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Geography
Teach Yourself Series
Topic 3: The Impacts of Land Use

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The Impacts of Land Use

Introduction to Impacts of Land Use

Large-scale and small-scale changes can produce both positive and negative impacts upon the environment. Land use intensification, for example, can affect an area's capacity to generate agricultural products (because the best agricultural land has been converted into suburban housing developments), but allows for other forms of community development.

Large-Scale Changes: Population Growth and Urban Sprawl

As it appears in Unit 3

A significant large-scale change to land use is the population growth which is increasing the urban density and sprawl in cities around the world. This land use process has an important impact on the natural environment which is being developed to meet the demands of the growing population.

Match the Cause to its resulting Change and Impact (adapted from: *Changing the Land,* 2016).

CAUSE	CHANGE	IMPACT
Increase in untreated stormwater run-off (cause by roofs, roads etc.)	Loss of forest and increase in reflective surfaces	Loss of habitat, reduction in bushland, loss of biodiversity
Urban and agricultural development	Fragmentation of remnant bushland	Urban Heat Island effect leading to increased temperatures
More hard surfaces (such as roads) case by increased urban density	Cleared land	Lack of genetic diversity, susceptibility to disease
Urban sprawl and its associated infrastructure	Pest and weed infestation	Erosion, poor water quality, flooding, changed flow regime, etc.
Introduction of foreign species (such as rabbits, blackberries etc.)	Additional water and pollutants entering waterways	Competition with indigenous species for habitat

Review Questions

1. Population growth has caused an increase in urban sprawl and impacted the environment. Is this a short-term or long-term impact? Why?

Small-Scale Changes: Reduction of Environment Degradation

As it appears in Unit 3

Water-sensitive urban design

What: Water-sensitive urban design is a planning and design approach to managing stormwater which works to minimise the impact of urbanisation on local waterways. Degradation of local waterways can be caused by urban development in previously forested catchments.

Why: Stormwater run-off entering urban creeks, when left untreated alters the natural flow regime and degrades the water quality. The water-sensitive approach allows for groundwater supplies to be recharged, and the demand on potable water to be reduced.

How: An increase in the amount of stormwater run-off alters the process of the water cycle. In this way, storm water becomes an effective resource as opposed to a waste product.

Urban Heat Island effect

What: The Urban Heat Island effect causes urban areas to be warmer than surrounding rural areas. This results from the replacement of vegetation with dense building materials, and the fast removal of water through urban drainage systems.

Why: Maintaining a healthy urban forest can reduce the UHI effect by providing shade. The benefits of a healthy urban forest include stormwater absorption and improvements in air quality.

How: By using water-sensitive urban design to slow the drainage of water, evaporation and transpiration is increased.

Establishment of wildlife corridors

What: Wildlife corridors are areas of bushland are linked using remnant and revegetated bands of habitat.

Why: Wildlife populations are separated due to habitat fragmentation, a result of residential and commercial development.

How: The corridors enable species to move between different regions. This in turn enables populations to increase their genetic diversity, while reducing their vulnerability to disease and alterations to food and water supply.

Conservation of remnant vegetation

What: Remnant vegetation can be defined as the patches of native trees, shrubs, and grasses which remain as they were prior to development. This can include forests, woodland, rainforests, coastal heathland, and native grasslands.

Why: To maintain the habitat of native animals, for storage of carbon, to preserve clean water supplies, and to improve aesthetics.

How: Revegetation of nearby areas, weed control, fencing off of regeneration zones.

Planting of indigenous vegetation

What: Indigenous vegetation includes trees, flowers, grasses, and other plants which have developed, occurred naturally, or existed for many years in a particular area.

Why: To battle the reduction of biodiversity and enhance an ecosystem's ecological balance, to combat the loss of habitat and preserve the ecological culture, history and identity of a region.

How: Planting indigenous species in gardens and landscapes (a low-cost, low-maintance gardening alternative).

Indigenous vs Native
Indigenous: species that naturally occur in a specific region
Native: species that come from anywhere in Australia

Solutions to Review Questions

1. *The impact on the environment caused by urban sprawl is a long-term one. Land use intensification affects the area's capability to generate agricultural products and, if the area is industrial, there is the possibility that soil and watertable would be contaminated. Before other land uses could occur in the area this problem would need to be remedied.*

2. *Multiple answers possible. The following are examples of a suitable response:*

a. *Water-sensitive urban design: Pollutants and waste on roads in urbanised areas get carried into waterways by storm water. The water-sensitive urban design approach to managing stormwater minimises this impact by replicating natural water cycle processes in urban environements.*

b. *Planting of indigenous vegetation: Land is cleared in order to develop urban and agricultural areas. Planting indigenous vegetation works to counter this process of urbanisation, by providing low-maintenance habitats and contributing to the maintenance of bushland and biodiversity.*

3. *Multiple answers possible. The following is an example of a suitable response: The establishment of wildlife corridors is interconnected with the conservation of remnant vegetation as they both work to preserve native species. Wildlife corridors encourage the natural movement of species which can reduce their susceptibility to changes to food and water supply, while remnant vegetation provides habitats for native animals.*

4.

a. *Stormwater run-off: Urban run-off, particularly from industrial areas, negatively affects the quality of the waterways and drainage systems.*

b. *Human activity: Increased population, and in turn, increased human activity has resulted in additional pollution, litter, and noise.*

5. *The conservation of remnant vegetation is necessary for the storage of carbon and for the preservation of clean water supplies. In the context of the Dandenong Creek, this conservation plays a role in climate change endeavours and in remedying the poor quality water.*

6. *Multiple answers possible. The following are examples of a suitable response:*

Positive: *1. Economic advantages in that the manufacturing produces many jobs in this area.*
2. Social advantages in that these jobs will in turn attract residents to to the rural residential areas in the Green Wedge or to nearby suburbs.

Negative: *1. Envionmental disadvantages such as the clearing of land to develop the industrial area means a loss of indigenous vegetation and a threat to native animals.*

2. Social disadvtanges such as noise, and environmental disadvantages such as pollution from the manufacturing.