# How Sustainable is the United States’ Food System?

*The United States is the world’s leading producer of commodity crops and processed foods. Thanks largely to this abundant production, the average American family is able to spend less than 10% of their income on food – a fact that contributes considerably to American’s affluence. However, concerns are growing that America’s food system is too dependent on fossil fuels and has perilous hidden costs.*

*“King Corn” and “Big River” are informative, yet entertaining documentaries that explore these issues. The 90-minute“King Corn” should be watched first in its entirety; viewing can be broken up into two or three segments. “Big River” is a 30-minute sequel. The following questions can guide your exploration.*

**“King Corn”**

1. The carbon in Ian and Curt’s hair is from corn. How did it get there? Trace the pathways through the principles foods in their diet.

Corn is fed to cattle and other livestock; the carbon in corn thus makes its way into animal products such as meat and milk. Corn is also a “feedstock” for industrial production of high fructose corn syrup, corn starch, and many other ingredients used in the production of processed foods.

1. Describe how farming has changed since the days of Curt and Ian’s grandparents.

Farming has become more mechanized (and costly). Farms have gotten much larger. Fewer people are farming.

1. Corn yields more than quadrupled since the days of Curt and Ian’s grandparents. Why? Describe at least two developments that account for this.

Corn is now fertilized with anhydrous ammonia, supplying nitrogen that boosts yields. More seeds are now planted per acre. Chemical pesticides reduce the effects of herbivores and competitors. Irrigation also reduces the effects of droughts.

1. Michael Pollan describes modern corn as “an urban creature”. What does he mean by this and how does it affect farming practices?

Through breeding, corn now tolerates more crowding without reducing yields.

1. What is crop rotation? How did this practice benefit the soil? How and why has corn farming strayed away from it?

Crop rotation involves planting a different crop in a given field each growing season. This reduces pest populations and can improve soil fertility (e.g. legumes adding nitrogen). Largely because of subsidies and other policies that promote corn production, many farmers have eliminated rotations in order to maximize short-term economic gains.

1. Curt and Ian grew a “Liberty Link” variety of corn that was tolerant of glyphosate herbicide. In what sense has Liberty Link technology helped to make this corn production system more sustainable? How does this compare with sustainability of organic farming practices?

Liberty Link enables no-till agriculture, which promotes sustainability by reducing soil erosion. Unlike organic farming, however, it does very little to promote soil-building.

*Note: Because these documentaries do not address organic farming specifically, instructors should encourage students unfamiliar with organic farming to consult other accessible resources (such as Wikipedia) for an overview of how it promotes sustainability.*

1. Where does corn go after harvest? Map out the pathways.

Most of the corn grown in the U.S. is fed to livestock, used for production of ethanol, or processed to produce food ingredients. From the field, corn goes to grain elevators, is loaded on to railway cars, and brought to centralized processing facilities.

1. Why does the U.S. government subsidize corn production? Is this good or bad for the system?

The federal government subsidizes corn production to reduce economic risks for farmers and to encourage cheap food production for consumers. While it is good for society to share in the costs of agricultural risks (due to droughts, flooding, etc.), corn subsidies disrupt market forces that tend to balance supply and demand and they have inadvertently promoted obesity and diabetes.

1. What is your reaction to Ian and Curt’s visit with Earl Butz?

Most students will likely reflect on the ironies of Butz’s comments about affluence in light of the human and ecological health risks these documentaries have revealed.

1. Map out the connections between the U.S. farm policy and…
	1. Changes in the town of Greene, Iowa.

The local economy has shrunk; few small businesses are left. Few young families remain.

* 1. The prevalence of diabetes in the US population.

Diabetes has increased on the heels of a doubling of obesity rates (from 15 to 30% of the adult population) since the 1970s.

**“Big River”**

1. What is causing the dead zone in the Gulf of Mexico? How does this relate to farming practices in Iowa? What is your assessment of the shrimpers’ and farmers’ perspectives on this problem?

Run-off from the fields in Iowa leads to excess nitrogen in the water, which promotes excessive algal growth. When these algae die, bacteria proliferate, reducing oxygen levels in the water and killing aerobic organisms.

The economic goals of farmers and shrimpers are currently at odds with one another. However, by reducing run-off, both would have a better chance of surviving long-term. *(Note: Instructors may have to prompt students a bit before they realize this.)*

1. How might the seemingly higher incidence of cancer in Greene, Iowa be linked to corn production? Why can’t we be sure that this is a cause-effect relationship?

Some research studies link pesticides used in corn production to higher risks of cancer. However, we cannot be sure that this is a cause-and-effect relationship until other environmental and genetic factors have been eliminated. *(Note: Instructors may need to prompt students to explore the difference between correlation and causation. Students may also need help identifying genetic and environmental factors that affect cancer.)*

**Formulating a More Sustainable Solution**

Discuss with your team your answers to the above questions. Use this as a basis for identifying key sustainability problems and potential solutions. Together draft a one-page “mini-proposal” outlining what it would take to create a more sustainable system. Be sure to explain how your proposed solutions address specific problems and to identify some realistic measures (such as incentives) that could be taken to achieve them. Be prepared to present your proposal and defend (answer questions about) it in class.

A simple rubric, such as the following, can be used to evaluate team proposals and presentations:

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| --- | --- | --- | --- | --- |
|  | **Inadequate (1 point)** | **Competent (2 points)** | **Excellent (3 points)** | **Score** |
| **Sustainability problems** | Students do not explain how the problems affect sustainability | Students identify problems and link them to sustainability concerns | Students explain how problems identified are key to resolving sustainability concerns |  |
| **Sustainability solution(s)** | Proposed solutions are not likely to improve sustainability | Proposed solutions would enhance sustainability at least somewhat | Proposed solutions have significant potential for enhancing sustainability |  |
| **Means of achieving sustainability** | Proposed measures are not likely to garner much support; they may even exacerbate the problem | Proposed measures will help to garner support from certain sectors; some concerns (such as feasibility or cost) may remain | Proposed measures are feasible, likely to gain wide support, and justly share benefits and risks  |  |
| **Collaboration** | Team work has been dominated by one or two members; little evidence that all members “own” the proposal | Team has worked to involve each member, consider their inputs, and identify best options | Team has sought input and reached consensus through a deliberative process involving all members |  |
| **Presentation** | Team has difficulty explaining and/or defending their proposal | Team adequately explains and defends their proposal | Team makes a very convincing case for their proposal |  |