



22146301

**ENVIRONMENTAL SYSTEMS AND SOCIETIES  
STANDARD LEVEL  
PAPER 1**

Candidate session number

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Wednesday 7 May 2014 (morning)

Examination code

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1 hour

**INSTRUCTIONS TO CANDIDATES**

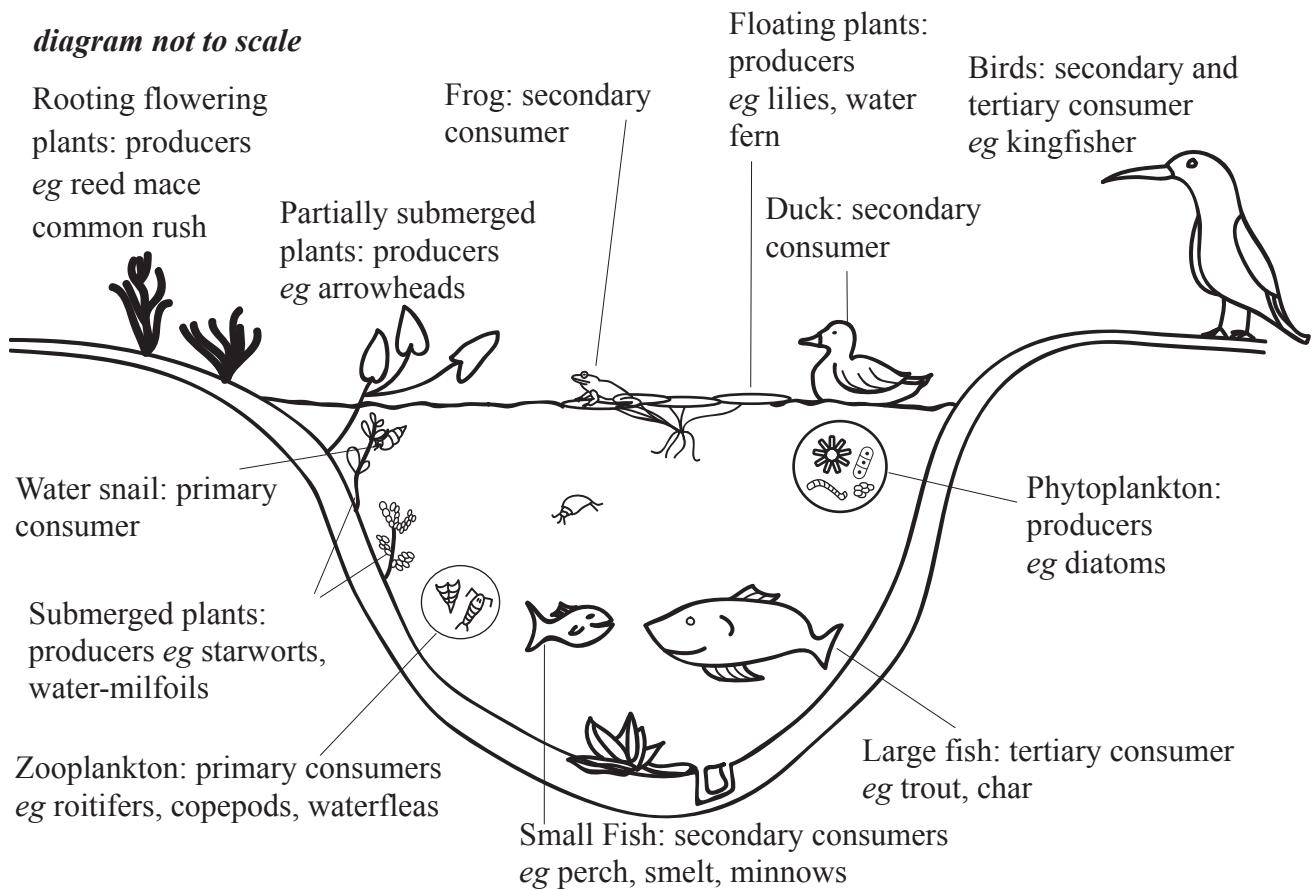
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is [45 marks].



16EP01

1. **Figure 1** below shows an example of a lake ecosystem.

**Figure 1**



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- (a) (i) State the source of energy for this ecosystem.

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- (ii) Identify **one** way in which energy may leave this ecosystem.

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(Question 1 continued)

- (iii) Draw a food chain from the ecosystem in **Figure 1** consisting of **four** trophic levels. [1]

- (iv) Identify **two** possible effects of removing trout on this ecosystem. [2]

- (v) Predict how the introduction of a non-native species may affect this lake ecosystem. [2]

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16EP03

Turn over

(Question 1 continued)

- (b) Fertilizers and pesticides used on farmland may eventually pollute local freshwater lakes.

Complete the table below, stating the impacts of these **two** types of agrochemicals on lakes **and** identifying a management strategy for each.

[2]

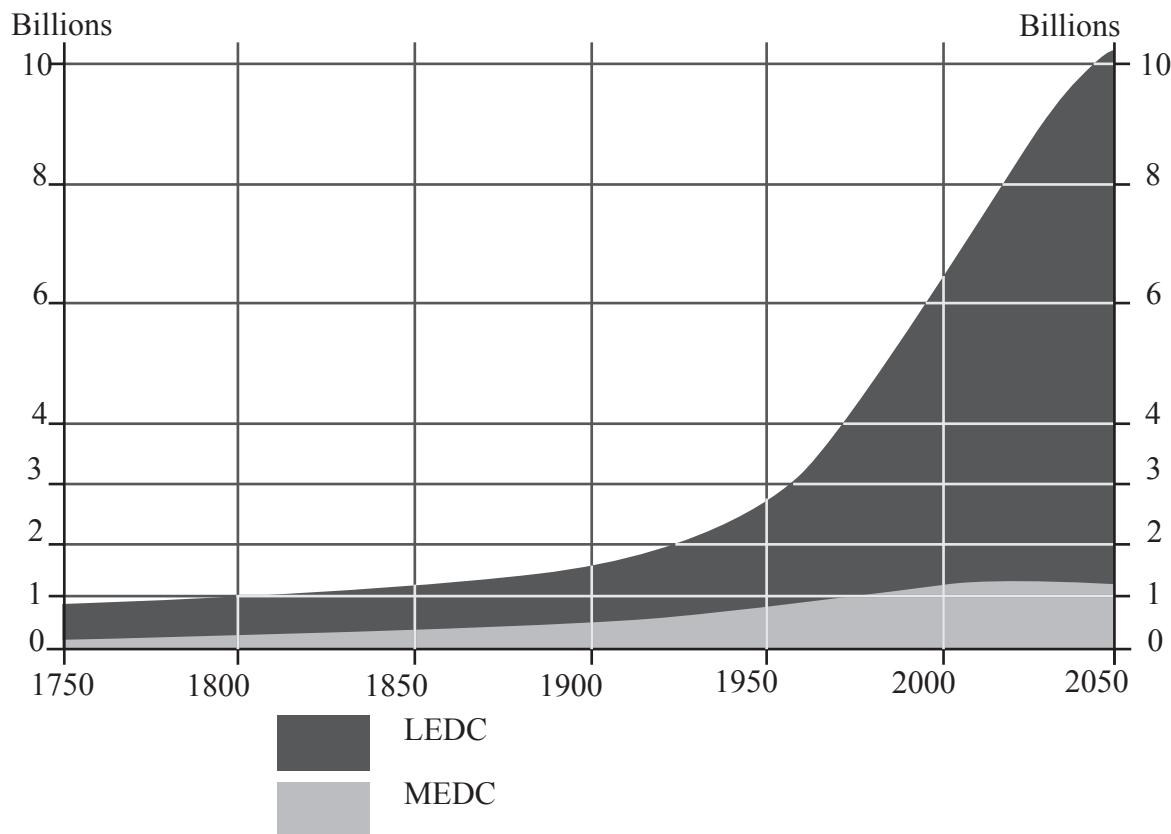
Agricultural Pollutant	Fertilizer	Pesticide
Impact on the lake	..... .....	..... .....
Management strategy	..... .....	..... .....



16EP04

2. Figure 2 below shows world population growth from 1750 to 2050.

**Figure 2**



[Source: [http://www.grida.no/graphicslib/detail/world-population-development\\_29db](http://www.grida.no/graphicslib/detail/world-population-development_29db)  
Philippe Rekacewicz, UNEP/GRID-Arendal]

- (a) With reference to **Figure 2**, estimate the predicted change in population between 2000 and 2050 for  
(i) LEDCs.

- (ii) MEDCs. [1]

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*(Question 2 continued)*

- (b) Explain one reason why population growth is greater in LEDCs than MEDCs. [3]

- (c) The lack of food and fresh water may limit the rate of global population growth beyond 2050.

- (i) Identify **two** reasons that may cause food supply to be limiting. [2]

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- (ii) Identify **two** reasons that may cause fresh water supply to be limiting. [2]

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*(Question 2 continued)*

- (d) With reference to a **named** example, explain why a national government may choose **not** to attempt to control the growth of its population. [2]

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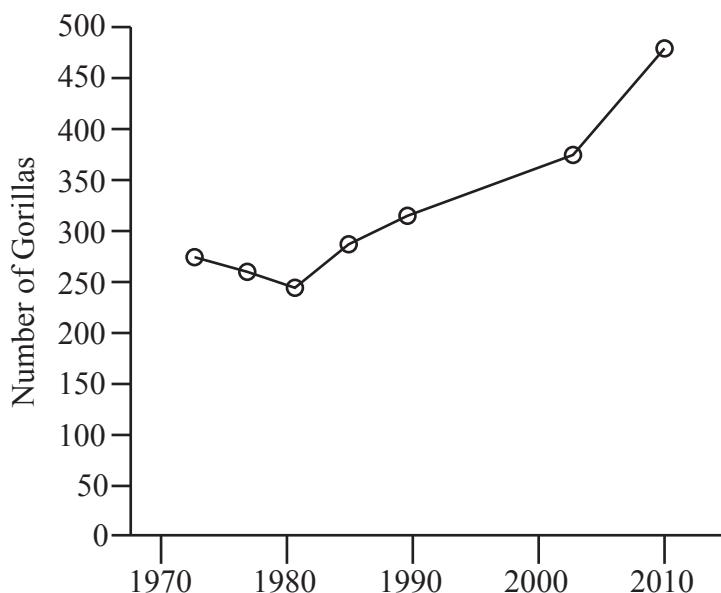


16EP07

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3. **Figure 3** below shows changes in the numbers of mountain gorillas in the Virunga Massif, Central Africa, following conservation efforts.

**Figure 3**



[Source: Maryke Gray *et al.*, (2010) Virunga Massif Mountain Gorilla Census – 2010 Summary Report]

- (a) (i) Identify **one** method that may have been used to estimate the size of this gorilla population. [1]

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- (ii) State **two** possible factors that may have led to the gorillas being endangered. [1]

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*(Question 3 continued)*

- (iii) Explain **one** possible reason for the increase in gorilla population over the period shown in the graph. [2]

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- (b) Evaluate the role of the Convention on International Trade in Endangered Species (CITES) in the conservation of species such as mountain gorillas. [4]

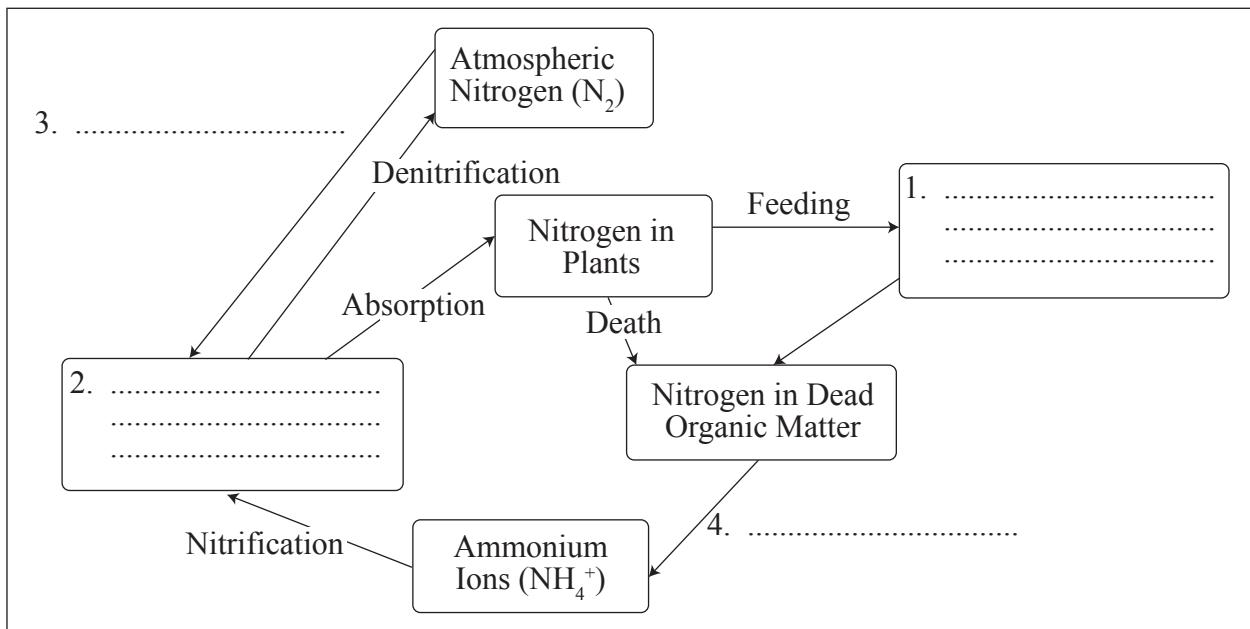
- (c) State **two** criteria necessary for a successful conservation area. [1]

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4. Figure 4 below shows a simplified version of the nitrogen cycle.

**Figure 4**



- (a) Complete the missing flows and storages labelled 1–4 within the diagram. [2]
- (b) Overgrazing may lead to soil degradation. Identify one impact that overgrazing may have on a named flow and a named storage within the nitrogen cycle.

(i) Impact on flow: [1]

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(ii) Impact on storage: [1]

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*(Question 4 continued)*

- (c) Identify **two** ways in which humans can restore soils degraded by overgrazing. [2]

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- (d) Explain how the use of non-biodegradable pesticides on farmland may affect the human food chain. [2]

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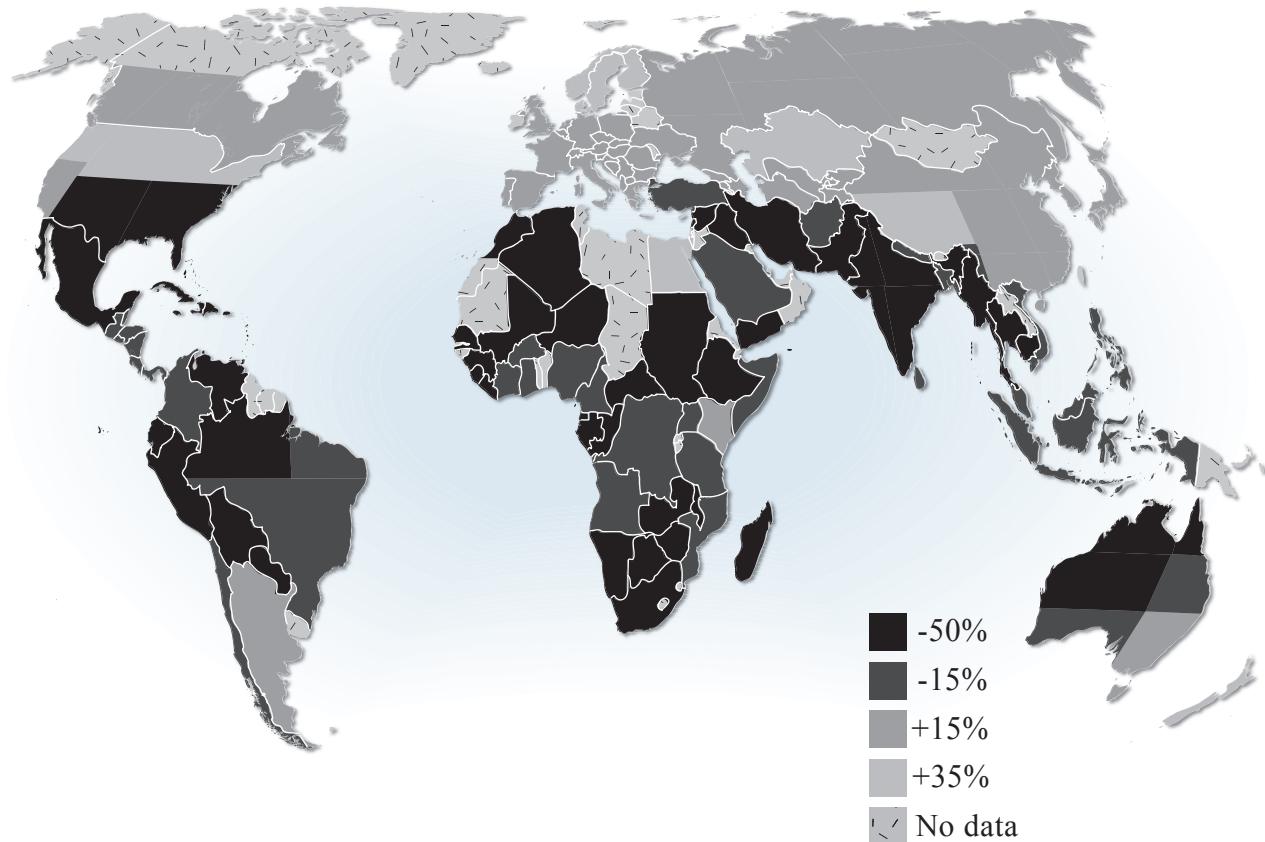


16EP11

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5. **Figure 5** below shows the possible changes in agriculture productivity from 2003 to 2080 due to global warming.

**Figure 5**



[Source: <http://www.grida.no/graphicslib/detail/projected-agriculture-in-2080-due-to-climate-change>] 141b

Hugo Ahlenius, UNEP/GRID-Arendal

[Source: Cline, W. R. 2007. Global Warming and Agriculture: Impact Estimates by Country. Washington D.C., USA: Peterson Institute.]

(a) With reference to Figure 5,

- (i) Identify **one** reason why global warming may cause a reduction in agricultural productivity.

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(Question 5 continued)

- (ii) Identify **one** pattern in the predicted changes in agricultural productivity. [1]

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- (b) Global warming predictions rely on an understanding of feedback mechanisms.

- (i) Define the term positive feedback. [1]

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- (ii) Identify a positive feedback mechanism associated with global warming. [1]

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16EP13

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*(Question 5 continued)*

- (c) Evaluate contrasting human perceptions of the issue of global warming. [4]

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16EP14

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16EP15

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16EP16