In Focus
Environmental Issues in Food Production

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 Suitable for:
Food Technology

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Summary

Many of us today are fortunate to have an abundant food supply. Technological advances over the past century have allowed us to increase food productivity and quality significantly, benefiting us as consumers and nations. Yet these improvements have not come about without an effect on our land and environment. In this program we’re asking what the true cost is, looking at environmental issues in food production.

In *Environmental Issues in Food Production* we examine the complex environmental equations of:
- Agriculture
- Animal farming
- Fishing
- Manufacturing.

This program is a concise, entertaining and thought-provoking program for Food Technology students.

Curriculum Reference

Food Technology, Yrs 11 and 12.

Using the Video

This program is equal parts information and entertainment. As such it can be used as a direct teaching aid, with clearly defined “chapters” and breaks to pause the program, or use as a stand-alone lesson in combination with the question sheets below.

In particular, the program is clearly divided into four sections:
- Agriculture
- Animal farming
- Fishing
- Manufacturing.

Each section is very content-rich, leading to the suggestion that each section could form the basis of an individual lesson, played once for initial absorption, followed by a discussion of the issues raised, followed by a further screening for emphasis of the key points.

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Environmental Issues in Food Production

Relevant Internet sites*

Overview

http://www.unep.org/ The United Nations Environment Program web site. A fascinating and information–rich site covering many environmental issues, including those surrounding food production.

http://www.usda.gov The US government Department of Agriculture site. Search for many environmental issues or follow links to many US and international agricultural sites.

http://directory.google.com/Top/Society/Issues/Environment/Food_and_Drink/ Excellent links to many different views on food production issues.

http://www.greenpeace.org/homepage/ Greenpeace. The site of the world–renown environmental advocacy group.

http://www.foodsafetynetwork.ca/ The Food Safety Network provides good general information about the issues surrounding food production issues.

Aquaculture.
http://www.cefas.co.uk/homepage.htm An excellent industry–centred site. UK based, it covers many international issues.

Environment and Food.
http://www.defra.gov.uk/ This UK based site for the Department of Environment, Food and Rural Affairs covers both specifically British issues and broader concepts of Environment and food.

Biotecnology in Agriculture.
http://www.agbioworld.org/ A credible, pro–biotechnology in agriculture site. Quite technical and detailed in nature, but with good overviews of the issues.

Australia
The Australian Bureau of Statistics

Salinity

Recycling

The Department of Agriculture, Fisheries and Forestry
http://www.affa.gov.au Search for many environmental issues or follow links to many Australian and international agricultural sites.

Salinity.

*At the time of printing these Teacher Notes, these web sites were found, after a number of separate visits, to be both accessible and appropriate for the subject material. Teachers are advised to thoroughly check any web site listed here before passing its details on to students.
**Student Response Sheet**

1. Name some resources that occur naturally in the environment?
   
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2. Renewable resources include the forests, soil and water. What does this mean?
   
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3. If a resource is “finite” what does this mean?
   
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4. Name the four main areas of food production.
   
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5. What is deforestation?
   
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6. What environmental effects does clearing or deforestation have?
   
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7. Define land degradation.
   
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8. What are the three primary causes of land degradation?
   
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9. Erosion refers to the loss of nutrient-rich topsoil, carried elsewhere by wind or water, much of which is caused by which modern agricultural practices?

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10. Chemical deterioration refers to what?

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11. How does agriculture combat land degradation?

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12. What happens during the process of salinisation?

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13. What is a pesticide?

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14. Name three main types of pesticides.

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15. What do we mean when we say that pesticides are indiscriminate?

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16. What negative effects can fertilisers have if they reach waterways?

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17. Name the two biggest environmental issues associated with animal farming.

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18. What is eutrophication?

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19. How can livestock alter and damage their grazing lands?

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20. Globally, fish provide 6, 16 or 60 % of total animal protein consumed by humans?

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21. Since the 1950s, fish production worldwide has almost doubled. Most of this increase has been made possible by what factors?

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22. What is the major ecological impact of fishing?

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23. What happens to the aquatic food chain when fishing targets particular species?

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24. Why is biodiversity important in wild populations?

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25. Modern fishing practices are not very discriminating. Name some of the unintended victims of fishing.

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26. Name the single most important influence on the future of fishing.

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27. Name the two key environmental impacts in food manufacturing.

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28. What is the key environmental impact of energy processing for food manufacturing?

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29. How can we minimise the environmental impact of energy processing for food manufacturing?

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30. Farming uses more than 7, 17 or 70% of the world's fresh water?

31. If all the earth's water were to fit into a 4 litre bottle, the fresh water available for human use would equal just over one litre, one tablespoon or one teaspoon?

32. Name the benefits that the packaging brings to food products.

33. Food waste accounts for over 40, 50 or 60% of household waste?

34. What is recycling?

35. Of a paper cup and a plastic cup, which is more recyclable?

36. Of a paper cup and a plastic cup, which is more environmentally friendly?
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Answers to Student Response Sheet

1. Name some resources that occur naturally in the environment?
The land, forests, water, minerals and energy resources such as gas and coal.

2. Renewable resources include the forests, soil and water. What does this mean?
They can be replaced over time.

3. If a resource is “finite” what does this mean?
They are not renewable and can only be used while they are there.

4. Name the four main areas of food production.
There are four main areas of food production: Agriculture, Animal farming, Fishing and Manufacturing.

5. What is deforestation?
The clearing of original vegetation from the land.

6. What environmental effects does clearing or deforestation have?
It damages or destroys the habitat for a biological chain. It exposes precious topsoil to wind and water.

7. Define land degradation.
Land degradation is deterioration in the quality of the land to a point that it is no longer useful. Degradation is the loss of soil nutrients, salt and acids and soil erosion.

8. What are the three primary causes of land degradation?
It occurs primarily through water and wind erosion, by chemical deterioration and through physical damage.

9. Erosion refers to the loss of nutrient-rich topsoil, carried elsewhere by wind or water, much of which is caused by which modern agricultural practices?
Powerful machines clear land and loosen soil deeply. Shallow rooted crops are unable to bind and protect soil, and grazing livestock kick and rip up soil, loosening it further, making erosion ever easier.

10. Chemical deterioration refers to what?
The loss of nutrients from the soil through erosion and the absorption in crops, without being replaced. It also refers to.

11. How does agriculture combat land degradation?
By
• minimising mechanical cultivation and other soil disturbance.
• adding fertilisers to supply the soil with extra nutrients, to increase its fertility and improve growth of crops.
• maintaining extensive crop coverage by growing continuously, particular in higher rainfall areas, to protect the soil.
• raising banks around plantations, to reduce water run-off in wet weather.

12. What happens during the process of salinisation?
During salinisation the water table beneath the soil rises, bringing with it mineral salts in the earth, making it difficult for plants to withdraw water from the soil.

13. What is a pesticide?
A pesticide is a broad term used to describe chemical substances used to control fungi, insects, diseases and pests on fruit, vegetables and plants.

14. Name three main types of pesticides.
Fungicides, herbicides and insecticides.
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15. What do we mean when we say that pesticides are indiscriminate?
They may successfully kill the fungi, plants and insects they are supposed to, but they can also kill much that they are not supposed to.

16. What negative effects can fertilisers have if they reach waterways?
They can be poisonous to marine life, or cause an explosion in marine plant growth that can block rivers or disrupt delicate eco-systems.

17. Name the two biggest environmental issues associated with animal farming.
The safe disposal of animal manure and land degradation from overgrazing.

18. What is eutrophication?
Eutrophication is a process whereby nutrients from sediments are carried by run off water into surface waters such as lakes and bays, providing nourishment for algae in the aquatic ecosystem.

19. How can livestock alter and damage their grazing lands?
By overgrazing an area leading to soil depletion and erosion, by spreading invasive grass species by carrying seeds that catch on their hides and by eating the native plants.

20. Globally, fish provide 6, 16 or 60% of total animal protein consumed by humans?
16%

21. Since the 1950s, fish production worldwide has almost doubled. Most of this increase has been made possible by what factors?
Advances in fishing technology and efficiency, including synthetic fibres for fishing gear, on-board freezing, electronic fish finding and improved navigation.

22. What is the major ecological impact of fishing?
The sheer extent of human fishing, with recent estimates suggesting that more than a quarter of stocks are already overfished or depleted.

23. What happens to the aquatic food chain when fishing targets particular species?
As the relative number of fish species declines, fish above or below them in the food chain are also effected – either declining or increasing dramatically in number, leading to an imbalance in biodiversity.

24. Why is biodiversity important in wild populations?
Biodiversity in wild populations is vital for adaptation to changing environment and ensuring long-term survival.

25. Modern fishing practices are not very discriminating. Name some of the unintended victims of fishing.
Undersized, unused fish and sea mammals such as dolphins, porpoises, turtles and seals.

26. Name the single most important influence on the future of fishing.
The single most important influence on the future of fishing is its governance.

27. Name the two key environmental impacts in food manufacturing.
The use of resources for energy supply and production, and waste disposal.

28. What is the key environmental impact of energy processing for food manufacturing?
Most sources of energy used for processing are non-renewable.

29. How can we minimise the environmental impact of energy processing for food manufacturing?
Develop alternative energy sources like solar power and methane gas production from waste; reducing power usage by designing food production plants that naturally stay cooler in summer and warmer in winter; and reducing transport costs by producing food locally.
30. Farming uses more than 7, 17 or 70% of the world's fresh water?
70%

31. If all the earth's water were to fit into a 4 litre bottle, the fresh water available for human use would equal just over one litre, one tablespoon or one teaspoon?
One tablespoon.

32. Name the benefits that the packaging brings to food products.
Packaging reduces waste by protecting food, informs consumers and allows people to consume safe, quality food, year round, from around the world.

33. Food waste accounting for over 40, 50 or 60% of household waste?
40%

34. What is recycling?
Re-using or re-processing materials, rather than throwing them away.

35. Of a paper cup and a plastic cup, which is more recyclable?
A paper cup.

36. Of a paper cup and a plastic cup, which is more environmentally friendly?
A plastic cup.
Split students into small groups. Provide each group with a food product and then get the groups to list as many possible environmental influences the food product has, from the farm to the consumer. Then ask students to think of ways to minimise the environmental impact of each food product.