Name:
Date:
Class:

## B ESS

# 1.4 Sustainability

#### Significant Ideas:

All systems can be viewed through the lens of sustainability.

Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Environmental indicators and ecological footprints can be used to assess sustainability.

Environmental Impact Assessments (EIAs) play an important role in sustainable development.



Sustainability and Natural Capital
1. Define "sustainability"  The use and management of resources that allows full natural replacement of the resources exploited and full revovery of the evasystem affected by their extraction and war
2. List the ways in which a nation might measure sustainability  Measuring the regranth/venewal of natural carpital  eg. If the rate of farest removal is less than the annual growth  then the farest removal is sustainable.
3. State at least one advantage of measuring sustainabilityon a local scale:  Advantage - Includes local methods/cultures that are evasystem special Disadvantage - class not include inter-relationships between systemson a global scale:  Advantage - many problems have worldwide impact.  Disadvantage - individual and small scale community action can be more effective or problem to local in nature (pant source pollution)
4. Define "natural capital"  resources that can produce a sustainable natural income or  goods or services  Notural capital can be rememble or non-renewable
5. For the country you live in (or you could choose the country you're from if it's different to the country you currently live in), list as many items of natural capital as you can think of that are provided by the ecosystem.  Frankincense, ou and gas, tourism, iron are, fisheries

Sustainability vs Natural Capital vs Natural Income
1. Define "natural income"  the yield obtained from natural capital can be products or services
2. Using examples, distinguish between natural income of <u>goods</u> and natural income of <u>services</u> .
Using the ocean as an example the goods provided
ove the fisheries products and the services ove the
recreational activities (guided shortaling for example)
3. Explain how unsustainable land use might affect natural income for the current <u>and</u> future generations.
Hints:
<ul> <li>Think about the <u>benefits</u> of unsustainable land use (there are some, at least in the short-term) as well as the drawbacks.</li> <li>Consider the various <u>goods</u> as well as <u>services</u> that land can provide, and the different people that benefit.</li> <li>Provide a <u>balanced</u> argument: should future generations be prioritized over the current generation? How might a technocentric person's opinion differ from an ecocentric person's opinion?</li> </ul>
Benefits of unstainable land use is high food yield but the drawback
are reduction in soil fertility and pollution
Land can provide food (local), medicines (local + global), co, absorption (local and global)
Ecocentric view would value the needs of the present generation without
compromising the future generation; they would advacate the reduction
in the use of mon-reachable resolution and invest more in renewable.

They would encourage education targeted towards self-systolinability

technological innovations can lead to the production of male restaurces

which can then guarantee present as well as future needs

- use of grey worter, grap their own had, reduce explogical hootprine.
Technocentrics argue that the present needs much be met and that



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#### The Millennium Ecosystem Assessment

- The MEA is very extensive and a lot of information has been published. To explore this
  research, a good place to start is the "Ecosystems and Human Wellbeing: Synthesis",
  available here:
  - http://www.millenniumassessment.org/documents/document.356.aspx.pdf.
- The research has also been summarised in a more accessible format at this website: http://www.greenfacts.org/en/ecosystems/index.htm

T. Gottimaniae the polipose of the minoritian Ecosystem Assessment
Funded by the UN and started in 2001, is a research programme that
focuses on how exacustoms have changed over time and predict what
in happen in the future

2. Summarise the key findings of the MEA with regards to:

1 Summarise the purpose of the Millennium Ecosystem Assessment

٦١	The percentage o	facosystams	worldwide that	are currently h	seina dearaded
αı	ne percentade o	t ecosystems	worldwide that	are currently b	seina aearaaea

60% of the world's ecosystems have been degraded

b) Fishstock exploitation

over 25% of all fish stocks are overharvested

c) Surface freshwater use

we use 40°10-5016 of all available surface freshwater

c) Mangroves

35% of margraves have been destrayed

Use the "Ecosystems and Human Wellbeing: Synthesis" to get information to answer the following question:

- 3. Regarding biomes (see page 4)
- a) Which three biomes had the most area converted by 1950?

Mediterranean forest, temperate forest, temperate broadleaf and

b) Which three biomes had the most area converted between 1950 and 1990?

Tropical and subinapical dry broad-leaf forests, flooded grasslands and subtrapical grasslands

c) What is the main cause for biome conversion?

Agriculture



4. Regarding extinction rates (see page 5):				
a) What is the current situation on global animal extinction rates?				
rate is roughly 50-500 times greater than 01-1 extractions per 1000				
b) How is this expected to change in the future?				
The rate will be more than 10 times higher				
5. The report states (Page 6) that "The degradation of ecosystem services often causes significant harm to human well-being."				
a) Figure 8 on page 9 will help answer the following:				
i) State the natural income of goods a forest can provide				
Timber, fuel, had, medicine				
ii) State the natural income of services a forest can provide  Carbon sequestration, watershed protection, aesthetie, recreation				
b) In what way(s) might a forest ecosystem's <u>services</u> become "degraded"?				
when forests are cut services can be degraded with pollution				
or eliminated				
c) Using forests as an example, explain how the use of natural capital for "marketed benefits" may be less economically sustainable than use for "nonmarketed benefits".				
The commonly marketed benefits come from tumber, fivel wand and				
grazing. These can be less evonomically sustainable for the long term				
becomes they cause direct degradation and loss of resources (eg soil)				

#### **Environmental Impact Assessments**

1. Outline the purpose of an Environmental Impact Assessment.

Establish the impact of a project on the environment. Aredicts possible impacts on habitats, species and ecosystems and helps to determine if the project should go ahead or to mit gate impact

2. Using the table, briefly outline the stages of creating an EIA

Stage	Details
Screening	once all project designs have been considered determine if the development will impact the environment significantly
Scoping	Define issues that need to be addressed. Focus on impacts that will have a significant effect on the environment
Baseline study	study current state of the environment against which change due to the development can be measured.
Impact prediction	Interpretation of the importance or significance of the impacts. Conclusions used to decide fate of project.
Mitigation	Taking measures to reduce or remove environmental impacts
Monitoring/ Assessment	Used to determine; accuracy of predictions, degree of deviation from predictions, reason for deviations, effect of mitigation

3. Oi	utline the	reasons for	creatina	a non-technica	l summary	<sup>,</sup> of an EIA.
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Make the report more accessible to non-scientians including media and general public.

Allows involved parties to be informed



4. Summarise at least four criticisms of EIAs.
· baseline studies are often inaccurate or incomplete
· not all impacts may be identified
. there is no standard to the acceptance of the EIA
some countries use it within their legal framework, some
was in to inform policy decisions and others ignore it
· accurate monitoring dependent on bosseline strang
and may also be inaccurate.

### **Ecological Footprints**

- 1. Outline what is meant by the term "ecological footprint".

  The area of land and water required to sustainably provide ou the resources at the rate at which they are being consumed by a given population.
- 2. Outline how the following factors relate to the ecological footprint of a country. The first one has been done for you.

Factor	Details
Cropland	The amount of land required to provide food for humans consumption (including food, animal feed, and other products taken from crops
Grazing land	The amount of land needed for meat production. The greater the meat consumption the greater the EF
Carbon sequestration	The more land with healthy vegetation the more combon implace for photosynthesis so reduced EF.
Forests	Increase carbon sequestration so reduce EF
Built-up land	Reduces the 2 preceding points more lively built-up land emits Gossil fivel emissions so increases EF
Fisheries	The greater the Roberies the higher the EF whether fishing or Rob farming



An ecological footprint is often expressed as an area of lo footprint is larger than their actual land mass, then they a probably not sustainable.	and: if the size of a nation's ecological re living beyond their means and this is			
3. Explain the link between EF and sustainability				
The EF measures the lound and wat	er needed to pronde			
resources for the population if this	exceeds the land and			
water that is available (fixed) that	is not sustainable.			
The higher the EF the greater the i	unsustainability			
Another convenient way to think about an EF is "number Earths would we need if everybody on the planet lived yo	our lifestyle?			
4. Using the "number of Earths" method, make a sensible <b>Justify</b> the answer your give.	estimate of your ecological footprint.			
5. Do some online research: find the ecological footprint of the country you live in, and compare it to the ecological footprint of one other country, and <b>explain</b> the differences. You may find data to explain the differences and/or you may use your own knowledge about lifestyle differences between the two countries.				
http://data.footprintnetwork.org is a useful resource for thi				
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Environment hot and day	cold and wek			
high GHG emissions				
high worter use				
limited recycling				

