

STUDENT WORKSHEET

Name	
Class	

Topic: Food Supply and Climate Change

Media: Worksheet

Time Allocation: 2 x 35 Minutes (70 Minutes)

Learning Objectives

Upon completion of this activity worksheet, you are expected to be able to:

1. Describe how humans have increased food production, limited to:
 - (a) agricultural machinery to use larger areas of land and improve efficiency
 - (b) chemical fertilisers to improve yields
 - (c) insecticides to improve quality and yield
 - (d) herbicides to reduce competition with weeds
 - (e) selective breeding to improve production by crop plants and livestock
2. Describe the advantages and disadvantages of large-scale monocultures of crop plants
3. Describe the advantages and disadvantages of intensive livestock production

I. Opening Case: "What Did You Eat This Morning?"

Discussion Questions:

1. How many people are eating breakfast on Earth right now?
2. Is the Earth getting bigger?"

II. Section A: How Do We Produce Our Food? (CU)

Before we explore the simulator, let's review how humans increase crop yields. Complete the table below by explaining the **biological mechanism** (how it works).

Table 1.1: Methods to Increase Food Production

Selective breeding ; Chemical fertilisers ; Insecticides ; Agricultural machinery ; Herbicides
Farmers add _____ to crops to provide nutrients so that the plants will grow faster.
Farmers use _____ to kill weeds, reducing competition and increasing the yield of the crops.
Farmers use _____ over many generations, to improve production by crop plants and livestock.
Farmers use _____ to enable them to cultivate more land in a shorter period of time.
Farmers use _____ to kill insect pests that would reduce the yield of their crops.

A1. Intensive Livestock Farming

1. **Definition:** Explain in your own words what is meant by **intensive livestock farming**.

	[2]
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2. Advantages and Disadvantages (Matching) [9]

Statement	A / D
Less land is required to produce large amounts of food	
Food can be produced all year round in controlled environments	
The cost of production is lower, so food can be sold at cheaper prices	
Ethical issues associated with cruel treatment of animals in intensive farms	

Statement	A / D
Natural habitats may be destroyed to maximise land available for keeping livestock	
Reduction in biodiversity where large areas are used for grazing (monoculture of grass)	
Overgrazing can lead to soil erosion	
Large numbers of cattle produce large amounts of methane (greenhouse gas)	
Livestock waste can be washed into waterways, causing water pollution	

A2. Monocultures

3. **Definition:** Explain in your own words what is meant by **monoculture farming**

	[2]
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4. Advantages and Disadvantages (Matching) **[8]**

Statement	A / D
Growing one crop lets farmers use machines to plant, weed, and harvest faster, so it saves time and workers	
Farmers can focus on the best soil, water, fertiliser, and conditions for one crop, so production can be higher	
Having only one crop over a large area reduces the number of different living things in that ecosystem	
Reduces habitat complexity and biodiversity in the field	
Pests can spread quickly because the same crop is everywhere and provides lots of food	
Using insecticides can kill helpful insects (like pollinators and natural predators)	
Pollution via pesticide run-off into soil and water	
Repeated use of the same pesticide can make pests resistant	