

Farming and Fishing

1. Use the following table to answer the questions

Year	Mass of fish caught by UK fishermen from ALL SOURCES in thousands of tonnes	Mass of fish caught by UK fishermen from SUSTAINABLE SOURCES in thousands of tonnes	Percentage of fish caught from sustainable sources
2002	690.0	427.8	62.0
2004	655.0	396.6	60.5
2006	619.0	386.0	62.4
2008	589.0	436.1	74.0
2010	611.5	465.0	

a. Calculate the percentage of fish caught from sustainable sources in 2010.

$$\begin{aligned}
 \% \text{ from sustainable sources} &= \frac{\text{Mass caught from sustainable sources}}{\text{Total mass caught}} \times 100 \\
 &= \frac{465.0}{611.5} \times 100 \\
 &= 76.0 \%
 \end{aligned}$$

b. Describe the patterns shown in the table.

- The total mass of fish has decreased until 2008 and then increased
- Percentage of fish caught from sustainable sources has generally increased

c. Suggest reasons for the patterns shown.

- Due to overfishing – fish stocks being depleted
- Decreased demand
- More people are buying sustainably sourced fish

d. State two methods of maintaining fish stocks.

- Fishing quotas
- Restricting net size



2. Intensive farming methods are often used to make biomass and energy transfers more efficient.

Animals can be transported in small spaces over long distances.	Advantage
Keeping temperatures constant reduces the energy that an animal uses to thermoregulate. The energy saved is used for growth.	Advantage
Movement of animals is restricted.	Disadvantage
Antibiotics used in farming can be a threat to human health, causing antibiotic resistance.	Disadvantage
Animals cages can be very small and stressful.	Disadvantage
Restricting the movement of animals so that energy used for movement is reduced and more can be used for growth.	Advantage
Slaughtering techniques can be inhumane.	Disadvantage
Animals are easily treated with antibiotics to prevent them from getting infections.	Advantage
Fewer animal pests to eat crops or cause disease in livestock.	Advantage
Animals are packed closely together, increasing the risk of disease spreading.	Disadvantage

a. Determine if each of the following statements is an advantage or a disadvantage of intensive farming:

b. Use the table to help you evaluate the advantages and disadvantages of using intensive farming methods.

Advantages

- Maximise animal growth by reducing energy lost through movement
- Reducing energy lost through thermoregulation
- Easy and cheap to transport animals
- Easy to treat infections
- Fewer pests

Disadvantages

- Inhuman slaughter methods



- **Animal movement is restricted and cages are cramped**
- **Antibiotics used can contribute to resistance**
- **Diseases spread easily**

3. Another way to increase the efficiency of biomass transfer is by limiting the length of food chains. The table below shows the energy available to humans from two different food chains:

Food chain	Energy transferred to humans in kJ per hectare of crop
Wheat → humans	900 000
Wheat → pigs → humans	90 00

- a. Explain what the arrows represent in a food chain.

The direction of energy transfer

- b. Compare the amount of energy the two food chains transfer to humans.

The food chain without pigs transfers (10x) more energy than the chain with pigs

- c. Suggest a reason for the difference in the amount of energy the two food chains transfer to humans.

Pigs lose energy on thermoregulation, movement and waste

Energy is lost at each trophic level, pigs are an extra trophic level

- d. Explain how this data could be used as evidence to promote a vegetarian diet.

It is much more environmentally friendly to omit the pigs from the food chain, as more energy is transferred directly from the wheat.

