**MODULE 4. BIODIVERSITY AT LOCAL AND NATIONAL**

**Introduction**

Major biomes are includes the dessert, forests, grasslands, tundra, and

several types of aquatic ecosystem. Each biomes are consists of many ecosystem.

All living things are closely related to their environment. Any changes or alteration happens in any part of the environment causes a big effect in human and other organisms.

This module consists of two lessons namely:

Lesson 1: Biodiversity and Conservation

Lesson 2: Philippine Biodiversity

**Objectives:**

At the end of this module, you will be able to:

1. Discuss the importance of biodiversity.

2. Identify the threat to biodiversity

**Timeframe**: 1 week

**Activity:**

* List down at least 10 Endangered, and 10 Endemic or Rare species of flora and fauna that can be found in your community or municipality.

**Analysis:** Write a short notes on how diverse your community in 100 words.

**Abstraction:**

**Definition and Significance of Biodiversity**

* Biodiversity includes diversity within species, between species and of ecosystems. It can be partitioned, so that we can talk of the biodiversity of a country, of an area, or an ecosystem, of a group of organisms, or within a single species.

**Biological Diversity or Biodiversity**

* Coined by Walter G. Rosen (1985)
* It represents the foundation of human existence.
* Similarly additions to biodiversity include addition of new elements of life by mutation, by artificial breeding, by biotechnology or by ecological manipulation.

**Uses of Biodiversity**

Humans derive many direct and indirect benefits from the living world. Biodiversity is the source of food, medicines, pharmaceutical drugs, fibers, rubber and timber. The biological resources contain potentially useful resources as well. The diversity of organisms also provides many ecological services free of charge that are responsible for maintaining ecosystem health.

* **Source of Food and Improved Varieties**

Biodiversity is of use to modern agriculture in three ways:

(i) as a source of new crops,

(ii) as a source material for breeding improved varieties, and

(iii) as a source of new biodegradable pesticides.

Of the several thousand species of edible plants, less than 20 plant species are cultivated to produce about 85% of the world's food. Wheat, corn and rice, the three major carbohydrate crops, yield nearly two-third of the food sustaining the human population. Fats, oils, fibers, etc. are other uses for which more and more new species need to be investigated. The commercial, domesticated species are crossbred with their wild relatives to improve their traits. Genes of wild species are used to confer new properties such as disease resistance or improved yield in domesticated species.

For example, rice grown in Asia is protected from the four main diseases by genes received from a

single wild rice species (Oryza nivara) from India. 2

* **Drugs and Medicines**

Biodiversity is a rich source of substances with therapeutic properties. Several important pharmaceuticals have originated as plant-based substances. Examples of plant derived 9 substances developed into valuable drugs are:

* Morphine (Papaver somniferum), used as an analgesic;
* Quinine (Chinchona ledgeriana) used for the treatment of malaria; and
* Taxol, an anticancer drug obtained from the bark of the yew tree (Taxus brevifolia, T. baccata).

Currently, 25% of the drugs in the Pharmacy are derived from a mere 120 species of plants. But, throughout the world, traditional medicines make use of thousands of plant species. Plants can also be used for the manufacture of innumerable synthetic products, called botanochemicals.

* **Aesthetic and Cultural Benefits**

Biodiversity has also great aesthetic value. **Examples of aesthetic rewards** include:

* ecotourism,
* bird watching,
* wildlife,
* pet keeping,
* gardening, etc.

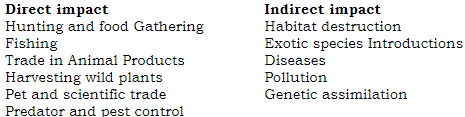
Throughout human history, people have related biodiversity to the very existence of human race through cultural and religious beliefs. In a majority of Indian villages and towns, plants like Ocimum sanctum (Tulsi), Ficus religiosa ( Pipal), and Prosopis cineraria ( Khejri) and various other trees are planted , which are considered sacred and worshipped by the people. Several birds, and even snake, have been considered sacred. Today, we continue to recognize plants and animals as symbols of national pride and cultural heritage.

* **Ecosystem Services**

Biodiversity is essential for the maintenance and sustainable utilization of goods and services from ecological systems as well as from the individual species. **These services include**:

* maintenance of gaseous composition of the atmosphere,
* climate control by forests and oceanic systems,
* natural pest control,
* pollination of plants by insects and birds,
* formation and protection of soil,
* conservation and purification of water, and
* 10 nutrient cycling, etc.

These ecosystem services have been valued in the range of 16 to 54 trillion (1012) US dollars per year.

* **Loss of Biodiversity**
* Natural Causes
* Human-caused extinction
* Direct and Indirect Impact of Humans on Biological Resources
* **Measuring Biodiversity**
* Alpha diversity - it indicates the number of species in a single community
* Beta diversity - it indicates the degree to which species composition changes along an environmental gradient.
* Gamma diversity - it indicates the rate at which additional species are encountered as geographical replacements within a habitat type in different localities.
* **Threats to Biodiversity**
* Extractive Industries
* Increased Population Density and Urban Sprawl
* Conflicting Policies

**Application:**

1. What are the two main benefits of protecting entire ecosystems rather than individual species of plants or animals?
2. Explain how exotic species threaten ecosystems.
3. Explain the difference between an endangered species and a threatened species.
4. List and describe the three levels of biodiversity that are observed in nature and studied worldwide