



MARKSCHEME

November 2013

ENVIRONMENTAL SYSTEMS AND SOCIETIES

Standard Level

Paper 2

20 pages

*This markscheme is **confidential** and for the exclusive use of examiners in this examination session.*

*It is the property of the International Baccalaureate and must **not** be reproduced or distributed to any other person without the authorization of the IB Assessment Centre.*

Subject Details: Environmental Systems and Societies SLP2 Markscheme

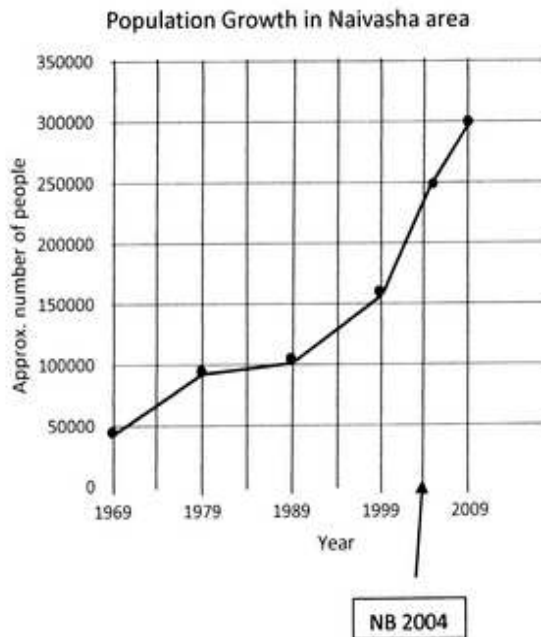
Mark Allocation

Candidates are required to answer **ALL** questions in Section A [**25 marks**] and **TWO** questions in Section B [**40 marks**]. Maximum total = [**65 marks**].

1. A markscheme often has more marking points than the total allows. This is intentional.
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 **WTTE** (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.

SECTION A

1. (a) (i) (papyrus) swamp / freshwater lake / tropical grassland / river / savanna / flower farm / small farms / Crescent Island; [1]
Award [1] for any two of the above.
- (ii) tilapia / water hyacinth / crayfish / black bass; [1]
Award [1] for any two of the above.
- (b) Award [1] for two inputs.
(Malewa & Gilgil) rivers / groundwater flow / rainfall/storms / run-off from Abedares;
N.B. “rainfall” OR “storms” is acceptable for 1 of the inputs, but not 2.
Award [1] for two outputs.
evaporation / transpiration / abstraction (for whatever purpose) / underground water flow; [2]
- (c) (i) Award [1] for correctly labelling axes (“year” and “approximate number of people”) AND using a consistent scale (including full range in equal intervals) with time on the x-axis. *N.B.* it would be acceptable to have intervals labelled 1969, 79 ...etc. providing intervals are equal in value.
Award [1] for accuracy of line (accurate plotting of points and drawing of line).



- (ii) Award [1] for two ways
deforestation leading to soil erosion;
overgrazing leading to siltation/soil erosion;

[2]

over-harvesting/over-irrigating so soil is depleted in minerals;
 application of agrochemicals/broken sewage system leads to toxification;
*Responses must link human activity to soil degradation eg just
 “deforestation” or “overgrazing” is not sufficient.
 Accept other reasonable responses of equivalent validity, significance &
 relevance.*

[1 max]

- (d) (i) $68 (\% \text{ hydro}) + 9 (\% \text{ geothermal}) = 77 \%$ [1]
*Response must have a minimum of “68 + 9 = 77” ie Responses lacking the
 sum should **not** be credited. (“%” not essential here for a mark, as it is in
 stem of question)*

- (ii) *Advantages/limitations [3 max]:*
 cheaper costs for flower farms for heating greenhouses;
 cheaper electricity costs for local people / tourism;
 reduced reliance on fossil fuels / increased energy independence / increased
 % renewable energy;
 reduced greenhouse gas emissions;
 provides employment opportunities for local people;
 will decrease ecological footprint of country/Kenya;

Disadvantages/weaknesses [3 max]:
 potential increase in conflict between tourism and energy generation / visual
 pollution from steam or ugly buildings;
 increased abstraction of water;
 loss of habitat/agricultural land due to more buildings;
 possible thermal pollution increasing;
 expensive set-up costs;
*Accept other reasonable responses of equivalent validity, significance &
 relevance.*

[4 max]

- (e) (i) to act as a control/pristine/untouched/untouched site/baseline study/as a
 comparison to the other sites;
 to measure impacts of pollution/fertilisers/tourism/eutrophication/hyacinth
 invasion on the lake/reserve;

[1max]

- (ii) because secchi disk method requires incoming light / secchi disk measures
 light penetration/ depth that light reaches / plants prevent light reaching
 secchi disk / make it dark so prevent measurement of transparency;
*Just mentioning plant cover prevents light entering is not enough for the
 mark, response must relate problem to use of secchi disk/measurement of
 transparency.*

[1max]

- (iii) *Some sites may be lower because:*
 of sediment being washed in;
 shallower waters allow for more disturbance of bottom sediment;
 of more algae due to nutrients from town sewage;
 of suspended material from sewage input/domestic farms;
 of more algae due to run-off of fertilisers;

Do not accept “greater cover by hyacinths”, since this only affects incidence of light, not transparency of water, and was avoided in the methodology anyway.

[2 max]

- (f) global warming/climate change/local changes in microclimate;
(seasonal) depth of water / shallower lake warms/cooling more quickly;
hot water being discharged into the lake from geothermal power plant;
increased natural tectonic/geothermal activity;
seasonal changes in cloud cover/precipitation/sunlight hours;
change in level/temperature of river/incoming water/run-off;
increase/decrease in shading from hyacinth cover;
increasing turbidity/suspended particles/eutrophication may increase temperature;

[2 max]

- (g) YES – flower farm is biggest source of pollution because water hyacinths/algal growth are highest there;
the hyacinth cover is 33.7 % higher than pristine / 18.7 % higher than town;
algal growth is 195 mg m⁻³ more than pristine / 160 mg m⁻³ more than town;

NO – because flower farm abiotic data/pH & transparency is closest to pristine/reserve data;

ie only 0.1 difference in pH / only 28.8cm different in transparency;

town is biggest source because transparency is lower / turbidity is higher;

ie 8.2 cm less light penetration than flower farm;

pH shows greater difference from “pristine”/reserve/baseline measurement;

ie pH 7.93 compared to 8.70 whereas flower farm is 8.80;

river is biggest source because transparency is the least of all sites;

ie 22.6cm less than flower farm / 31.4cm less than pristine;

But data is insufficient to be sure of causes / it all depends on which pollutant you are measuring;

Credit may be given to responses that take the river (rather than the reserve) to be a reliable baseline/control with which to compare pollution levels eg

YES – because flower farm has higher hyacinth cover/algal growth/pH than incoming water/river (as a baseline measurement);

ie 15.9 % higher hyacinth cover, than river / 343 mg m⁻³ algae, more than river / pH8.8 compared with pH7.28 in river;

Accept any conclusion that is consistent with data in the table.

Do not credit “yes, correct” / “no, not correct.”

[2 max]

- (h) (i) involves cooperation of different groups who are responsible for the problems;
drip irrigation is less wasteful/reduces losses from evaporation/leaching of nutrients;
metering will reduce/monitor abstraction/wastage of water resources;
controls on pesticides/fertilizers will minimize pollution/eutrophication;
conduct codes will educate for long term perspectives not short term exploitation;
effective sewage treatment will minimize pollution from human waste;
measures employ/emphasise small scale/local management of issues;

[3 max]

*Do not accept simple repetition of items on Fig. 8 list; responses must indicate **how** these measures lead toward sustainability.*

- (ii) *Accept either self reliance soft ecologist or environmental manager.*
eg self reliance soft ecologist because:
community involvement/participation is important;
education of people / personal improvement through codes of conduct;
opposed to use of commercial chemicals / excessive use of resources;

Or...

eg environmental manager because:
economic growth and resource exploitation continues with management;
metering is an example of economic adjustment/appraisal/small-scale technology;
assumption that people have a right to expect minimum environmental standards/quality;
consensus among interested groups;

Allow [1 max] for a counterargument against other approaches:

eg not Deep Ecologist because approach is:
people-centred approach / no reference to rights/biorights of organisms;

eg not Cornucopian because approach:
restricts use of resources/available technology / utilises codes of conduct/political manipulation rather than scientific expertise;

[2 max]

SECTION B

General Essay Markscheme

Each essay is marked out of **[20]** of which **[2]** are for clarity of expression, structure and development of ideas.

[0] Quality of expression, structure and development is poor.

[1] Quality of expression, structure and development is limited.

[2] Quality of expression is clear, structure is good and ideas are well developed.

*Do not penalize candidates for writing in bullet pointed lists – if this technique is used appropriately ie to summarize or outline a list of points within an essay at an appropriate point. However, a candidate who has not shown **any** evidence of being able to write a paragraph with a developed, logical line of reasoning would not be able to achieve maximum marks.*

2. (a) *For full credit, response must include a named ecosystem eg Alpine Pine Forest in Swiss Alps.*

Award [1 mark] for establishing control/baseline and repetition:

make a baseline study before human activity begins and repeat at regular intervals over time after the human activity / or at different distances from human activity;

Award marks as follows for methods to record changes due to human activities [3 max]

use appropriate biotic sampling method eg randomised quadrats/water samples/kick samples/mark-release-recapture/Lincoln Index to establish abundance of species;

...and to use Simpson's diversity index to establish species present/diversity;

use relevant/standardised/sampling method of measuring abiotic data eg light meter/ anemometer/thermometer/pH meter/Secchi disk;

[4 max]

Award [3 max] if no specific ecosystem named.

- (b) *Effect on nitrogen cycle (no credit to be given for simply describing N cycle):*

[3 max]

production of nitrogen based fertilizers has converted large amounts of N₂ into NO₃;
agriculture/use of fertilisers/biomass burning has added large amounts of NO₃ to ecosystems;
fossil fuel based cars/power plants release large amounts of NO_x into atmosphere;
over-harvesting/irrigation has reduced mineral N in soils;
release of sewage/livestock effluent has increased N content in waterways;

Impact on ecosystem: [4 max]

General:

NO_x enters atmosphere and combines with H₂O to form acid rain;
NO_x is a powerful greenhouse gas which leads to global warming/climate change;

Specific:

acid rain causes needle loss in pine forests;
acidified soil can lead to leaching of cations/essential minerals/ Ca⁺⁺ out of soil;
excess NO₃ in soil may change species composition in the ecosystem;
loss of nitrates through harvesting/irrigation lowers productivity;
NO₃ leach into water and can lead to eutrophication of water bodies;
acid rain can lead to acidified water/death of pH sensitive species;
and increase in heavy metals/aluminium ions in water, damaging fish;
these abiotic changes may reduce biodiversity/stability of systems;
climate change may lead to destruction/flooding of ecosystems / shifting biomes;

[6 max]

- (c) *Description of EIA [2 max]:*

an evaluation of current ecosystem/environment and likely impacts from the development;
often it is a legal requirement and ideally independent of (but funded by) the developer;
involving a baseline study and subsequent monitoring of a variety of environmental aspects including eg ecological, social, economic, aesthetic during and after the development;

Evaluations of the role and outcomes of EIA in two different societal structures [8 max]:

Societal structures should be allowed a very broad interpretation ie candidates may compare or describe eg MEDCs and LEDCs; two countries; or two societal structures within one country eg western capitalist society and first generation Americans; two socioeconomic groups; two different societal institutions.

N.B. *The following marks should NOT be awarded for statements that simply describe an EIA; there must be some evaluative element (positive or negative; effective or ineffective etc) to gain the mark.*

time-consuming so may effectively prevent valuable development / or not be completed in time to prevent development;
wide variety of skills needed to collect appropriate data which implies extensive recruitment/education/cooperation;
conflicts of interest as developer pays for the EIA which may bias findings;

raises awareness of local viewpoints so promotes community ownership;
allows the local community an input into the development of their area /
empowers minorities;
monitoring post development is often not completed so usefulness is limited;
EIA have proved to be a very useful in MEDCs where environmental and
economic priorities are more equal *WTTE*;
cost of EIA may be too high to be carried out effectively in less wealthy societies;
in LEDCs economic development may be higher priority than environmental
concerns;
...recommendations in EIA may therefore not be followed;
some societies/LEDCs may not have the expertise to carry out effective EIAs;
in some countries corruption may influence decisions rather than EIA;
in some countries political/lobby groups have a bigger influence on development
than others;
countries that have incorporated environmental/sustainability ideas into their
constitution (eg Ecuador and Bhutan) may be more inclined to use and fully
implement EIA;
*If no direct links to any named societal structures are made award [3 max].
If only one societal structure is named, award up to [4 max].*

*Allow credit for different approaches to this question eg a "case-study"
approach:*

EIA manifesting the ecological significance of redwood (for temperate forests'
ecology) would allow American Indians to continue their traditional way of life;
EIA manifesting the ecological significance of redwood would cause an increased
concern for loggers losing their major source of income;
an EIA allowing timbering of redwood forest would offer economic benefit to
timber industry/ would promote economic development of region / would offer
jobs to loggers;
an EIA allowing timbering of redwood forest may cause relocation of local
Amerindians;

[8 max]

Accept other reasonable responses of equivalent significance, validity & relevance.

Expression of ideas: [2 max]

Total: [20]

3. (a) *Award [1] for two examples.*
flood control / regulating river flow;
timber for firewood and building;
food eg fruits and nuts from local trees;
reduction in soil erosion;
aesthetic value / tourism;
recreational value eg hiking;
Accept other equivalent valid responses that are relevant to named area.

Award [1 max] if no named protected area eg Palani Hills Conservation Area, South India

[2 max]

- (b) *Award [1 max] for general definition/principle of sustainable management & natural income:*
sustainable management ensures use of the protected area at a rate that allows natural regeneration/minimizes damage to the environment/is available for future generations *WTTE*;
in sustainable management, natural income is utilised without depleting natural capital;

Analysis: Award credit for responses that address forms of natural income (with specific examples) and address their role or influence upon sustainable management [8 max]:

natural income is essentially what is being protected *ie* natural population growth and abiotic processes;
natural income has important role in sustainable management because it may provide support for project;
maintaining/improving natural income of ecosystem services improves sustainability;
eg reforestation/removing alien species improves natural income leading to greater biodiversity;
planned local use of natural income/goods (*eg* firewood, regulated grazing, food);
...generally increases the success/sustainability of a protected area by encouraging local support and cooperation;
but conflicts may arise between local people using natural income and the area management; tourism/recreation is one form of natural income;
...that generates funding for staffing/management costs/effective protection of the park;
...and also provides local employment/education/awareness / raises profile of area in local community / increases sustainability of local community;
but tourism/recreation also places pressure on the ecosystem through waste/path erosion/disturbance;
and tourism/recreation can reduce aesthetic value of the area *eg* commercial infrastructure/hotels/noise;
difficult to quantify the value of some natural income/ecosystem services in economic terms;
natural income from a protected area may provide essential services for ecosystems far outside the area/or even globally;

Award [5 max] if these points are not directly related to named protected area. (Full credit, however, can be awarded to responses that indicate reference to same area named in Q3a without actually repeating the name.)

Accept other reasonable responses of equivalent significance, validity & relevance.

[8 max]

- (c) *Award [1 max] for correctly identifying eg of both intergovernmental and non-governmental organisations (Full credit can be given to responses that refer to one or more examples of each):
eg UNEP=IGO and WWF=NGO;*

Award [7 max] for discussing impact of named IGOs and NGOs, [5 max] for responses where no examples of actions/impacts are given (eg Biodiversity Convention; orang-utans; Palani Hills; as below).

IGOs have an impact when directing/advising government policy / setting agreements/treaties;
IGOs eg UNEP is actively involved in negotiations for eg Biodiversity Convention thus preserving important habitats;
IGOs often have less impact than NGOs on a local level in protecting ecosystems;
...because they have a more global perspective / because they have less influence over local communities;
intergovernmental agreements eg CITES / Ramsar Convention have global influence but take a long time to make a difference;
NGOs eg WWF are based world-wide and raise funds to support ecosystem conservation/protection eg orang-utans in Malaysia;
...particularly active/effective in LEDCs that lack funding / less able to implement measures from IGOs;
usually their impact comes through high media visibility/public profile amongst the general population;
...but in large organizations a great deal of money goes to maintain the organization itself, rather than actually impacting environmental issues;
smaller, local NGOs, can bring about more rapid and lasting change due to good community links;
...but struggle to raise funds to buy equipment/pay staffing etc necessary for effective impact;
greatest impact may be achieved when NGOs work in cooperation with IGOs;
eg Palani Hills Conservation Council and Vatakanal Conservation Trust in South India are examples of NGOs that have worked closely with forestry service to improve watershed protection;
...and provide education for local people to improve the success of their projects;
If responses give incorrect eg of IGO or NGO (eg a GO) apply ECF (ie do not award mark for eg but credit any further points that are consistent with IGO or NGO) and award [5 max] for whole question.

Accept other reasonable responses of equivalent significance, validity & relevance

[8 max]

Expression of ideas: [2 max]

Total: [20]

4. (a) volcanic activity associated with plate movement can give rise to new oceanic islands;
 mountain building creates greater habitat diversity due to range of altitudes;
 plate activity gives rise to unique ecosystems *eg* deep oceanic trenches/submarine volcanic outlets;
 habitat diversity increases the niches available and so increases species diversity;
 mixing of gene pools from different regions (*eg* India and Eurasia)/ land bridges created an opportunity for new species to form;
 divergent plate activity/island formation/mountain ranges isolate populations creating opportunities for speciation;
eg the dividing of Pangea creating new oceans and continents;
 divergent plate activity shifts ecosystems to new latitudes with new climatic conditions;

[4 max]

- (b) *Definition of carrying capacity [1 max]:*
 Carrying capacity is the maximum number of a species/“load” that can be sustainably supported by a given environment/habitat/ecosystem;

Comparisons/Contrasts [6 max]

populations are generally limited by density dependent factors/limited resources as they approach carrying capacity;
 human populations may be less influenced by these factors;
 generally, fertility decreases/mortality increases/migration increases in response to exceeding the carrying capacity;
 famines/water-shortages/environmental degradation may suggest that humans have exceeded their carrying capacity / **whereas** other species rarely exceed the carrying capacity (for extended periods of time);
 human population growth is following a J-curve/not limited by carrying capacity / **whereas** most species follow an S-curve/fluctuate widely around carrying capacity;
 difficult to determine the carrying capacity of humans / **whereas** for most species it is less complex;
 this is because humans use a great variety of resources / **whereas** for most species one of a few possible resources is limiting;
 and humans have ability to switch resources when they are limiting / **whereas** most species have a limited range of available resources;
 carrying capacity of some regions can be exceeded through importation of resources / **whereas** other species depend solely on availability in their immediate environment;
 technological developments allow greater efficiency in resource use for human populations / **whereas** other spp depend on their adaptations/cannot develop “technological” solutions;
 other species rely solely upon slow evolutionary processes to improve efficiency of resource use / **whereas** human mental/social skills enable them to adapt to change far more rapidly;
 humans may take conscious action to control population growth through policies / **whereas** other species rely upon natural processes/environmental resistance;
 for other species, carrying capacity may fluctuate dramatically with changes in weather/food availability / **whereas** human populations can often adapt to significant changes with technology/imports/switching *etc*;

other species (usually r-strategist) following J-curve crash eventually / perhaps human population will eventually suffer similar crash;
in some LEDCs opportunities for switching/importing resources are limited so carrying capacity is more limiting as with other species;

*Award [3 max] if no explicit contrasts/comparisons are made with other species ie if candidate describes humans and/or other species **without** indicating the similarities or differences (as in the “whereas” statements above).*

Accept other reasonable responses of equivalent significance, validity and relevance.

*Award [5 max] for whole question if other species are just referred to generally with no **named** example.*

[6 max]

- (c) *Award [1 max] for a clear developed statement of candidate’s environmental viewpoint in relation to depletion of a correctly identified non-renewable resource. Accept a personal stance that is a combination of conventional viewpoints.*

eg I am an environmental manager because I feel we should have legislation in place to encourage research into renewable energy sources as oil is running out;

Award [7 max] for outline and evaluation of candidates own, and ONE other, contrasting viewpoint/approach. Do not credit discussion of more than two viewpoints.

eg Ecocentric approach/ viewpoint:

Outline [2 max]:

ecocentrics may believe in biorights and that human interaction with the environment should always be sustainable;

depletion of resource indicates the overexploitation of resources by humans;

humans need to reduce their consumption and lead simpler lives;

Evaluation [3 max]:

reusing/recycling will lead to longer life span of resources containing the resource;

limiting resource use will protect life of other species/biosphere;

limiting resource use will provide for future generations;

difficult to persuade people to change their lifestyles;

limiting resource use for LEDCs may hold back their development alongside MEDCs;

eg Environmental manager approach/viewpoint:

Outline [2 max]:

growth/development is possible with appropriate management;

effective population control will limit resource use;

taxes can be used to control the use of this resource;

governments can legislate to manage the resource;

Evaluation [3 max]:

can effectively limit resource use (through population control and disincentives);

allows for continued development/growth (especially important for LEDCs);

does not tackle the problem of overconsumption/unsustainable lifestyles;

puts human needs at the centre and may involve infringement of biorights;

eg Cornucopian approach/viewpoint:

Outline [2 max]:

humans have right to exploit environment as much as required for growth & development;

only limitations are scientific and technological expertise;

humans will find another alternative resources / new supplies of the resource;

or new technology to increase efficiency / exploit new sources / replace need of resource;

Evaluation [3 max]:

allows for continued development/growth (especially important for LEDCs);

scientific/technological developments have historically been used to extend resource use;

scientific/technological developments often cause even greater environmental problems;

does not tackle the problem of overconsumption/unsustainable lifestyles;

puts human needs at the centre and may involve infringement of biorights;

Award [4 max] if viewpoints are not clearly named or only one viewpoint is addressed.

Award [2 max] for each evaluation if only strengths, or only weaknesses, are addressed.

Accept other reasonable responses of equivalent significance, validity & relevance.

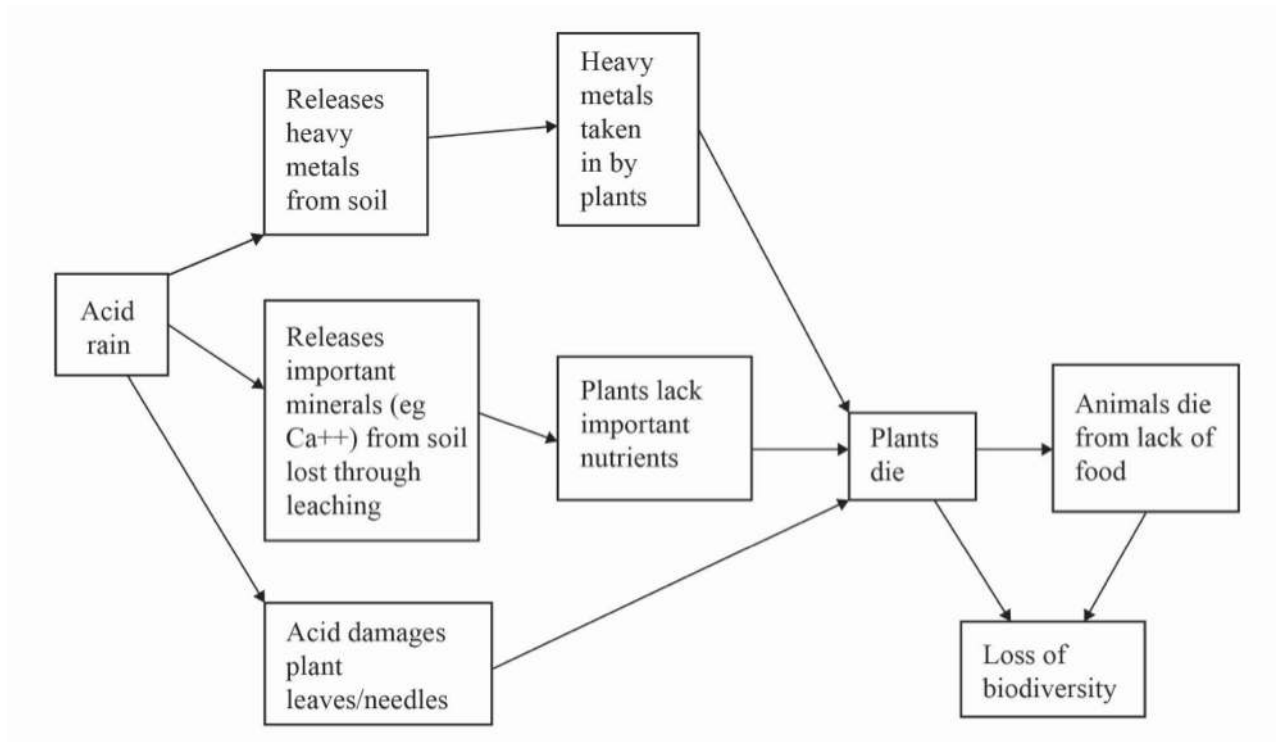
[8 max]

Expression of ideas: [2 max]

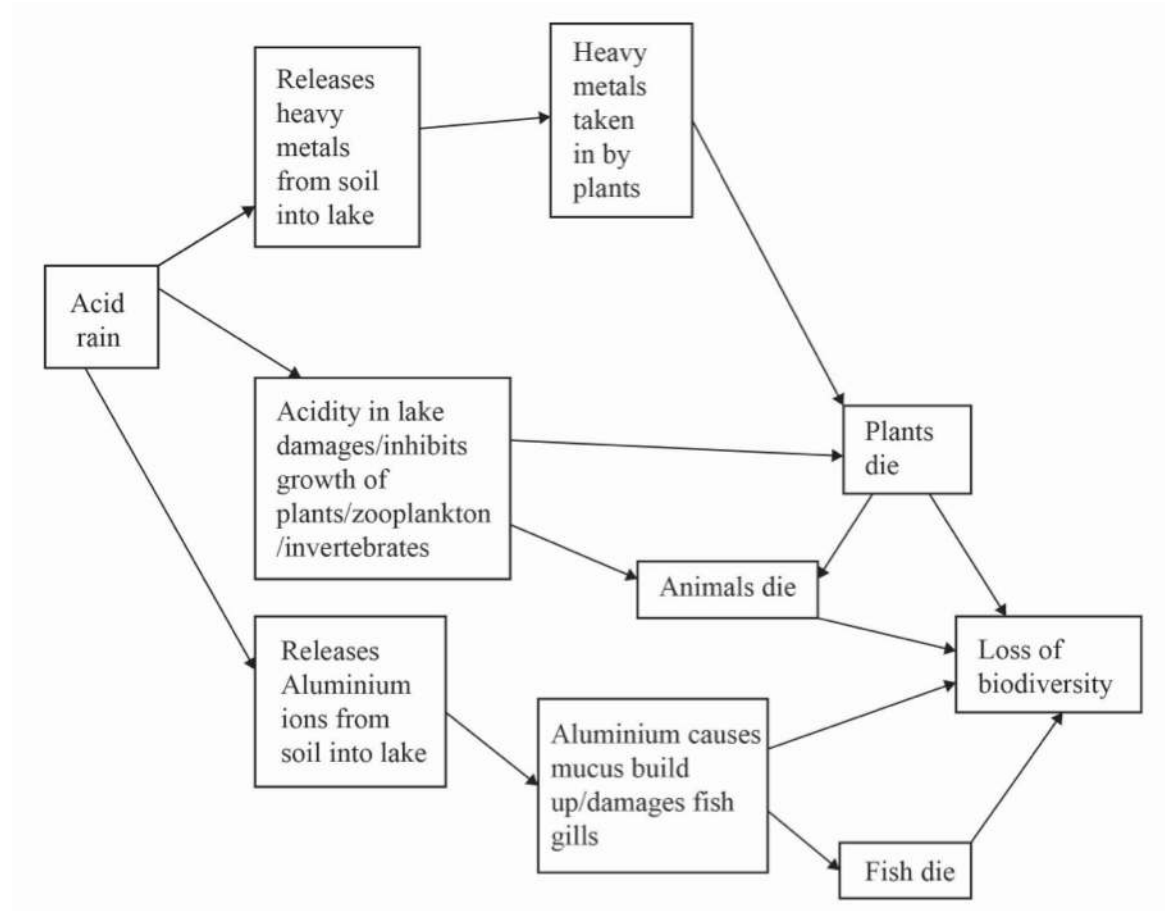
Total: [20]

5. (a) Credit may be given for flow diagrams that indicate cause and effect or conventional flows and storages.
Award **[1 mark]** for EACH correctly identified cause & effect link (arrow joining two boxes) **[3 max]**
Award **[1 mark]** for clarity/accuracy of diagram that includes impacts **[1 max]**

For terrestrial ecosystem eg:



For aquatic ecosystem eg:



- (b) *eg acid rain and carbon dioxide emissions (causing global warming/climate change):*

Comparisons/Contrasts [6 max]

both can be reduced by a reduction in fossil fuel use;
 both can be reduced by reducing private transportation / switch to public transportation;
 both can be reduced by a switch to renewable energy/resource use;
 both can be reduced by legislation/taxation/fines to control use;
 both can be reduced by reducing consumerist lifestyles/luxury goods;
 NO_x/SO_x may be point source pollutants that can be controlled at point of emission / **whereas** CO₂ is invariably non-point;
 NO_x/SO_x can be removed by scrubbers fitted to industrial outlets / catalytic converters fitted to vehicle exhausts / **whereas** no technology for removing CO₂ at point of emission;
 remediation/restoration can be applied to acidified ecosystems *eg* liming water bodies / **whereas** impacts of CO₂ are too widespread to restore affected ecosystems;
 CO₂ can be removed from atmosphere through carbon capture/re-afforestation *etc* / **whereas** it's not possible to retrieve NO_x/SO_x directly from atmosphere;
 because CO₂ has a far wider range of impacts and causes, there are many more strategies for approaching it;
eg mitigation of impacts through *eg* flood defence / *eg* reducing emission through reduced livestock farming / switching from heavy meat diets / reducing deforestation;

eg acid rain and CFCs causing ozone depletion;

Comparisons/Contrasts [6 max]

both can be reduced by education to adopt environmentally informed lifestyles/consumer choices;
eg acid rain can be reduced by opting for hybrid/fuel efficient cars / **whereas** CFCs can be reduced by opting for more efficient air-conditioning/refrigeration/CFC-free products;
 both can be reduced by reduction in rate of resource use;
 both can be reduced by switch to more renewable/sustainable resource;
 both can be reduced by legislation/taxation/fines to control use;
 ozone depletion is addressed by international treaties (Montreal Protocol) / **whereas** acid rain by national legislation (US Clean Air Act);
 catalytic converters/scrubbers can be fitted to reduce NO_x/SO_x emissions / **whereas** no such technology to remove CFCs at point of emission;
 CFCs are manufactured chemicals so can be commercially modified/replaced by safer alternatives / **whereas** NO_x/SO_x are naturally occurring bi-products of combustion;
 remediation/restoration can be applied to acidified ecosystems *eg* liming water bodies / **whereas** CFCs are persistent in atmosphere/no effective method of restoring stratospheric ozone;
 impacts of acid rain localised so easier to address impacts / **whereas** ozone depletion more widespread/global phenomenon;
 acidity can be neutralised through natural/intervention procedures / **whereas** CFCs are constantly regenerated through cyclical reactions;

Award [4 max] if no explicit contrasts/comparisons are made with other form of pollution ie if candidate addresses acid rain and another form of pollution without explicitly indicating the similarities or differences (as in the “whereas” statements above).

Accept other reasonable responses of equivalent significance, validity & relevance.

Award [2 max] for whole question if acid rain is the only named form of pollution addressed.

[6 max]

(c) *Reasons for different perspectives:*

Religious/cultural imperatives:

eg some societies have cultural beliefs that hold the natural environment in high regard;

so will be opposed to human activity that leads to global warming;

or may value national happiness over economic growth;

may believe global warming stems from western capitalist greed;

eg perspective of Buddhist cultures/first generation Americans;

some are more pragmatic/consumer-oriented/pro-economic development eg Western capitalism;

so may be less concerned with global warming issues / less willing to compromise lifestyles;

Political ideology:

more capitalist societies may rely heavily upon market forces to drive solutions to global warming;

and will value marketable goods over non-marketable services affected by global warming;

so may see global warming as a negative but necessary result of economic growth / be less concerned with addressing the issue;

State of development:

MEDCs can better afford to address global warming issues through more expensive alternative technologies/resources;

MEDCs have more extensive media availability/education and so may have more informed perspectives on global warming;

...or be more sceptical about causes/existence of the phenomenon of global warming;

high profile of science/technology in MEDCs may lead them to seek scientific/technological solutions rather than changes in lifestyle;

LEDCs may prioritise catching up in development with MEDCs rather than environmental/global warming issues;

LEDCs may not have the funding/expertise to address issues of global warming;

Imminence of impacts;

societies already experiencing possible impacts of global warming (eg flooding/severe weather patterns/drought) may be more sensitive to global warming issues;

Geographical location:

Northern societies may welcome benefits of climate change and be less concerned / societies in more vulnerable locations (eg coastal locations/low altitude) may be more concerned;

Award [1 mark] for a list of 3 or more general influences similar to those in the headings above.

Award [6 max] to responses that do not identify specific societies (eg Buddhist cultures; MEDCs; Northern societies etc)

Accept other reasonable responses of equivalent significance, validity & relevance.

[8 max]

Expression of ideas: [2 max]

Total: [20]
