5.2 Terrestrial Food Production Systems & Food Choices

Mark Schemes

Course	SL IB Environmental Systems & Societies (ESS)
Section	5. Soil Systems & Terrestrial Food Production Systems & Societies
Topic	5.2 Terrestrial Food Production Systems & Food Choices
Difficulty	Medium

To be used by all students preparing for
SL IB Environmental Systems & Societies (ESS)
Students of other boards may also find this useful

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Indicative Content	Commentary
Food is in short supply in some human societies because there may be: Any **three** from the following: • Disruption caused by conflicts/wars that leads to the destruction/weakening of agricultural infrastructure; [1 mark] • (National/regional) variations in climate / soil quality / water access (for irrigation) that affects agriculture; [1 mark] • Insufficient/inadequate resources/facilities for food preservation/storage in less economically developed countries / LEDCs; [1 mark] • Insufficient/inadequate distribution infrastructure for food in certain nations/countries/regions; [1 mark] • Political systems that hinder/reduce incentives for increasing food production **OR** political instability/corruption disrupting food production / distribution systems; [1 mark] • Challenges/problems/negative impacts arising from natural disasters e.g. tsunamis / volcanic eruptions / hurricanes / droughts; [1 mark]	You can still gain marks for responses that use examples to explain the above concepts For example: The Syrian Civil War, which began in 2011, has led to the destruction of agricultural infrastructure in the region. Farms, irrigation systems, and storage facilities have been damaged or abandoned due to the conflict, resulting in decreased food production and food insecurity The 2010 earthquake in Haiti resulted in widespread devastation, including the destruction of crops and infrastructure. The disaster disrupted local food production and distribution, exacerbating existing food security issues In addition, the influx of heavily subsidised imported rice into Haiti following the earthquake lowered local rice prices, making it difficult for local farmers to compete and resulting in a decline in domestic rice production

• Challenges/problems/negative impacts from human activities e.g. increased desertification due to climate change / overgrazing / over-abstraction/unsustainable use of fresh water **OR** land degradation / soil erosion affecting agricultural productivity; [1 mark] • Food aid from other nations that could decrease local food prices, making local production economically unviable; [1 mark] • Lack of investment in agricultural technology / modern farming methods / modern agricultural infrastructure; [1 mark] • Rapid population growth outpacing agricultural production/resources; [1 mark] • Limited access to education/knowledge about sustainable farming practices; [1 mark] • Trade imbalances and dependence on imported food leading to vulnerability in supply chains; [1 mark]	

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Indicative Content
The environmental impacts of cattle farming in Brazil include: Any **four** from the following: • Livestock trampling leads to vegetation loss / exposed soil / promotes (soil) erosion **OR** exposed soil is easily eroded / leads to soil loss / desertification; [1 mark] • Disruption of natural nutrient cycles / reduced soil fertility; [1 mark] • Biodiversity is reduced due to destruction of (delicate/vulnerable) vegetation / only hardy vegetation can grow once the soil has been trampled; [1 mark] • Habitat loss from deforestation / forest clearance for livestock grazing areas / grass **OR** clearance of tropical rainforest / cerrado vegetation results in loss of habitat/biodiversity; [1 mark] • Methane emissions from cattle contribute to the greenhouse effect / global warming; [1 mark] • Deforestation/clearance/burning of rainforests decreases (globally important/significant) carbon sink/storage **OR** increases carbon dioxide / CO_2 emissions contributing to greenhouse effect / global warming; [1 mark] • Use of agrochemicals/pesticides/antibiotics results in local habitat pollution / loss of biodiversity; [1 mark] • Water pollution due to runoff of agrochemicals / waste from cattle farming; [1 mark] • Loss of ecosystem services e.g. carbon sequestration / water regulation (due to deforestation); [1 mark] • Over-abstraction / unsustainable use of fresh water for consumption by cattle is problematic in regions facing water scarcity; [1 mark] • Increased risk of diseases due to concentrated livestock populations; [1 mark] • (Significant) carbon emissions from transportation of beef products to international markets; [1 mark] • Displacement of indigenous people/cultures/societies reduces local environmental stewardship; [1 mark]

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Indicative Content
The environmental impacts of wheat and corn cultivation in the USA include: Any **four** from the following: • Soil compaction due to heavy machinery use, leading to soil erosion / loss of soil structure; [1 mark] • Intensive human inputs e.g. agrochemicals / machinery, resulting in degradation of soil structure; [1 mark] • Easier topsoil removal by wind/water; [1 mark] • Improper irrigation / leaving fields bare post-harvest increases soil erosion; [1 mark] • Loss of topsoil leads to reduced fertility due to loss of organic material; [1 mark] • Excessive irrigation / over-irrigation can cause soil salinisation; [1 mark] • Agrochemicals/fertilisers runoff into water courses/bodies/rivers/lakes causing eutrophication; [1 mark] • Pesticide runoff into water courses/bodies/rivers/lakes leads to bioaccumulation in organisms **OR** agrochemicals may affect top predators/birds through biomagnification/bioaccumulation; [1 mark] • Monoculture practices reduce local biodiversity (in local habitats/ecosystems); [1 mark] • Greenhouse gas emissions from heavy (farming) machinery contribute to global warming; [1 mark] • Excessive herbicide/pesticide use diminishes local biodiversity / harms beneficial insects e.g. pollinators / predators of pest species; [1 mark] • Genetically modified organisms/crops / GMO crops like Bt corn can lead to reduced biodiversity; [1 mark] • Irrigation/agrochemicals can deplete/pollute aquifers / (freshwater) reservoirs; [1 mark]

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Indicative Content
Factors contributing to food waste in LEDCs include: Any **two** from the following: • Poor (food) storage/refrigeration facilities/infrastructure; [1 mark] • Limited access to technologies for food preservation; [1 mark] • Lack of (reliable/sufficient) transportation / distribution systems / road network/infrastructure; [1 mark] • High post-harvest losses / spoiling of perishable crops/food products due to manual labour / rough handling / inadequate packaging (during transit); [1 mark] • Inefficient supply chains / market access (e.g. in rural areas / remote locations); [1 mark] • Insufficient financial resources to invest in reducing food waste; [1 mark] • Lack of education/awareness about food waste; [1 mark] • Traditional practices / cultural attitudes may not prioritise food preservation; [1 mark] Factors contributing to food waste in MEDCs include: Any **two** from the following: • Consumer behaviour/preferences leading to over-purchasing; [1 mark] • High standards for appearance leading to rejection / disposal / throwing away of imperfect produce; [1 mark] • Strict(er) food safety regulations contributing to (often/potentially unnecessary) discarding/disposal of food; [1 mark] • Oversupply in supermarkets/restaurants (cannot sell/use produce quickly enough); [1 mark] • Bulk purchasing / portion sizes (often) exceeding actual consumption **OR** consumers purchase more than they can consume / need to consume; [1 mark] • Fast-paced lifestyle / convenience culture / takeaway food / food 'to go' leading to neglect of leftovers; [1 mark]

- Misinterpretation of expiration dates / confusion about food labels (by consumer/purchaser); [1 mark]
- Lack of awareness about the environmental impact of food waste; [1 mark]
- Lack of respect for environment / lack of attempt to be more sustainable / environmentally friendly / reduce food waste despite understanding the negative environmental impacts; [1 mark]