



# **MARKSCHEME**

**November 2011**

## **ENVIRONMENTAL SYSTEMS AND SOCIETIES**

**Standard Level**

**Paper 1**

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## Subject Details: Environmental Systems and Societies SLP1 Markscheme

### Mark Allocation

Candidates are required to answer **ALL** questions. Total = **[45 marks]**.

1. A markscheme often has more marking points than the total allows. This is intentional. Do **not** award more than the maximum marks allowed for part of a question.
2. Each marking point has a separate line and the end is shown by means of a semicolon (;).
3. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.
4. Words in brackets ( ) in the markscheme are not necessary to gain the mark.
5. Words that are underlined are essential for the mark.
6. The order of marking points does not have to be as in the markscheme, unless stated otherwise.
7. If the candidate's answer has the same "meaning" or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).
8. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
9. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script.
10. Do not penalize candidates for errors in units or significant figures, unless it is specifically referred to in the markscheme.

1. (a) (acid rain would lower the pH which would) decrease availability of potassium;  
(acid rain would lower the pH which would) increase availability of copper; [2]
- (b) decrease in organic store of nitrogen / increase in inorganic store of nitrogen /  
decrease in soil fertility;  
reduced growth of producers / lower primary productivity;  
less biomass/energy to support food chains;  
increase in plants adapted to low nitrogen / increase in plants using alternative  
sources of nitrogen (*e.g.* insectivorous plants);  
increase in plants able to recycle nitrogen internally;  
reduction in ammonification;  
reduction in nitrification; [3 max]  
*Do not accept accounts of organic decomposition, because nitrogen-fixing  
bacteria are not relevant to the decomposition of organic material.*
- (c) Award [1] for name/identification of strategy and [1] for description of strategy.  
  
*e.g.* reduction of fossil fuel use;  
through switching to renewable sources / conservation campaigns;  
  
*or*  
  
*e.g.* addition of calcium carbonate/lime to soils;  
raises the pH;  
  
*or*  
  
*e.g.* smoke stack scrubbers;  
removes sulfur compounds/pollutants at the source; [2 max]  
  
*Accept any other suitable example.*
2. (a) parasitism; [1]
- (b) as population size increases, density-dependent limiting factors play an increasing  
role;  
factors that only affect a population when it reaches a certain density / starting at  
the transition point (of the sigmoid growth curve);  
they operate as negative feedback mechanisms;  
leading to stability/regulation of the population;  
malaria spreads more rapidly when people are in close proximity; [2 max]  
*Accept any other reasonable response.*

- (c) (i) Brazil, Colombia, Venezuela and Ecuador; [1]  
*All four required to award [1].*
- (ii) indoor (residual) spraying appears to limit the growth of malarial incidence;  
but disease still on the rise / many would view growth in incidence as unacceptable;  
malarial incidence is rising in all countries except Ecuador;  
broad use is cutting incidence / Ecuador is the only country which allows broad use of DDT; [3 max]  
*Accept any other reasonable response.*
- (iii) the ecocentrist position is that ecological laws should drive human decision making;  
POPs being added to the environment could harm many species/can flow out of the house;  
and therefore affect biorights/right of organisms to remain unmolested / mosquitoes have the right to exist;  
ecocentrists might argue that alternative (less objectionable) strategies exist;  
such as lowering population density / decreasing standing water / using natural repellents / encouraging natural predators; [2 max]  
*Accept any other reasonable suggestion.*
- (iv) DDT gets stored in tissues/fat tissues / bioaccumulation;  
because it is not recognised as a toxin and not excreted;  
the pyramid structure of food chains;  
means the toxin becomes increasingly concentrated at higher trophic levels / biomagnified;  
example of biological effect such as thinning of eggshells in birds at top of food chain; [2 max]

3. (a) *Accept answers in the range 6.5 to 6.7.* [1]
- (b) fertilizers / nutrients;  
pesticides;  
(irrigation) water / precipitation;  
fossil fuels / machine labour / energy subsidy;  
genetically modified varieties / selectively bred varieties;  
sunlight / solar energy; [2 max]
- (c) (nearly) all populations are in decline;  
the higher the cereal yield, the greater the population decrease / negative correlation;  
data are (highly) variable / relationship not strong; [2 max]
- (d) (because of inputs) marginal lands are brought under cereal production;  
loss of permanent grassland/hedgerows and tree lines / habitat loss;  
wetlands and ponds are filled in/reduced;  
pesticides have food chain effects;  
pollution of water sources;  
disease;  
protection/conservation policy;  
competition from alien species;  
natural disasters;  
hunting; [3 max]  
*Accept any other reasonable suggestion.*
- (e) species have different levels of tolerance to environmental change;  
presence/absence/well-being of indicator species;  
can be used as an indirect measure of pollution/environmental degradation;  
detailed examples such as lichens/freshwater invertebrates; [2 max]
- (f) numbers of mature individuals;  
quality of habitat / degree of habitat fragmentation;  
area of occupancy;  
probability of extinction; [2 max]

4. (a) biomass nutrient store increases with temperature;  
biomass nutrient store increases with precipitation;  
pattern is clearer with temperature; [2 max]
- (b) the process is decomposition / represents decay/the activities of decomposers;  
it is a transformation;  
as it involves a change from the organic form to an inorganic form / it is a chemical change; [3]
- (c) steppe; [1]
- (d) increased rates of leaching;  
increased rate of uptake by plants;  
decrease in transfer to leaf litter;  
decrease in the size of the soil compartment;  
increase in the size of the biomass compartment;  
no change in the size of the litter compartment;  
no change in rate of decomposition;  
no change in the level of run-off; [3 max]  
*Accept any other reasonable suggestion.*
5. (a) replenishable; [1]
- (b) reduction in flooding;  
tourism / recreation / fishing / conservation of some freshwater species;  
controlled water supply / drinking water; [1 max]
- (c) land area subsumed by the reservoir;  
land area for the transmission lines / infrastructure;  
land area for producing construction material; [1 max]  
*Allow responses justifying either an increase or decrease in the ecological footprint. (e.g. 'hydroelectricity generation reduces a country's need for fossil fuels, thus reducing the ecological footprint').*
- (d) baseline study;  
assessment of possible impacts;  
proposals for mitigation of impact;  
monitoring of change during development;  
monitoring of change after development; [3 max]
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