Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

intensive: large inputs of labour, capital, fertilizer per unit area, giving a high yield per area; extensive: few inputs spread over a large area, giving a low yield per area

2.2

cattle digestion and flooded rice paddies release methane; nitrogen fertilizer releases nitrous oxide from soil; clearing forests for farmland, and fuel for machines and transport, release CO_2

2.3

uses natural predators (e.g. ladybirds eat aphids) and crop rotation to keep pests low; pesticides are sprayed only when pests pass a threshold, so less is used; fewer non-target species are harmed, less pesticide runs into water, and resistance develops more slowly

3.1

(a) $160 \div 2 =$ **80** times

(b) animals are fed on plants (grazing or feed crops); energy is lost at each trophic level, mostly in respiration, so only about 10% is passed on; so far more plant food, and land, is needed for the same protein from animals

3.2

(a) low-income: losses early, in harvest, storage and transport (poor storage, no cooling); high-income: waste at the end, in shops and homes (buying too much, strict "best before" dates, cosmetic standards)

(b) e.g. better storage and cold chains: cuts losses where most food is lost in poorer countries; costs money and energy; judgement: high benefit for small cost when supported by government or aid

3.3

award up to [8]: intensive: high yields per area, so less new land is cleared; feeds cities and earns exports; but high fertilizer, pesticide and water use; eutrophication, soil degradation, greenhouse gases; dependence on bought inputs; agroforestry: trees hold soil, add organic matter and nitrogen (legume trees), store carbon and support biodiversity; but lower yields of the main crop, slower returns, needs knowledge and labour; conclusion: a mix, matched to land type and farmers' needs, with justification

exercises.lol exercises.com.cn