

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**5014 ENVIRONMENTAL MANAGEMENT**

**5014/21**

Paper 2, maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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- 1 (a) (i) loss of plant cover; roots pulled out; no roots to hold soil; loss of interception; erosion by wind; by rain; loss of minerals/nutrients/fertility; difficult for plants to regenerate; [3]
- (ii) same conditions; similar pastures/similar farms; same soil type; soil pH; same climate; same rainfall; [2]
- (iii) fair test/comparison idea [1]
- (iv) age of sheep/ size/type of pasture/farm/ AVP; [max 1]
- (v) Sardi, more milk; and lambs;  
OR Timahdit, more meat; more wool; (max one if both types discussed) [2]
- (b) (i) lambs 20(%); ewes 30(%); [2]
- (ii) extra feed in the dry season/eq so more growth/milk production/less disease as better fed; [1]
- (iii) only need to plant it once/ it is self seeding/ no need to plough; [1]
- (c) (i) 242; [1]
- (ii) driest July; AND wettest March; [1]
- (iii) drought causes a big decline in Medicago yield/not much difference between weedy and Medicago/eq; (allow Medicago still does better in drought years) [1]
- (iv) repeat the trial/eq; [1]
- (d) (i) **plan A** sheep might starve/overgrazing/eq; [1]
- (ii) **plan B** more food for sheep/eq; so survive drought; in non drought more sheep products to sell/eq [2]
- (iii) **plan C** more cash crops/income; not as reliant on one crop/more variety of crops; any disease would do less damage to yield/income; ref to crop rotation; ref to (beans)improved fertility/manures/sheep dung; [max 2]
- (e) (i) (description of) some crop rotation; intercropping; prevents soil erosion/water loss; suggest a specific cash crop; use of sheep manure; rotational grazing; ref to changes in year two; and three; AVP; such as ref to leguminous plants/N fixation [4]
- (ii) Soil fertility – organic matter not washed away/combined with soil; minerals not washed out/prevents/reduces leaching;  
Soil erosion – less surface runoff; so less soil washed away/no gully formation/eq; [4]

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- 2 (a) (i) phosphate; [1]
- (ii) 99 million (US\$); [1]
- (b) (i) most harmful minerals: lead; cobalt;
- reasons: both have 4 health risks/; least harmful mineral zinc as only one health risk;  
lead has risk of blood poisoning; cobalt has risk of skin irritation; [max 4]
- (ii) draw arrows pointing right; [1]
- (iii) lowest: algae highest: large fish;  
Algae short lived; only absorbs from water/eq; fish long lived; metal not excreted;  
bioaccumulates/stored in body; [max 3]
- (c) (i) 5(times more); [1]
- (ii)  $5 \times 100 \times 1 = 500 \text{ (m}^3\text{)}$  [1]
- (iii) added value; control of market; more employment; reduced transport costs; increased  
agricultural output; improved infrastructure; [max 1]
- (iv) orientation; labels on axes (units on at least one axis);; plots (no errors); [4]
- (v) increase in growth/eq;  
steady/no further increase/eq; [2]
- (vi) 18kg, as no further increase in yield/eq; [1]
- 3 (a) uses waste from coal burning; for 30 years;  
no need to transport tonnes of waste/low transport costs;  
reduce need for waste storage; export gives Govt money for infrastructure/eq; [max 2]
- (b) carbon dioxide released; leads to greenhouse effect/described/global warming;  
sulphur dioxide released; acid rain; [max 2]
- (c) no need to import coal; energy source is free; will never run out/sustainable/renewable/eq;  
ref to energy security; pollution free/eq; [max 2]
- (d) idea of no further building of coal fired power stations/use alternative energy sources;  
do not want to convert to oil/gas for electricity generation;  
solar power can be carried out in desert/unproductive land;  
can invest in solar slowly as demand increases; could sell surplus electricity to nearby  
countries;  
so workers experienced/trained;  
will need help from firms outside Morocco to start with;  
AVP; such as desert sparsely populated/eq [max 4]