

MARKSCHEME

November 2005

ECOSYSTEMS AND SOCIETIES

Standard Level

Paper 1

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Subject Details: Ecosystems and Societies SLP1 Markscheme

General

A markscheme often has more specific points worthy of a mark than the total allows. This is intentional. Do not award more than the maximum marks allowed for part of a question.

When deciding upon alternative answers by candidates to those given in the markscheme, consider the following points:

- Each marking point has a separate line and the end is signified by means of a semicolon (;).
- An alternative answer or wording is indicated in the markscheme by a “/” either wording can be accepted.
- Words in (...) in the markscheme are not necessary to gain the mark.
- The order of points does not have to be as written (unless stated otherwise).
- If the candidate’s answer has the same meaning or can be clearly interpreted as being the same as that in the mark scheme, then award the mark.
- Mark positively. Give candidates credit for what they have achieved, and for what they have got correct, rather than penalizing them for what they have got wrong.
- Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
- Occasionally, a part of a question may require a calculation whose answer is required for subsequent parts. If an error is made in the first part then it should be penalized. However, if the incorrect answer is used correctly in subsequent parts then **follow through** marks should be awarded. Indicate this with “**ECF**”, error carried forward.
- Units should always be given where appropriate. Omission of units should only be penalized once. Indicate this by “**U-1**” at the first point it occurs. Ignore this, if marks for units are already specified in the markscheme.
- Do not penalize candidates for errors in significant figures, unless it is specifically referred to in the markscheme.

1. (a) (i) figure 2 – marine food webs because there are more links in the food web;
there are more trophic levels;
there is more than one food source at each trophic level;
there is no organism dependant on a single food type; *[2 max]*
Award [2] for correct food web and two correct reasons, award [1] for correct food web and one correct reason.
- (ii) if rabbits were removed grass would increase dramatically;
succession would occur: grass – scrub – trees;
fox population would crash and disappear without a food source; *[2 max]*
- (iii) if foxes were removed the rabbit population would rise dramatically;
rabbits would overgraze their food source (grass) and the rabbit population
would crash;
dynamic balance between rabbits and grass may result; *[2 max]*
- (b) (i) A *[1]*
- (ii) C *[1]*
- (c) (i) use of a global resource at a rate that allows natural regeneration;
and minimises damage to the environment; *[2]*
- (ii) fishing effort should be set at a level that will not deplete the overall krill
population;
krill should not be fished at a level beyond which they can naturally regenerate
their population numbers;
baseline studies undertaken to find out how much krill there is;
monitoring of krill populations / monitoring catch;
setting quotas and limiting fishing effort (boat numbers, size, setting seasons,
control on gear type); *[4 max]*

2. (a) (i) maize, USA; [1]

(ii) intensive agricultural system;
 high levels of inorganic fertilizer used per unit area;
 high yielding / management-intensive crop varieties (possibly GM types);
 extensive and intensive weed, pest and disease control;
 efficient harvesting;
 possibly irrigation; [3 max]

(iii)

<i>Low Input Systems</i>	<i>High Input Systems</i>
migratory pastoralists, Kenya	cattle, UK
shifting cultivation, Papua New Guinea	wheat, UK
	maize, USA

5 correct [2], 4/3 correct [1], 2/1 correct [0] [2 max]

(b) (i) MEDCs have a greater proportion of animal protein in their diet (approx 26%),
 whereas LEDCs are more dependant on grain crops;
 MEDCs generally have greater variation in their diets than LEDCs; [2]

(ii) MEDCs tend to have larger ecological footprints than LEDCs;
 because they have high “grain equivalent” food consumption lifestyles;
 they consume high levels of fossil fuel;
 high CO₂ emissions;
 produce larger amounts of waste;
 higher lifestyle expectations and possess more consumer goods;
 use proportionately more raw materials; [4 max]

(iii) limits biodiversity because of herbicide and pesticide elimination of non-crop species;
 introduces toxins through fertilizers / irrigation;
 limits habitat type because of monoculture;
 eutrophication due to fertilizer application;
 risk of hybridization from GM maize;
 aesthetic impact on landscape; [2 max]

(iv) trampling from livestock leading to soil loss / desertification;
 cause over grazing and soil loss / desertification;
 introduce diseases from herds to native species; [1 max]

3. (a) 911 kg (*units required*) **[1]**
- (b) November **[1]**
- (c) introduction of disease to indigenous species;
over predation of indigenous species who have little (evolutionary) defence against
new predator;
out competition of indigenous species in same niche;
hybridization of indigenous species; **[3 max]**
- (d) *Any two of the following for [1]*
natural hazards;
global catastrophe;
habitat loss;
pollution;
over exploitation; **[1 max]**
Accept other appropriate answers.

4. (a) *There are a number of valid answers. Impact may be both direct and indirect.*

changing crop type will change soil cohesion and soil protection;
humans may change the nature of soil mechanically *e.g.* plowing / lightening with sand;
humans may change the nature of soil chemically *e.g.* liming / use of fertilizers / pesticides / fungicides;
human may alter slopes – terracing *etc.*; **[3 max]**
Accept other reasonable answers.

- (b) (i) global warming is caused by an increase in greenhouse gases leading to an increase in mean global temperature;
due to the trapping of extra short wave radiation;
greenhouse gases include carbon dioxide, methane, ozone and water vapour;
these are released as fossil fuels are burned / through farming and industrial processes; **[3 max]**

(ii) increase in temperature could lead to desiccation;
evaporation due to increased temperature may lead to the accumulation of natural salts changing the chemistry and structure of the soil (salinization);
lower temperatures may cause freeze–thaw processes to break up soil and allow more rapid weathering;
increased rainfall may cause increased runoff and thus soil erosion;
increased rainfall may cause leaching and erosion of material from the soil profile;
decrease in rainfall will lead to aridification and make soil surface prone to wind erosion;
increase in wind magnitude and frequency will increase surface erosion (in terms of volume and rate); **[4 max]**
Accept other reasonable answers.

- (c) (i) any system that is open to energy and material outputs and inputs and can be described as an open system;
e.g. a forest or ecosystem (*to be ecological the example must have biological inputs and outputs*). **[2]**

(ii) the Earth acts as a complex self-regulating organism via a series of feedback mechanisms;
rather than being a passive object controlled by external forces and chance;
theory by James Lovelock and demonstrated via his Daisy World Model; **[2 max]**

(iii) lacks quantitative values;
over simplifies complex relationships;
lacks complex network connections; **[1 max]**
Accept other reasonable answers.
