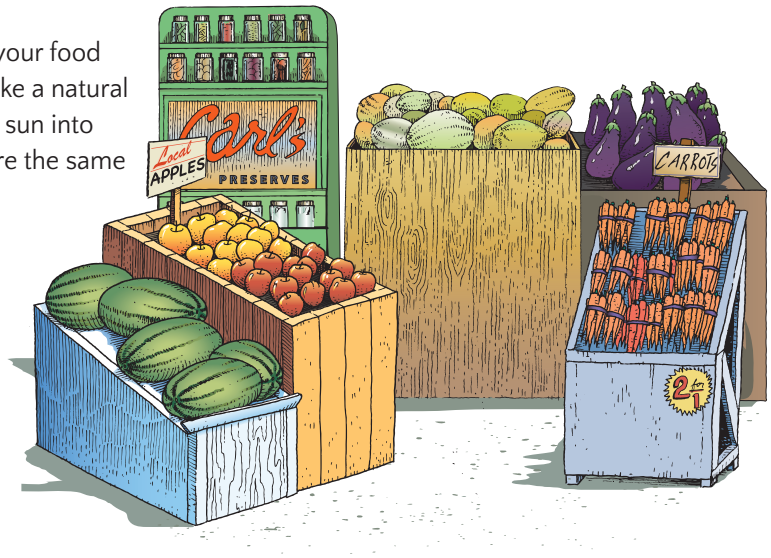
Food Reimagined

The remarkable system of food production



Beyond the grocery store or restaurant, do you know where your food comes from and how it is grown? The agricultural system is like a natural food web. Both depend on plants to convert energy from the sun into chemical energy that can be used by living things. Both require the same inputs of sunlight, air, water, space, and nutrients.

Humans began growing plants about 10,000 years ago in ancient Mesopotamia. In the 20th century, technologies like tractors, dams and irrigation projects, hybrid crops, and artificial fertilizers allowed people to make far more food on each acre of farmland than ever before. Today we feed our growing population with farms that use the latest technologies like global positioning system, herbicides, automation, genetically modified organisms, center pivot irrigation, and pesticides. Food is trucked across a continent or shipped or flown halfway around the world. There are massive storage silos and huge refrigeration systems. There are also farmers who grow organically and keep pesticides and herbicides out of their fields in order to reduce the environmental impact.

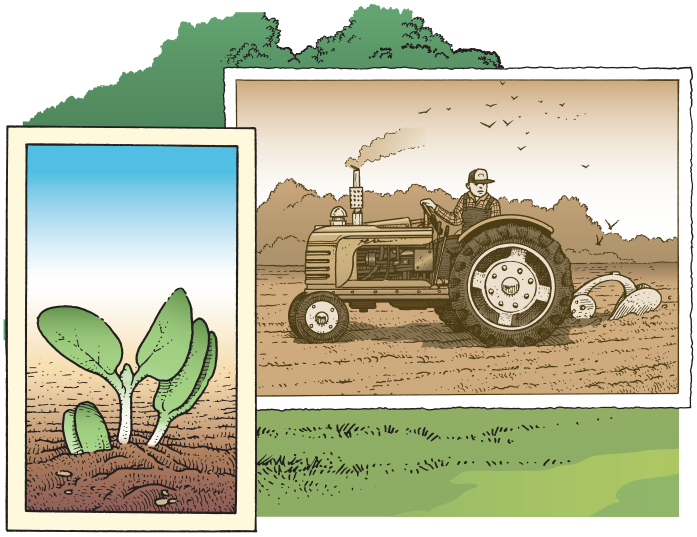
The modern, conventional agricultural system leaves a significant impact - fertilizers, herbicides and pesticides pollute the environment, large scale irrigation pumps aquifers dry, overfishing leads to the collapse of many species, and large amounts of land are used for farming. Humans directly or indirectly use 40% of the surface of the Earth for agricultural purposes. Almost half of the productive capacity of the planet is being consumed by one species, the other approximately 8.7 million species use the rest.

As the human population has grown, the scale of the agricultural system has grown with it. There are over 7 billion people on Earth today and the population is still growing with a baby born every 7 seconds. How can we feed more people without increasing our harm to the rest of the planet? Here are a few ways.

Increase yields.
More food per acre of land means less total land under production if we can increase yields faster than our population grows. Less agricultural land means more land for natural food webs. We can increase yields in a lot of ways. One way might be to make new hybrid crops or GMO crops that are more productive and more resistant to harsher climates than current varieties.

Organic farming.
Industrial farming requires significant inputs. It's the use of these inputs like fertilizers, pesticides, and herbicides that damages the environment. There are alternative techniques that don't rely on these inputs. Organic farmers generally try to mimic the food web. As much as possible they use inputs that can be found on the farm like animal manure for fertilizer or naturally found sulfur for a pesticide.

This project was funded through a Pennsylvania Department of Environmental Protection Environmental Education grant (EE#:16-186).



Eat less intensive foods.
It takes about 36 square feet to raise a pound of beef. If we eat less meats and dairy, and more of a plant based diet there will be less demand for land. 10lbs of grain equals 10lbs of food when given directly to a person but turns into about 1lb of food in the form of meat products and dairy after being fed to an animal. In theory, a population of just meat eaters would need 10 times as much land to sustain them as a population of just plant eaters. A population of omnivores that eat mostly plants would require the least amount of land.

Waste less of the food we produce.
Around the world people waste about a third of the food that is produced. In the United States up to 40% of food is wasted. Sometimes the food is never harvested and simply rots in the fields. Sometimes it is thrown away because it has a strange shape or color at the grocery store. Sometimes it is wasted in homes because we cooked too much or didn't eat the food before its use by date. If less food is wasted, less would need to be produced, reducing the scale and impact of the agricultural system. You can waste less by being less picky about what your fruits and vegetables look like. Misshapen fruits and veggies taste just like normal ones. You can also help reduce waste by choosing smaller portions.

Garden and eat local.
Growing your own food can be a rewarding experience. In addition to the health benefits of a little hard work in the fresh air and sunshine, you can also help the environment. Gardens produce fresh, tasty food without the need to transport it around the country or refrigeration. Gardens also make yards friendlier to the environment as birds and insects pollinate flowers.

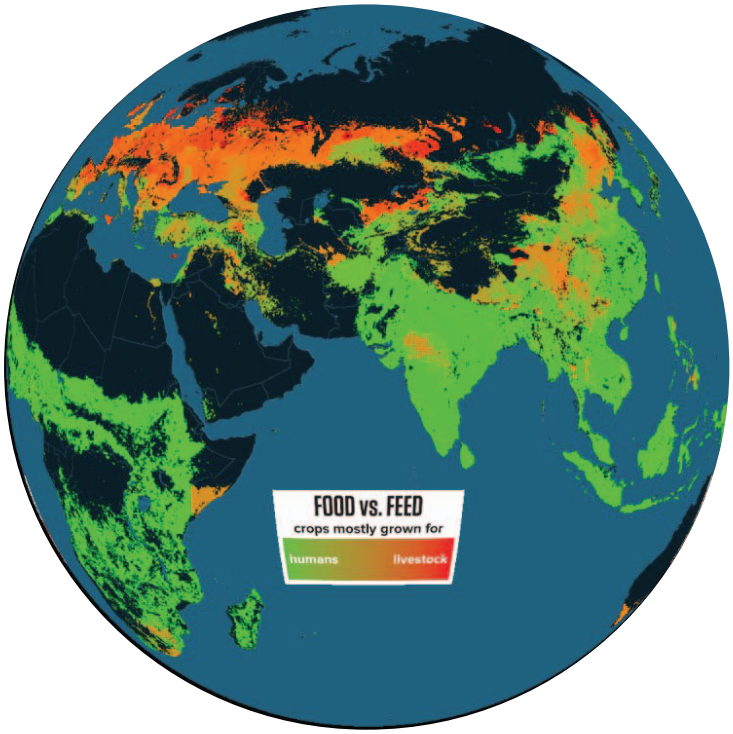


Image credit: Science Museum of Minnesota,
University of Minnesota/Institute on the Environment/Global Landscapes Initiative

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Name:_____

How we get our food ranges from simple (backyard garden) to complex (grown and flown in from other countries) but to many people it just comes from a grocery store or restaurant. It is important to understand the food production system and how food gets on your dinner plate because producing food creates a large and significant impact on the environment and because the world requires more and more food to feed a growing human population.

1) What five things do plants need to grow?

a) _____ c) _____ e) _____

b) _____ d) _____

2) What takes more land to produce one pound of food – meat or plants?_____

3) Which of the following modern technologies is not used to grow food at a large scale?

a. Global Positioning Systems

b. Horses to pull plows

c. Pesticides and herbicides

d. Center pivot irrigation

4) What causes food waste (check all that apply).

___Misshapen or ugly fruits and vegetables don't get sold

___Too much food is cooked or portions are too large

___Restaurants offer specials

___People shop at farmer's markets

___Crops are left in the field to rot because they could not be harvested

5) In what ways can you reduce food waste in your home, school, or community? _____

_____

6) What foods do you regularly eat that are grown locally? _____

_____

7) What foods do you regularly eat that are shipped or flown to you from far away? _____

_____

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8) Which of the following statements best describe growing a garden?

a) Food grown in a garden is fresher and tastier than in the grocery store

b) Growing a garden benefits the local environment by providing food for pollinators.

c) Growing a garden reduces your environmental impact by reducing the amount of food needing to be transported from far away.

d) All of the above.

9) What kinds of food do you or would you like to grow in your own garden? _____

_____

_____

To feed more people while minimizing environmental impact, here are five potential changes: increase yield, organic farming, eat more plant-based diet, waste less food, and garden/eat locally grown food.

10) Match these five changes to the descriptions below.

This change allows us to use less land for farming by making a dietary change _____

This change focuses on practicing lower impact farming techniques _____

This change allows us to use less land for farming by growing more food on the land we already use _____

This change encourages us to make our own decisions about how and where our food is grown _____

This change allows us to use less land for farming by ensuring we use what we have already grown _____