

2

Biodiversity

STRUCTURE

- 2.1 Introduction
- 2.2 Objectives
- 2.3 What is Biodiversity
- 2.4 Keepers of the Knowledge
- 2.5 Loss of Biodiversity
- 2.6 Unit End Exercise
- 2.7 Teacher Section



2.1

As described in Module 1, 'biodiversity' is a combination of two words - 'biological' and 'diversity'. Taken literally, biodiversity refers to the number, variety, and variability of all life forms on Earth. These include millions of plants, animals and micro-organisms, the genes they contain, and the intricate ecosystems of which they are a part.

If you want to get a feel of how much biodiversity is around us, just take a walk outside your room. Take a pad and a pen. In the garden of your house or school, or a park nearby try to note down the type and number of plants and animal species you find in an area of around 20x20 m. You need not know the names of all of them but can just write Bird 1, Bird 2, Insect 1, Insect 2, Flowering plant 1, Tree 1, 2, Shrub 1, Grass 1, etc. Just make a ten minute observation and you will be amazed the kind of biodiversity you have around you. If you have a chance to compare this with the plants and animals inside or around a pond or a wetland, or an agricultural field, do try it. The difference in the type of biodiversity would be quite revealing. Keep watching the biodiversity at different places when you move around and also in you home and class.

Do you think the different types of plants and animals that you noticed in the garden have a role in nature?

Where do you observe more biodiversity—at places where there is less human intervention or where there is more human intervention? Why?

2.2

On completion of this unit, you should be able to:

- Elaborate key issues related to biodiversity conservation and its uses.

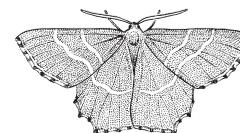
2.3 WHAT IS BIODIVERSITY?

Biodiversity is usually described at three levels: genetic, species and ecosystem diversity.

Genetic biodiversity refers to the genes within a species passed down the generations. It is this type of diversity that gives rise to the different varieties of rice, mangoes, etc.

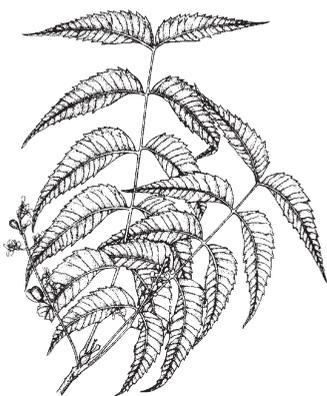
Species biodiversity is usually measured in terms of the total number of species within a defined area.

Ecosystem diversity is the diversity of habitats which include the different life forms within. The term also refers to the variety of ecosystems found within a biogeographic or political boundary.



2.4 KEEPERS OF THE KNOWLEDGE

In December 1987, a team of scientists belonging to the All India Coordinated Research Project on Ethnobiology formed a part of a botanical expedition into the forests of the Western Ghats of southern Kerala. Accompanying them as guides were some Kanis, members of a local tribe. The team had to undertake hard treks, and during one such trek, scientists noticed the tribals eating certain fruits which kept them energetic and agile. When the exhausted scientists were also offered the fruit, they felt an immediate gain in energy and strength. The scientist were eager to find out more about the fruit, but the accompanying Kanis were reluctant to give them any information, saying it was a sacred tribal secret, not to be revealed to outsiders.



It took a lot of persuasion on the part of the scientists to convince the guides to part with their secret. Plant specimens were collected to carry out investigations into its medicinal properties. Initial investigations revealed the presence of certain glycolipids and non-steroidal compounds, which possessed anti-stress, anti-hepatotoxic, immuno-restorative and anti-fatigue properties—the revealing much greater potential, than that for what the plant was being used till then.

The last phase of the research was shifted to the Tropical Botanic Garden Research Institute (TBGRI), Thiruvanthapuram, Kerala. It was at TBGRI that the drug “Jeevani” (life-giving) was formulated using this and three other medicinal plants as the ingredients. The license for manufacturing the drug was given to a private company, “Arya Vaidya Pharmacy”(AVP) (Coimbatore) Ltd., for a period of seven years.

Several stakeholders have contributed to enabling this formulation reach the larger section of the society. The most significant contribution was of course that of the Kanis. Kani tribals who now lead a primarily settled life in the



Traditional Knowledge and Biodiversity

Traditions, beliefs and cultures of communities are closely linked to the diversity of life around them. In India, hundreds of tribal and other communities utilize biodiversity products in their everyday lives. They are known to use about 5000 species of wild plants for many different purposes—for food, fibre, antidotes against insect and snake bite, medicines; and for making hunting, fishing and farm implements. The life styles of these communities are rapidly changing. If their traditional knowledge is not recorded understood and passed on, we are likely to lose it all.

forests of the Agasthyamalai hills of the Western Ghats in Thiruvananthapuram district of Kerala, were traditionally a nomadic community. There are some identified members called “*Plathis*” who have knowledge of the flora and fauna of the region and their medicinal properties. This knowledge is traditionally passed on from one generation to another, mostly through the oral tradition. The second crucial actor in the process has been TBGRI. This is an autonomous institution set up by the government of Kerala. TBGRI worked for seven to eight years to carry out all the investigations as well as oxicity tests and clinical trials to complete the formulation of Jeevani. Subsequently, the Institute obtained a patent for the process of making the drug.

The third stakeholder was the Arya Vaidya Pharmacy, a private limited company. The right to manufacture Jeevani was given to the company for seven years in 1995, at a license fee of Rs. 10 lakh, by a committee constituted at TBGRI for authorizing a party interested to manufacture the drug.

In a unique and first-ever benefit-sharing arrangement of its type in India, a resolution was passed by TBGRI declaring that the Kani tribals would receive a share of 50 per cent of the license fee, as well as 50 per cent of the royalties obtained by TBGRI on sale of the drug. Hitherto there had been no defined structure or policy for benefit sharing between originator communities and other bodies involved in use of traditional community knowledge. The idea of sharing the license fee and royalties was developed by TBGRI in the spirit of recognizing the contribution of Kanis rather than through any legal compulsion to enter into such a benefit-sharing arrangement.

A number of Kanis got together in November 1997, and with the assistance from TBGRI, registered a trust called the “*Kerala Kani Samudaya Kshema Trust*”. All registered members of the Trust are Kani tribals. The objectives of this trust include promotion of welfare and development activities for the Kanis, preparation of biodiversity registers to document the Kani knowledge base, and evolving and supporting methods to promote the sustainable use and conservation of biological resources.

Do you think it was good for Kanis to part with their traditional knowledge? Why?

Do you think Kanis got a good deal with the arrangement? If you were to make the arrangement how would you do it?

Are you aware of any example where a traditionally used plant or animal source is being commercially utilized? Give some examples of the same.



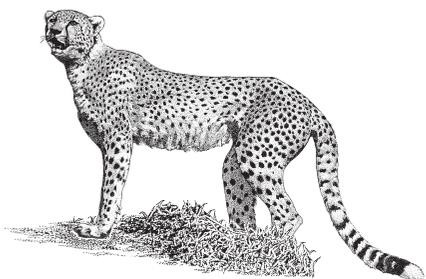
2.4.1



- a) Define biodiversity.
- b) Fill in the blanks:
 - i) Varieties such as those of mangoes and rice are examples of _____ biodiversity.
 - ii) _____ diversity is usually measured in terms of the total number of species within a define area.

2.5 LOSS OF BIODIVERSITY

India's rich biological diversity is rapidly eroding. At least 10 per cent of its recorded flora, and possibly a large fraction of its wild fauna, is threatened. Many may be on the verge of extinction. In the last few decades, India has lost at least 50 per cent of its forests; polluted over 70 per cent of its waterbodies; built, cultivated or otherwise encroached upon its grasslands; and degraded many coastal areas.



The cheetah and the pink-headed duck are amongst the conspicuous species that have become extinct. More than 150 of the known species of medicinal plants in India have already become extinct due to unsustainable methods of harvesting. Of the species of flora and fauna that remain, over 10 per cent of flowering plants, 21 per cent of mammals and 5 per cent of birds are believed to be under threat. India's domesticated biodiversity is also under threat. Hundreds of crop varieties have disappesddared, and even their genes have not been preserved.

Loss of Biodiversity: Causes and Consequences

Most causes of the loss of biodiversity can be traced, directly or indirectly, to the way we live. Biodiversity is essential for sustainable development, but finding sustainable ways of living is essential for the conservation of biodiversity. The following are some of the major causes of the loss of biodiversity.

- Unplanned development and habitat destruction
- Changing agricultural and forest practices
- Invasion by introduced species
- Over-exploitation for commercial gain
- Environmental pollution
- Global climate change
- Loss of traditional knowledge
- Nature of legal systems
- Nature of management systems
- International trade



2.6

1. In what way do our changing lifestyles and consumption patterns lead to biodiversity loss?
2. In what ways can local communities living around biologically-rich areas be motivated to conserve the biodiversity?
3. What kind of plant and animal diversity/species is your town/district/city famous for?

2.7

People or Tigers: A Role Play

Conduct this role play with students preferably in the age group of 13-15 yrs.

Scenario

Ranthambore, once the hunting ground of the Jaipur Maharajahs, became a Project Tiger Reserve in 1973 and acquired the status of a National Park in 1981. Twelve villages were moved out of the forest area when it was declared a National Park. An area of 115 sq. km. outside the park boundary was demarcated as the *buffer zone* to which the villagers were allowed access to meet their fuel and fodder needs.

The census conducted in 1992 showed that the number of tigers, which had been 44 in 1981, was down to 17. Nearly 60 villages surround the Park. Villagers depend for their fuel, fodder and timber requirements on the buffer zone. The buffer zone experienced tremendous pressure as soon as large part of the forest was declared inaccessible. Recently poaching has been a cause for serious concern. Ranthambore has become an important destination for Indian and foreign tourists, giving rise to a good tourism industry at the

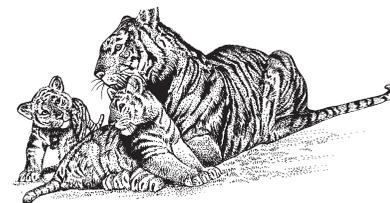
Project Tiger: Some Facts

Project Tiger was launched in 1973, with nine Tiger Reserves covering an area of 16,339 sq. km. which was increased to 37,761 sq. km. in 27 Tiger Reserves.

Project Tiger was originally started with the help of 1 million children who collected USD 1 each and handed this some to the WWF which in turn made it available to the Government of India.

One of the most successful conservation projects in the world, project tiger not only help save the tiger but also wound up saving creatures such as Gibbons, Rhinoceros, Elephants, Caracals, and many other species.

Source: Sanctuary Asia, 2004 July



place.

There are several interconnected problems crippling conservation efforts at Ranthambore. The first problem is that the people of Ranthambore were not consulted by the government when it created the National Park. Thus, they were abruptly cut off from their traditional resource base. No alternatives were provided, which led to an acute mistrust between the Park authorities and the people. The second problem is that of diminishing habitats for endangered species, such as tiger. Citizens and activists alike have serious concern about the future of such species and their degraded habitats.

Perspectives of different stakeholders

Forest Guard: Feels that villagers are the major cause for the depletion of flora and fauna of the Park. The guard believes that the women are a nuisance as they are always sneaking into the Park to collect fuel and fodder, thus making conservation difficult.

NGO worker: Creating awareness among the villagers about the need for protected forests and their importance for endangered species is your primary role. The worker recognizes that people should have a stake in protection of the habitat and has therefore been demanding that the Forest Department develop sustainable income-generating projects for local inhabitants.

Village Woman: Has been concerned about the forest because it has been the primary source of fuel and fodder for the family's use. However, now there is no access to the forest that the village and all the others in the area depended upon for generations. The degraded buffer zone cannot sustain even minimal usage of so many people. With no alternatives, women find themselves sneaking into the Park for essential resources.

Young Villager: The main source of income for this young villager has been his 3 buffaloes. But of late their milk yield has gone down because they do not get enough to eat. As a boy he used to graze the cattle in the forest. But that has not been possible ever since the forest was declared a national park. Every time he gets caught smuggling fodder out of the forest, he has to either bribe the guard or get beaten up. You feel that it is unfair that the forests should be protected to save the tiger when humans and cattle do not have enough to eat.

Hotel Owner: The main worry for the hotel owner is that the disappearance of tigers in the Park will mean your hotel will have to be closed down. The concerns about villagers' needs do not bother the owner much.



2.7.1 PEOPLE OR TIGERS: THE FEEDBACK

(credit points: 5)

Conduct this as a role play in the class with different roles being enacted by different students. They should be allowed to express their own viewpoint but also open to the ideas and suggestions of other and the sarpanch.

Ask a team of 2 students to be the 'observers' and present a report of the proceedings after the role play.

- a) How long did the role play take? How did the role play end?
- b) What report was presented by the 'Observers'?
- c) What were some of the key points that you could use to lead the discussion after the role play?
- d) In middle school curriculum 'Biodiversity' and related concepts are discussed in which subjects and classes? Give a few examples.

