






BIODIVERSITY
MADE SIMPLE





# BIODIVERSITY MADE SIMPLE

2011-2020

United Nations Decade on Biodiversity

# myBioD

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## Malaysia's Biodiversity: My Life, My Heritage, My Future

**Malaysia** is blessed to house an **amazing array of biodiversity**. Our biodiversity shapes our **life**, our **culture** and is our **living heritage** which we must **conserve** and **use wisely** to be inherited by **generations** to come. Malaysia's biodiversity is also our **future** as it not only provides **vital ecosystem services** but also has the potential for **wealth creation**.

### THE MyBioD LOGO

The MyBioD logo was unveiled in 2012 to give a branding and to internalize the appreciation of Malaysia's rich and amazing biodiversity. It is aimed at generating awareness at all levels of the Malaysian public to foster and enhance the understanding that Malaysia's Biodiversity is their life, heritage and future.

The MyBioD logo in general portrays that all life on earth is interconnected forming a fragile yet wonderful web of life which is so vital to the survival of this planet.

The logo represents the richness and importance of Malaysia's biodiversity which is represented by the tree, animals, birds, insects and marine life in the logo. The tree depicts the gentle mother earth which shelters, nurtures and takes care of all of us, who in return needs to be cared for too.

The mother and child in the logo signify the role of women in biodiversity conservation and the need to protect and conserve our rich natural heritage for generations to come. Hence, everyone has the role to conserve and use our biodiversity wisely.

Tones of Green represents the richness of Malaysia's biodiversity
Brown represents the terrestrial ecosystem
Blue represent the marine and water ecosystem
The leaf in the letter 'o' represents the continuous conservation efforts that need to be undertaken to safeguard our biodiversity.

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Third Edition

**Biodiversity Made Simple**

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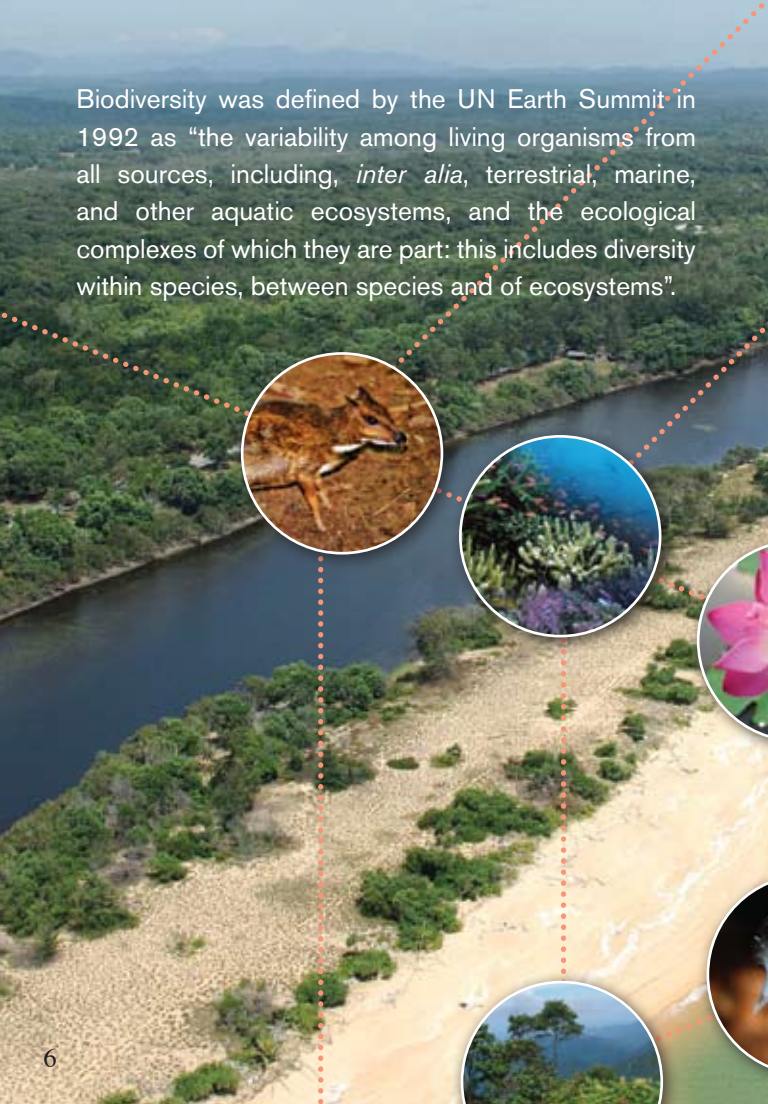
# WHAT IS BIODIVERSITY

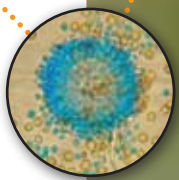
Just look around us we have a wide variety of flowering plants, ferns, majestic trees, insects, birds, fish and animals and the unique places they live in such as mangrove swamps, rivers, highlands and coastal areas. The water we drink, the air we breathe and the clothes we wear all comes from nature and the complex process and services that nature does to sustain life on earth. All this living forms including us humans and the services that nature does forms an integrated web of life. This brings about the concept of biodiversity.

Biodiversity was defined by the UN Earth Summit in 1992 as “the variability among living organisms from all sources, including, *inter alia*, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems”.



**In simple terms biodiversity is the variety of all living forms found in this world and the various habitats they live in.**

Biodiversity is often understood in terms of the wide variety of plants, animals and microorganisms. So far, about 1.75 million species have been identified. Scientists reckon that there are actually about 13 million species, though estimates range from 3 to 100 million.



# Importance of Biodiversity

1

**Survival of Mankind**

Biodiversity gives us clean air, oxygen, water, food, shelter, clothing, medicine, and all of our basic needs for survival.

2

**Ecosystem Benefits & Services**

Biodiversity regulates the ecosystem and other complex biological processes and interactions including nutrient cycling, pollination, formation and protection of soil, flood control, and climate regulation.

3

**Leisure and Cultural Values**

Biodiversity provides aesthetic, educational, recreational, religious and cultural values. In fact biodiversity plays a huge role in shaping the rich cultural diversity of many communities.

4

**Supporting Life**

Biodiversity supports life on Earth for the present and the future by allowing living organisms to adapt and evolve over changing environmental conditions.

# Malaysia's Biodiversity Richness

| | Number of species |
|---|---|
| Mammals | 307 |
| Birds | 785 |
| Reptiles | 567 |
| Amphibians | 242 |
| Marine Fishes | 1,619 |
| Freshwater Fishes | 449 |
| Invertebrates | 150,000 |
| Vascular Plant | 15,000 |
| Orchids | 3,000 |
| Palms | 536 |
| Ferns | 2,012 |
| Fungi | >4,000 |
| Mosses | 522 |
| Hard Coral | 612 |
| Microorganisms | NA* |

** Complete data is not available*

# What is happening to biodiversity

The world is witnessing an unprecedented loss of biodiversity and ecosystem services, which brings direct impact on human well-being and sustainable development.

*The target agreed by the world's Governments in 2002, "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty and to the benefit of all life on Earth', has not been met.*

- Global Biodiversity Outlook 3, 2010

*As a follow up, the global world adopted the Convention on Biological Diversity Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets in 2010. The mission is 'to take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication'.*

To address this global issues, in 1992, the largest ever meeting of world leaders took place at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. A historic set of agreements was signed at the 'Earth Summit', including the Convention on Biological Diversity, the first global agreement on the conservation and sustainable use of biological diversity.

# Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD) is an international legally-binding treaty with three main goals:

- The conservation of biodiversity,
- Sustainable use of the components of biodiversity; and
- Sharing the benefits arising from the utilization of genetic resources in a fair and equitable manner.

Convention on Biological Diversity

The CBD recognizes for the first time that the conservation of biological diversity is “a common concern of humankind” and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably.

The CBD sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources. It also covers the rapidly expanding field of biotechnology, addressing technology development and transfer, benefit-sharing and biosafety. Importantly, the Convention is legally binding; countries that join it are obliged to implement its provisions.

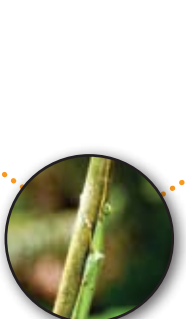
The Convention reminds decision-makers that natural resources are not infinite and sets out a new philosophy for the 21st century, that of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of humans. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity. The Convention acknowledges that substantial investments are required to conserve biological diversity. It argues, however, that conservation will bring us significant environmental, economic and social benefits in return.

Malaysia is committed in the conservation and management of the nations rich biodiversity and has put in place several policies and legal framework towards this end. The New Economic Model has also indentified biodiversity as an important element to be used in a sustainable manner among others through biotechnology for new wealth creation for the nation.

# National Policy on Biological Diversity (NPBD)

National Policy on Biological Diversity was launched on April 1998 to guide planning, conservation, sustainable utilisation and management of biodiversity in Malaysia. This policy aims to conserve Malaysia's biodiversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation.

The vision of this Policy is to to transform Malaysia into a world centre of excellence in conservation, research and utilization of tropical biodiversity by the year 2020.



The objective of the NPBD is as following:

- To optimise economic benefits from sustainable utilisation of the components of biological diversity;
- To ensure long-term food security for the nation;
- To maintain and improve environmental stability for proper functioning of ecological systems;
- To ensure preservation of the unique biological heritage of the nation for the benefit of present and future generations;
- To enhance scientific and technological knowledge, and educational, social, cultural and aesthetic values of biological diversity;
- To emphasize biosafety considerations in the development and application of biotechnology;

# Common Vision on Biodiversity

The Common Vision on Biodiversity (2009) aims to implement some of the strategies outlined in the NPBD especially at the ecosystem level and by managing biodiversity in an holistic manner by incorporating it in planning and development process. The Common Vision promotes a three-pronged approach and outreach strategy which are:

i) Strengthening the Protected Area System;

ii) Land/Seascape management for biodiversity; and

iii) Mainstreaming of biodiversity.

The Common Vision on Biodiversity provides for government and all relevant stakeholders towards a shared perception of issues, priorities and the required integrated actions for the better management of biodiversity. It is a framework that will support the ongoing transformation of environmental planning and management from a largely sector-based to an integrated approach.

# Glossary of commonly used biodiversity terms

**Alien species**

A species occurring in an area outside of its historically known natural range as a result of intentional or accidental dispersal by human activities (also known as an exotic or introduced species).

**Biodiversity**

(also known as biological biodiversity)

The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

## Biological resources

Includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

## Biogeography

A branch of geography that deals with the geographical distribution of animals and plants.

## Biologically unique species

A species that is the only representative of an entire genus or family.

## Biome

A major portion of the living environment of a particular region (such as a fir forest or grassland), characterised by its distinctive vegetation and maintained by local climatic conditions.

## Bioregion

A territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.

## Biosphere reserves

Established under UNESCO's Man and the Biosphere (MAB) Program, biosphere reserves are a series of protected areas linked through a global network, intended to demonstrate the relationship between conservation and development.

## Biota

The living organisms of a region.

## Biotic

Pertaining to any aspect of life, especially to characteristics of entire populations or ecosystems.

**Breed**

A group of animals or plants related by descent from common ancestors and visibly similar in most characteristics. Taxonomically, a species can have numerous breeds.

**Breeding line**

Genetic lines of particular significance to plant or animal breeders that provide the basis for modern varieties.

## Buffer zones

Areas on the edge of protected areas that have land use controls and allow only activities compatible with protection of the core area, such as research, environmental education, recreation, and tourism.

## Captive breeding

The propagation or preservation of animals outside their natural habitat, involving control by humans of the animals chosen to constitute a population and of mating choices within that population.

## Carrying Capacity

The maximum number of people, or individuals of a particular species, that a given part of the environment can maintain indefinitely.

## Centres of diversity

The regions where most of the major crop species were originally domesticated and developed. These regions may coincide with centres of origin.

## Conservation

The management of human use of the biosphere so that it may yield the greatest sustainable benefit to current generations while maintaining its potential to meet the needs and aspirations of future generations: Thus conservation is positive, embracing preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment.

## Conservation of biodiversity

The management of human interactions with genes, species, and ecosystems so as to provide the maximum benefit to the present generation while maintaining their potential to meet the needs and aspirations of future generations; encompasses elements of saving, studying, and using biodiversity.

**Country of origin of genetic resources**

The country which possesses those genetic resources in in-situ conditions

**Cultivar**

A cultivated variety (genetic strain) of a domesticated crop plant.

**Cultural diversity**

Variety or multiformity of human social structures, belief systems, and strategies for adapting to situations in different parts of the world.

**Cutting**
Plant piece (stem, leaf, or root) removed from a parent plant that is capable of developing into a new plant.

**Domesticated or cultivated species**
Species in which the evolutionary process has been influenced by humans to meet their needs.

## Domestication

The adaptation of an animal or plant to life in intimate association with and to the advantage of man.

## Ecology

A branch of science concerned with the interrelationship of organisms and their environment.

## Ecosystem

A dynamic complex of plant, animal, fungal, and microorganism communities and their associated non- living environment interacting as an ecological unit.

## Ecosystem diversity

The variety of ecosystems that occurs within a larger landscape, ranging from biome (the largest ecological unit) to microhabitat.

**Ecotourism**

Travel undertaken to witness sites or regions of unique natural or ecologic quality, or the provision of services to facilitate such travel.

**Endangered species**

A technical definition used for classification in the United States referring to a species that is in danger of extinction throughout all or a significant portion of its range. IUCN The World Conservation Union (1994) definition, defines species as endangered if the factors causing their vulnerability or decline continue to operate.

**Endemic**
Restricted to a specified region or locality.

**Endemism**
The occurrence of a species in a particular locality or region.

**Exotic species**
An organism that exists in the free state in an area but is not native to that area. Also refers to animals from outside the country in which they are held in captive or free-ranging populations.

## Ex-situ

Pertaining to study or maintenance of an organism or groups of organisms away from the place where they naturally occur. Commonly associated with collections of plants and animals in storage facilities, botanic gardens or zoos

## Ex-situ conservation

The conservation of components of biological diversity outside their natural habitats.

## Extinct

As defined by the IUCN, are species that are no longer known to exist in the wild after repeated search of their type of locality and other locations where they were known or likely to have occurred.

## Extinction

Disappearance of a taxonomic group of organisms from existence in all regions.

**Fauna**
Organisms of the animal kingdom.

**Feral**
A domesticated species that has adapted to existence in the wild state but remains distinct from other wild species. Examples are the wild horses and burros of the West and the wild goats and pigs of Hawaii.

**Flora**
Organisms of the plant kingdom

**Gene**

A chemical unit of hereditary information that can be passed from one generation to another.

**Gene bank**

A facility established for the ex situ conservation of individuals (seeds), tissues, or reproductive cells of plants or animals.

**Genetic diversity**

The variety of genes within a particular species, variety, or breed.

## Genetic material

Any material of plant, animal, microbial or other origin containing functional units of heredity.

## Gene pool

The collection of genes in an interbreeding population.

## Genetic resources

Genetic material of actual or potential value.

## Genotype

The genetic constitution of an organism as distinguished from its physical appearance.

## Genus

A category of biological classification ranking between the family and the species, comprising structurally or phylogenetically related species or an isolated species exhibiting unusual differentiation.

**Germplasm**

The genetic material, especially its specific molecular and chemical constitution, that compromises the inherited qualities of an organism.

**Habitat**

The environment in which an animal or plant lives, generally defined in terms of vegetation and physical features.

**Hotspot**
An area on earth with an unusual concentration of species, many of which are often endemic to the area.

**Hybrid**
An offspring of a cross between two genetically unlike individuals.

**Hybridisation**
Crossing of individuals from genetically different strains, populations, or species.

## Important Bird Area (IBA)

Sites of importance to birds, identified by Birdlife International and International Waterfowl and Wetlands Research Bureau. The sites are identified for four groups of birds: regularly occurring migratory species which concentrate at and are dependent on particular sites either when breeding, or migration, or during the winter; globally threatened species (ie species at risk of total extinction); species and sub-species threatened throughout all or parts of their range but not globally; species that have relatively small total world ranges with important populations in specific areas.

## In-situ

Maintenance or study of organisms within an organism's native environment.

## In-situ conservation

The conservation of biodiversity within the evolutionary dynamic ecosystems of the original habitat or natural environment.

## Inbreeding

Mating of close relatives resulting in increased genetic uniformity in the offspring.

**Indicator species**
A species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem.

**Intellectual Property Rights (IPR)**
Rights enabling an inventor to exclude imitators from the market for a certain period of time.

**Intrinsic value**
The value of creatures and plants independent of human recognition and estimation of their worth.

**Introduced species**
See ‘Alien species’.

**Inventory**
On-site collection of data on natural resources and their properties.

**In vitro**
(Literally ‘in glass’). The growing of cells, tissues, or organs in plastic vessels under sterile conditions on an artificially prepared medium.

## Island biogeography

The study of the relationship between island area and species number. This idea has also been applied to isolated areas of habitat in continental areas which are effectively islands for many species. The extent to which habitat fragmentation may lead to extinction of species can be predicted from the relationship between number of species and island area.

## Keystone species

A species whose loss from an ecosystem would cause a greater than average change in other species populations or ecosystem processes.

## Landrace

Primitive or antique variety usually associated with traditional agriculture. Often highly adapted to local conditions.

**Living collections**

A management system involving the use of off-site methods such as zoological parks, botanic gardens, arboretums, and captive breeding programs to protect and maintain biological diversity in plants, animals, and microorganisms

**Marine Protected Area (MPA)**

An area of sea (or coast) especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

**Megadiversity countries**
The small number of countries, located largely in the tropics, which account for a high percentage of the world's biodiversity by virtue of containing very large numbers of species.

**Micro-organisms**
a diverse classification of all those organisms not classed as plants or animals, usually minute microscopic or submicroscopic and found in nearly all environments. Examples are bacteria, cyanobacteria (blue-green algae), mycoplasma, protozoa, fungi (including yeasts), and viruses.

**Native**
A plant or animal indigenous to a particular locality.

**Native species**
Plants, animals, fungi, and microorganisms that occur naturally in a given area or region.

**Nitrogen fixation**
A process whereby nitrogen fixing bacteria living in mutualistic associations with plants convert atmospheric nitrogen to nitrogen compounds that plants can utilise directly.

**Non-Governmental Organisation (NGO)**
A nonprofit group or association organised outside of institutionalised political structures to realise particular social objectives (such as environmental protection) or serve particular constituencies (such as indigenous peoples). NGO activities range from research, information distribution, training, local organisation, and community service to legal advocacy, lobbying for legislative change, and civil disobedience. NGOs range in size from small groups within a particular community to huge membership groups with a national or international scope.

**Off-site**
Propagation and preservation of plant, animal, and micro-organism species outside their natural habitat.

**On-site**
Preservation of species in their natural environment.

**Open-pollinated**
Plants that are pollinated by physical or biological agents (e g, wind, insects) and without human intervention or control)

**Orthodox seeds**
Seeds that are able to withstand the reductions in moisture and temperature necessary for long-term storage and remain viable.

**Parataxonomists**
Field trained biodiversity collection and inventory specialists recruited from local areas.

**Patent**
A government grant of temporary monopoly rights on innovative processes or products.

## Pathogen

A disease causing microorganism, bacterium or virus.

## Phenotype

The observable appearance of an organism, as determined by environmental and genetic influences (in contrast to genotype).

## Phytochemical

Chemicals found naturally in plants.

## Phylogenetic

Pertaining to the evolutionary history of a particular group of organisms.

## Phylum

In taxonomy, a high-level category just beneath the kingdom and above the class; a group of related, similar classes.

## Population

A group of individuals with common ancestry that are much more likely to breed with one another than with individuals from another such group.

## Population and Habitat Viability Assessment (PHVA)

The theoretical modelling of minimum areas, habitat types and population sizes, to sustain any one or more species. Population size will be determined by the carrying capacity of the habitat

**Population Viability Analysis (PVA)**
The theoretical determination of the minimum viable (in terms of genetic make-up) breeding population for any one species to survive in a given range.

**Predator**
An animal that obtains its food primarily by killing and consuming other animals.

**Primary (or natural) forest**
A forest largely undisturbed by human activities.

**Primary productivity**
The transformation of chemical or solar energy to biomass. Most primary production occurs through photosynthesis, whereby green plants convert solar energy, carbon dioxide, and water to glucose and eventually to plant tissue. In addition, some bacteria in the deep sea can convert chemical energy to biomass through chemosynthesis.

**Protected Area (PA)**
An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

## Provinciality effect

Increased diversity of species because of geographical isolation.

## Recalcitrant seeds

Seeds that cannot survive the reductions in moisture content or lowering of temperature necessary for long-term storage.

## Rehabilitation

The recovery of specific ecosystem services in a degraded ecosystem or habitat.

## Restoration

The return of an ecosystem or habitat to its original community structure, natural complement of species, and natural functions.

## Riparian

Related to, living, or located on the bank of a natural watercourse, usually a river, sometimes a lake or tidewater.

## Seedbank

A facility designed for the ex situ conservation of individual plant varieties through seed preservation and storage.

## Selection

Natural selection is the differential contribution of offspring to the next generation by various genetic types belonging to the same populations. Artificial selection is the intentional manipulation by man of the fitness of individuals in a population to produce a desired evolutionary response.

**Species**
A group of organisms capable of interbreeding freely with each other but not with members of other species.

**Species diversity**
The number and variety of species found in a given area in a region.

**Species richness**
The number of species within a specified region or locality.

**Subspecies**
A distinct form or race of a species. For example the Malayan Tiger is one of the 6 known subspecies of tiger.

**Succession**
The more or less predictable changes in the composition of communities following a natural or human disturbance.

**Sustainable development**
Development that meets the needs and aspirations of the current generation without compromising the ability to meet those of future generations.

## Sustainable use

The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

## Systematics

The study of the historical evolutionary and genetic relationships among organisms and of their phenotypic similarities and differences.

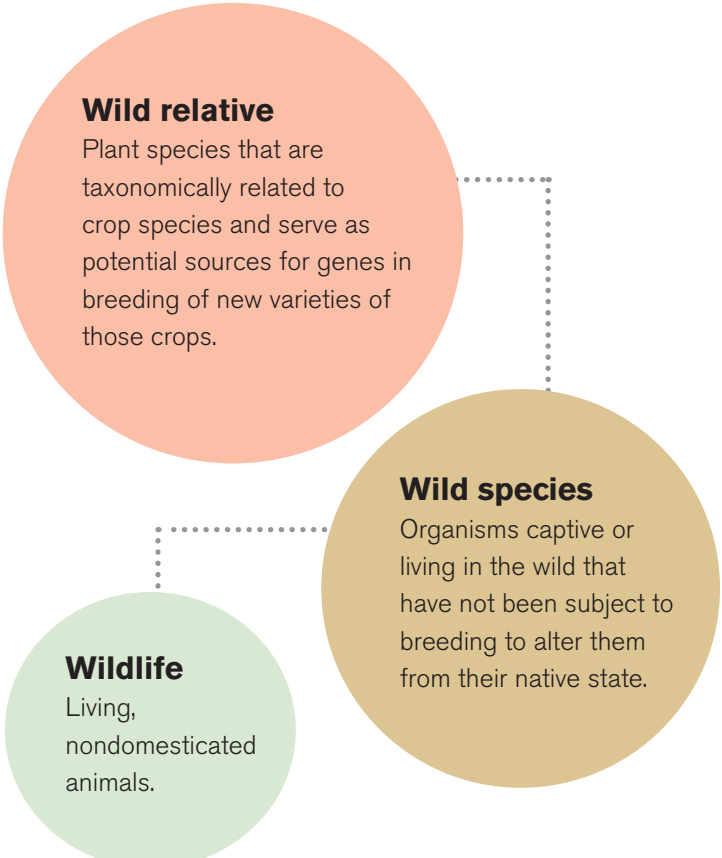
## Taxon (pl. taxa)
The named classification unit (eg Homo sapiens, Hominidae, or Mammalia) to which individuals, or sets of species, are assigned. Higher taxa are those above the species level.

## Taxonomy
The classification of animals and plants based upon natural relationships.

## Threatened species
A technical classification referring to a species that is likely to become endangered within the foreseeable future, throughout all or a significant portion of its range. These species are defined as vulnerable taxa by the IUCN.

## Trophic level
Position in the food chain, determined by the number of energy-transfer steps to that level.

## Variety
See 'Cultivar'.




**Main source:**
*United Nations Environment Programme (UNEP) & World Conservation Monitoring Centre*


**www.chm.frim.gov.my**

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## SUMMARY:

A database environment has been developed that now house checklist of Malaysian mammals, reptiles, amphibians, birds, marine algae, freshwater crabs, marine and freshwater fishes, seaweeds, Lucanidae, Peninsular Malaysia ant distribution and butterflies, FIRM's entomology collection type catalogue, fungi, and the vascular flora of Malaysia.

The database also houses interactive Malaysian protected areas, list of resource individuals for specific flora or fauna groups, biodiversity and biodiversity information managers, as well as biodiversity collections in Malaysia. An intelligent search engine permits rapid searches and swift acquisition of data reports.

The content management system allows resource individuals to update and edit data regularly.

**NOTES:-**

More information is available at:

**www.nre.gov.my**

**www.chm.frim.gov.my**

**www.cbd.int**

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