

Food Security & Production

Human Population

Increase in human population has led to concerns for food security and food production.

Food Security

The ability of human populations to access food of sufficient quality and quantity.

Food Production

Whilst food production must increase to cope with issues of food insecurity it must also be

1. Sustainable
2. Not degrade the natural resources

Crop versus livestock production

More energy produced per unit area



Crop protection

Less energy produced per unit area



Livestock protection

Livestock production should only occur in areas unsuitable for crops.

For example sheep on a steep hill.



Why do crops contain more energy per unit area?

Crops (producers) are at the first trophic level whereas livestock are at higher trophic levels

& energy is lost at each trophic level.



Types of Farming

Types of Farming

Feature	Intensive Farming	Free Range farming (organic)
Land Required	<u>Less</u> land required	<u>More</u> land required
Labour intensive	<u>Less</u> labour intense	<u>More</u> labour intense
Price of product	<u>Lower</u> price	<u>Higher</u> price
Cost effectiveness of process	More cost effective	<u>Less</u> cost effective
Net profit	<u>Higher</u> profit	<u>Lower</u> profit
Ethical practice	<u>Less</u> ethical	<u>More</u> ethical
Animal welfare/ quality of life of animals	<u>Low</u> quality of life/welfare	<u>Better</u> quality of life/ welfare

Poor Animal Welfare

4 behavioural indicators that can show poor animal welfare during intensive farming.

Indicator	Example
Stereotype behaviour	Repeated pointless behaviour
Misdirected behaviour	Inappropriate behaviour
Altered levels of activity	Apathy—low levels Hysteria—High levels
Failure in sexual/parental behaviour	Failure to reproduce Rejecting young

Factors affecting agricultural production

Examples of plant crops

1. Cereals
2. Potatoes
3. Legumes
4. Roots



Factors affecting Agriculture production

There are 2 main factors which can affect agriculture production

1. Plant growth

1. Breeding of higher yielding cultivars (plant varieties)
2. Use of fertilisers
3. Protecting crops from pests, disease and competition.
 - Chemical control methods
 - Biological control methods
 - Cultural methods
 - Integrated Pest management
4. GM crops

2. Factors affecting photosynthesis

All food production is ultimately dependent on photosynthesis

1. Temperature
Enzymes needed at each stage of Carbon fixation
2. Carbon dioxide concentration
- more RuBP converted to 3PG
3. Light intensity
Needed to produce H and ATP for 3PG to go to G3P

Explain why higher light intensity increases yield of crop.

2 marks

More light

More photosynthesis

More glucose produced for growth

Explain why insect infestation of leaves decreases yield of crop.

2 marks

Less leaves (eaten by insects)

Less photosynthesis

Less glucose produced for growth