

Name: _____

Date: _____

Class: _____

IB Environmental Systems and Societies

8.4 Human Carrying Capacity

Significant ideas:

Human carrying capacity is difficult to quantify

The ecological footprint is a model that makes it possible to determine whether human populations are living with carrying capacity.



Carrying Capacity

1. Define carrying capacity.

maximum number of a species or 'load' that can be sustainably supported by a given area.

2. Explain how the following things make it difficult to quantify human carrying capacity

We use a wide range of resources

This makes it much more complex to calculate. Animals would just need food, water, shelter for example.

We can substitute resources if they run out

We can find alternatives to resources that are being depleted so we might not reach the carrying capacity because the resource is not 'limited'

We all have very different lifestyles

Resource use varies greatly from one individual to another.

This is due to lifestyle, culture and economic situation so there is no single number that be used for everyone.

We import and export our resources

We have to look beyond the local environment - the number and relative contribution of these other environments will vary greatly.

We are constantly developing new technology

leads us to change the resources we use and how we use them.

We could use less if machines become more efficient or more if we gain access to new resources e.g. shale oil



3. It may be possible to increase our carrying capacity. Read the opinion below:

"The Earth has enormous carrying capacity for humans, but we've got to be the generation of change if we want to utilize that capacity. It's time for legislation on energy use; electric cars on every drive-way and solar panels on every roof should be set in law."

a) Which environmental value system do you think is being expressed here? Justify your answer.

Technocentric as they argue that the human carrying capacity can be expanded continuously through technological innovation and development. Using resources efficiently means they will last longer.

b) Choose a different value system from the one you mentioned in answer "a)". How might a person with that value system approach the issue of limited carrying capacity?

Ecocentrists may try and reduce their use of non-renewable resources and minimize their use of renewable ones. Some would try and become more self-sufficient - grow their own food, use rainwater and grey-water recycling for their water use.



Ecological footprints

1. Describe what is meant by the term "ecological footprint" hypothetical model
is the area of land and water required to support a defined human
population at a given standard of living. Takes into account the
resources needed and the assimilation of all waste.

2.
a) According to footprintnetwork.org, the global ecological footprint is about 1.5 Earths.
Explain what this means.

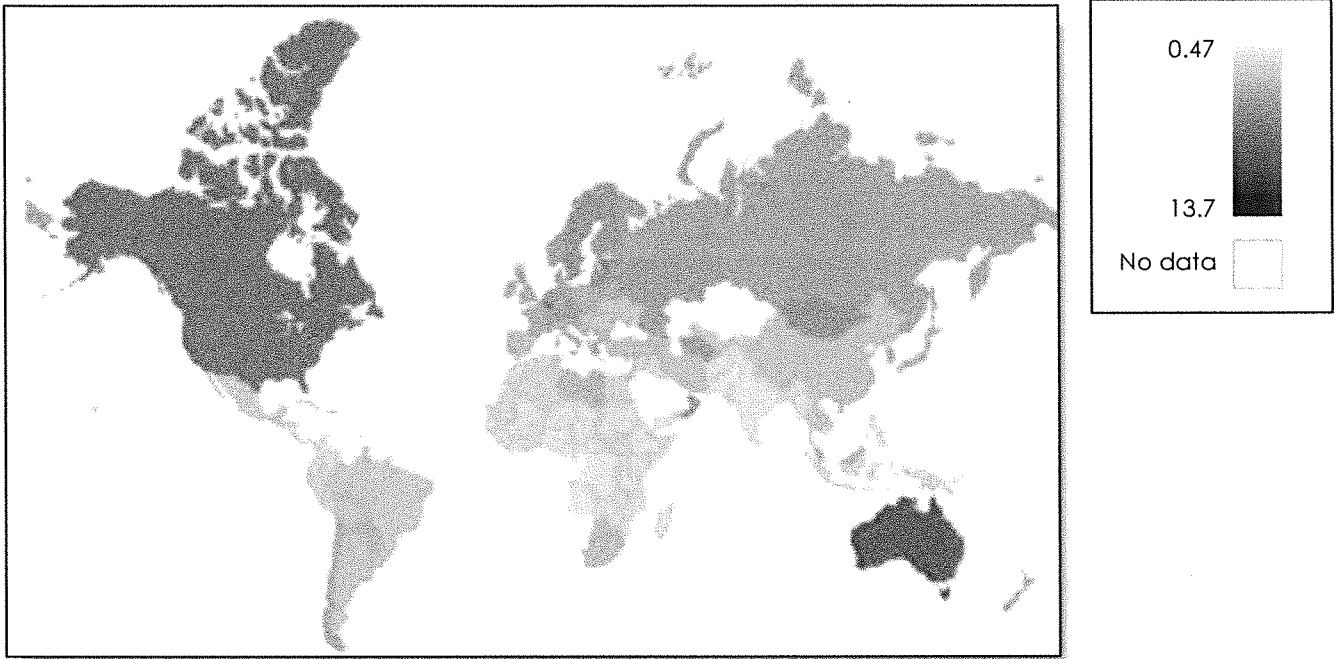
We are consuming resources and assimilating waste on a scale
that would require a land area 1.5 times that of the Earth
if we were to be sustainable.

b) An alternative way of presenting ecological footprints is as "global hectares per
person". Explain the meaning of this unit of measurement.

This relates to a fair Earthshare and is the amount of land
each person would get if all the ecologically productive land on Earth
were divided equally among the present world population.



3. The map below shows the ecological footprint in g ha per person ("global hectares per person) of a number of nations in 2013.



(Data source: <http://data.footprintnetwork.org/compareCountries.html>)

a) Describe any trends you observe in the data.

MEDC have a higher ecological footprint than LEDCs.

b) Explain any trends you observe in the data using your own knowledge.

Hint: think about any economic, cultural and social factors that might influence the EF of a nation.

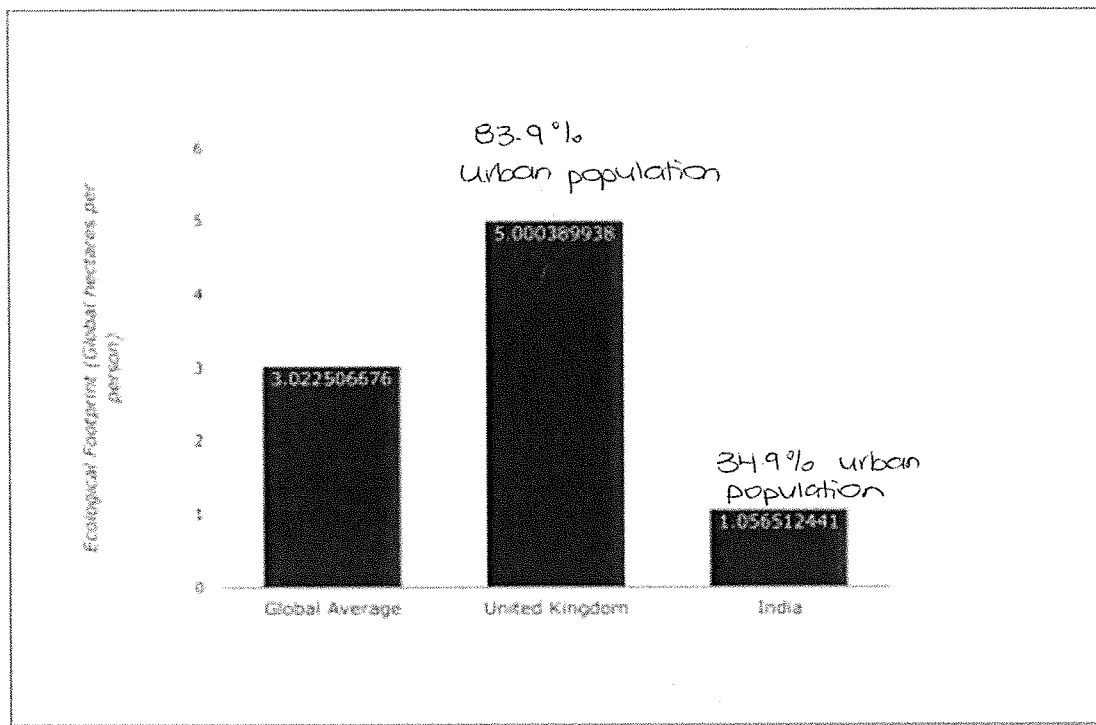
In MEDCs people have more disposable income and demand for energy resources is high. Consumption is also high because resources use is often wasteful.

A meat eating diet is prevalent in MEDCs which increases EF.



Comparing ecological footprints – Research task

1. The chart below shows the ecological footprint of two nations compared with the global average (2013 data).



(Data source: <http://data.footprintnetwork.org/compareCountries.html>)

Conduct your own research to find demographics and data regarding these two nations (and others if relevant) to answer the question:

“Explain the differences in ecological footprints of the United Kingdom and India with reference to the global average.”

Hint: A good place to find information is the CIA World Factbook (<https://www.cia.gov/library/publications/the-world-factbook/>). Use it to find information on things like energy sources, imports and exports, waste etc. for each country. Try to find reasons why the EF of the UK is much higher than India, and why each one is above/below the global average.

UK higher than the global average - heavily industrialized MEDC, only 15% below poverty line, people has a meat-rich diet, wealthier so are able to access resources, high access and usage of electricity from fossil fuels. \$615.9 billion in imported goods (manufactured goods, machinery, fuels, foodstuff)

India lower than the global average - less industrialized LEDC, less meat consumed, 21.9% live below poverty line so have less access to resources, only 71% of the country have full access of electricity, only \$452.2 billion in imported goods (Crude oil, precious stones, machinery, chemicals, fertilizer, plastics, iron and steel)

