НАЦИОНАЛНА АГЕНЦИЈА
ЗА ЕВРОПСКИ ОБРАЗОВНИ
ПРОГРАМИ И МОБИЛНОСТ

IT-ARGF

Innovative training

Augmented reality for green food

PROJECT RESULT 1

MODULE 3

SPECIES-BASED CONSERVATION

Project. Reference no. 2021-1-MK01-KA220-VET-000025293

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Introduction

Welcome to the Innovative Training - Augmented Reality for Green Food project's training MODULE 3!

In this module we will introduce you, VET educators, and VET learners to the aim, objectives, and impact of our topic, highlighting the importance of species-based conservation and its potential impact on the green food industry. The aim of this module is to provide an understanding of species-based approaches to biodiversity conservation and how they contribute to the overall conservation of ecosystems.

So, let's get into our topic!

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Overview

In this section, learners will be introduced to the module's topic, aim, impact and gain an understanding of its relevance to the field.

Firstly, we need to clarify some important basic terms.

To begin with the species-based approach focuses on specific species and not the environment as a whole. Based on this approach every species has an ecological value as it provides a service to its environment and therefore a species based approach is very important.

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Overview

Species-based conservation focuses on protecting and preserving individual and closely related species such as groups of plants or animals, that are at risk of extinction. This approach involves various strategies, such as habitat restoration, captive breeding programs, and legal protections, to safeguard the survival of specific organisms. It aims to prevent the loss of biodiversity by addressing threats to particular species and ensuring their long-term survival in their natural habitats.

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Overview

Balancing species conservation with the green food industry's growth requires careful planning and sustainable practices. Collaboration between conservationists, farmers, and policymakers is essential to find solutions that protect biodiversity while supporting the food industry's sustainability.

Species-based approaches to biodiversity conservation focus on the protection and management of individual species within ecosystems. These approaches recognize that safeguarding specific species can have a broader positive impact on the overall health and stability of ecosystems.

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Objectives

- **Enhanced understanding:** by the end of the module, participants will have a thorough understanding of species-based approaches to biodiversity conservation and their significance in preserving ecosystems.
- **Improved skills:** participants will acquire knowledge about practical skills in utilizing various tools and techniques for species-based conservation, including species inventories, monitoring, and habitat management.

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Objectives

- **Increased awareness:** participants will develop an awareness of the different strategies employed in the conservation and sustainable use of species, as well as the role that stakeholders play in implementing these strategies.
- **Improved decision-making:** participants will be equipped with the knowledge and tools necessary to make informed decisions in species conservation, including conducting risk assessments and developing effective conservation plans.

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Objectives

- **Enhanced conservation efforts:** the module aims to inspire participants to actively contribute to species-based conservation by creating awareness, implementing conservation actions, and promoting collaboration among stakeholders to protect species and their habitats.

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Objectives

The main topics of this learning module:

- **Biodiversity conservation:** main aspects, importance and its 4 level.
- **Species-Based Approaches to Biodiversity Conservation:** key aspects and conservation tools.
- **Strategies for the conservation and sustainable use of species.**

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Unit 1

About biodiversity conservation

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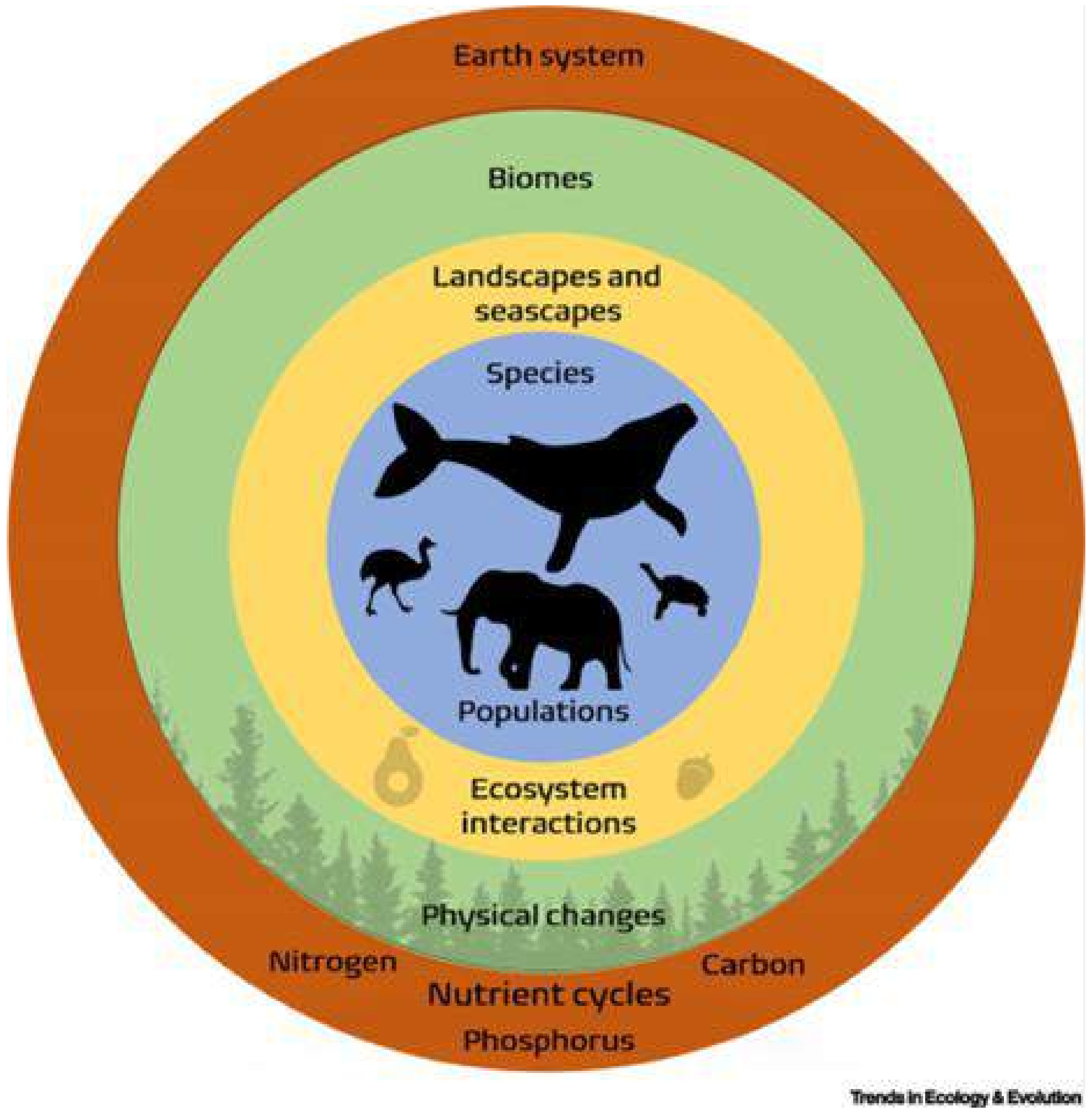
1.1. The main aspects of Biodiversity conservation

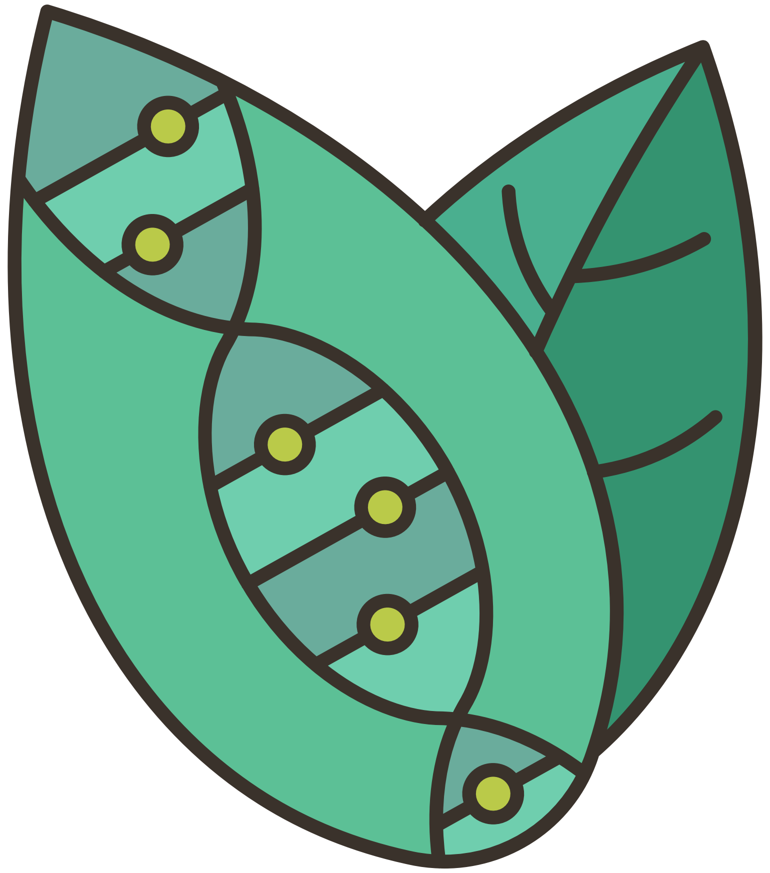
Biodiversity conservation is the practice of protecting, preserving and managing the wealth and variety of species, habitats, ecosystems, and genetic diversity on the planet.

Its goal is protecting all organisms and species within their natural habitats with the aim of ensuring intragenerational and intergenerational equity.



The main aspects of biodiversity conservation include:

- **Genetic Diversity:** This focuses on maintaining the variety of genetic traits within species. Genetic diversity is crucial for adaptation to changing environments. It can be conserved through practices like seed banks and selective breeding: Ensuring the genetic variability within species is maintained to adapt to changing environmental conditions and prevent inbreeding.



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The main aspects of biodiversity conservation include:

- **Species Diversity:** This involves preserving different species within ecosystems. Efforts to prevent species extinction, habitat restoration, and the establishment of protected areas contribute to species diversity conservation.

- **Species Conservation:** Protecting individual species, especially those that are endangered or threatened with extinction. This involves habitat preservation, captive breeding programs, and legal safeguards.

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The main aspects of biodiversity conservation include:

- **Ecosystem Diversity:** Ecosystems, such as forests, wetlands, and coral reefs, are made up of various species interacting with their physical environment. Conserving ecosystem diversity ensures the functioning of ecological processes and services like pollination, water purification, and carbon storage.

- **Ecosystem Conservation:** Preserving entire ecosystems, such as forests, wetlands, coral reefs, and grasslands, to maintain their ecological functions and the species that rely on them.

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The main aspects of biodiversity conservation include:

- **Functional Diversity:** This aspect focuses on the roles that species play within ecosystems. Maintaining a wide range of ecological functions ensures the resilience and stability of ecosystems.

- **Habitat Restoration:** Rehabilitating degraded or destroyed habitats to support the recovery of native species and ecosystems.

- **Ethical and Cultural Values:** Biodiversity has intrinsic value and is important for cultural, spiritual, and ethical reasons. Many indigenous cultures rely on the conservation of biodiversity for their way of life and traditions.

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The main aspects of biodiversity conservation include:

- **Economic Benefits:** Biodiversity provides essential resources like food, medicine, and raw materials. Conserving biodiversity can have economic benefits by sustaining these resources and supporting ecotourism.

- **Global Responsibility:** Biodiversity conservation is a global concern because the interconnectedness of ecosystems means that actions in one part of the world can affect biodiversity elsewhere. International cooperation and agreements, such as the Convention on Biological Diversity, are essential for effective conservation.

The main aspects of biodiversity conservation include:

- **Sustainable Land Use:** Promoting responsible land and resource management practices to minimize habitat destruction and fragmentation.

- **Protected Areas:** Establishing and managing protected areas like national parks and reserves to provide safe havens for biodiversity.

- **Conservation Policies and Legislation:** Implementing laws and regulations to prevent overexploitation, habitat destruction, and illegal trade of wildlife and plants.

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The main aspects of biodiversity conservation include:

- **Education and Awareness:** Raising awareness among the public and stakeholders about the importance of biodiversity and conservation efforts.

- **International Cooperation:** Collaborating on a global scale to address transboundary conservation challenges and protect migratory species.

- **Research and Monitoring:** Conducting scientific research to understand biodiversity patterns, threats, and conservation needs, as well as monitoring progress and adapting strategies accordingly.

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BIODIVERSITY CONSERVATION: WHAT IS FOR?

Biodiversity conservation refers to the efforts and strategies aimed at preserving the variety of life on Earth, encompassing the diversity of species, ecosystems, and genetic diversity within species.

Biodiversity conservation is essential for the health of ecosystems, the well-being of human societies, and the preservation of Earth's natural heritage. It helps maintain ecosystem services, supports food security, and contributes to the resilience of ecosystems in the face of environmental changes.

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1.2. Why is biodiversity conservation important?

Biodiversity conservation protects plant, animal, microbial and genetic resources for food production, agriculture, and ecosystem functions such as fertilising the soil, recycling nutrients, regulating pests and disease, controlling erosion, and pollinating crops and trees. At the same time, unsustainable agricultural production can reduce biodiversity.

Humankind depends on the following goods and services provided by the ecosystems: fresh water, pollination, soil fertility and stability, food and medicine. Ecosystems weakened by the loss of biodiversity are less likely to deliver those benefits, especially given the needs of an ever-growing human population.

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The importance of biodiversity conservation

Biodiversity conservation is critically important for several reasons:

Biodiversity plays a pivotal role in ensuring the stability and resilience of ecosystems. The presence of a diverse range of species within these ecosystems equips them with the capacity to adapt effectively to environmental changes, strengthening their overall robustness. This enhanced resilience not only safeguards the intricate web of life within ecosystems but also empowers them to provide essential services crucial for human well-being, such as the purification of water, pollination of crops, and regulation of climate.

Moreover, biodiversity is intrinsically tied to human survival and prosperity. It provides us with food, medicine, clothing, and numerous other resources. Genetic diversity found in nature is particularly indispensable, as it underpins the vitality of many of our crops and livestock and provides a breeding program to develop new crops, medicines, and technologies, especially in the face of changing environmental conditions and emerging diseases.

Recognizing these connections underscores the critical importance of preserving biodiversity as a cornerstone of ecosystem stability and human well-being.

For cultures and societies, biodiversity is significantly important. Culturally and recreationally, it is a central element in many societies, offering spiritual and cultural value while serving as a source of inspiration and leisure. Natural areas enriched with biodiversity often become havens for people seeking solace and connection with the natural world.

Furthermore, biodiversity plays a crucial role in enhancing future resilience. It acts as a buffer against unforeseen challenges, such as emerging diseases or environmental crises, by bolstering our ability to adapt to the unknown. Beyond individual or national boundaries, biodiversity conservation fosters international cooperation and strengthens the sense of global interconnectedness.

Finally, the intricate relationships among predators, herbivores, and plant species maintained by biodiversity ensure ecological balance, emphasising the far-reaching consequences that the loss of even a single species can have on entire ecosystems.

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1.3. The 4 levels of biodiversity

Biodiversity is often categorised into three levels, each representing a different aspect of the variety of life on Earth. It exists in the form of biological resources: species, genes, ecosystem and functional. In this following chapter we will elaborate on those levels to give a more deep understanding.

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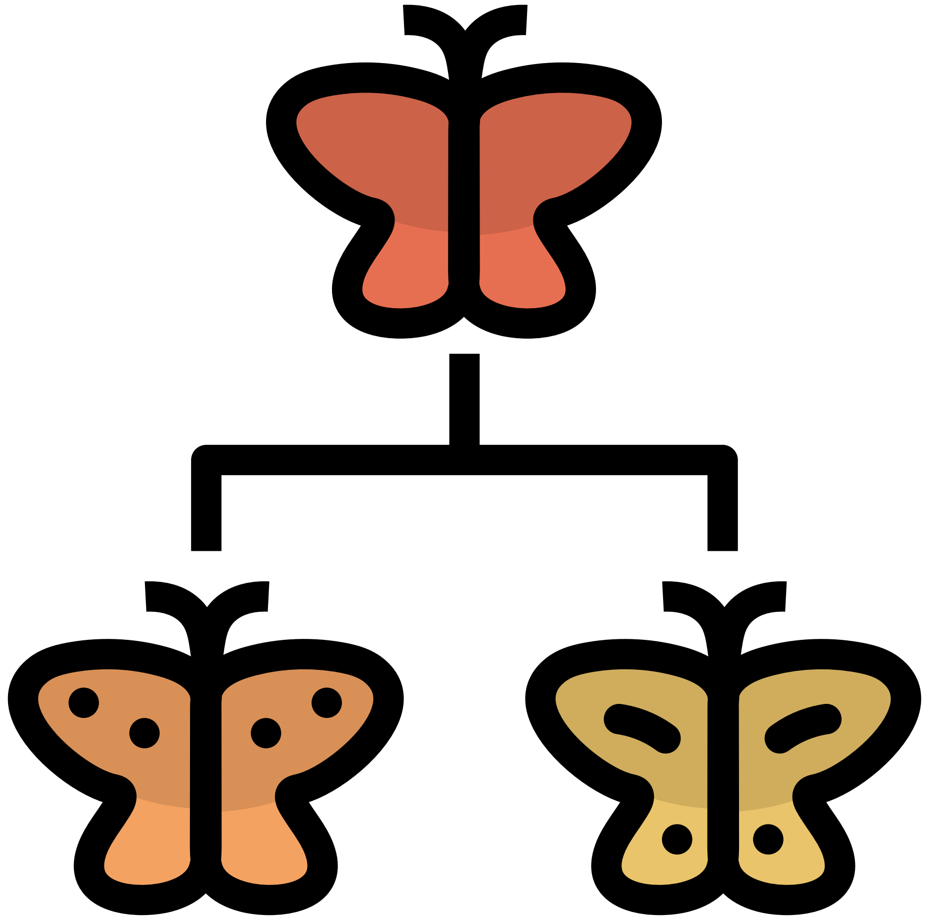
1.Species diversity

Let's start with species diversity which basically focuses on the number and variety of different species within a particular area or ecosystem. It considers the richness and evenness of species present. High species diversity is indicative of a healthy and balanced ecosystem, as each species plays a unique role in maintaining ecological stability.



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2. Genetic diversity

Moving towards genetic diversity it is important to state first that this is the most basic level of biodiversity and refers to the variety of genes within a species. It encompasses the genetic variation that allows populations to adapt to changing environmental conditions. Genetic diversity is critical for breeding programs, disease resistance, and the overall health and resilience of a species.

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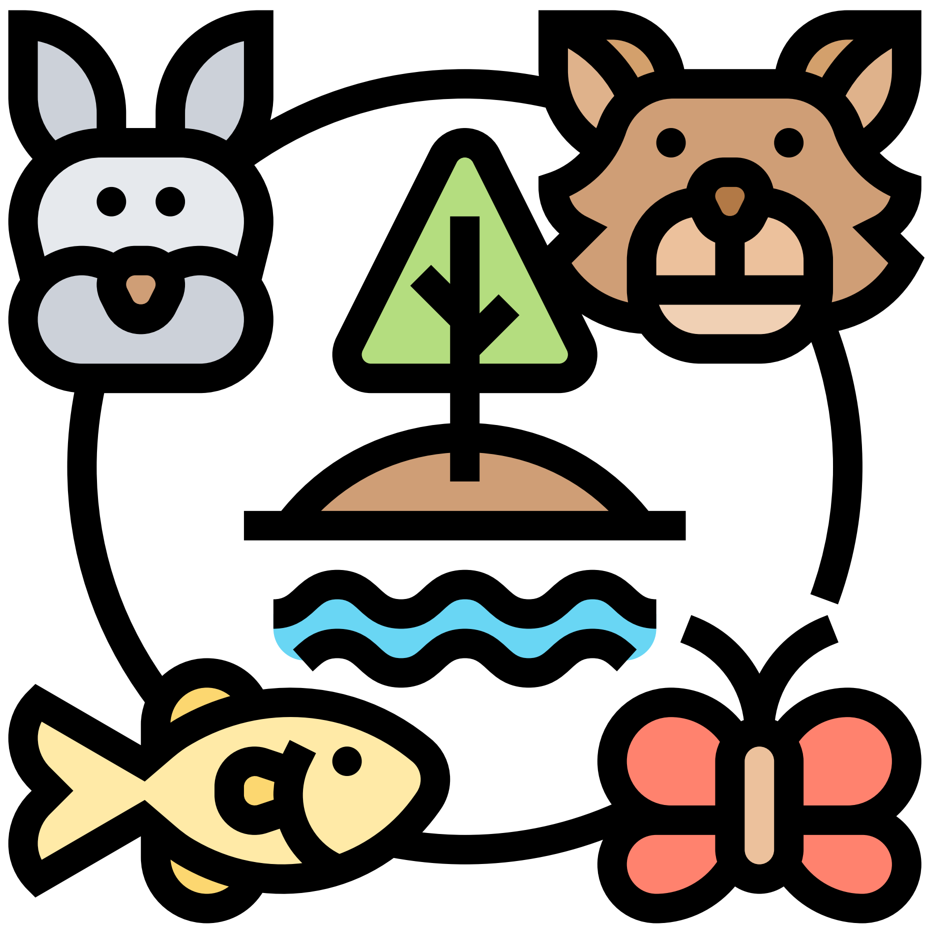
3. Ecosystem diversity

About ecosystem diversity first we need to mention how it relates to the variety of ecosystems or habitats within a region or on a global scale. It includes different types of terrestrial, aquatic, and marine ecosystems, such as forests, wetlands, coral reefs, and grasslands. Ecosystem diversity is important because each type of ecosystem provides distinct services and supports various species.



4. Functional diversity

It is also important to mention that often above those categories they mention functional diversity: This level of biodiversity considers the diversity of ecological functions and processes performed by different species within an ecosystem. It focuses on how species interact with each other and their environment. A high level of functional diversity ensures that ecosystems can perform essential functions like nutrient cycling, pollination, and decomposition. Moreover they also often include global diversity which refers to the range of differences that depict the composition of a group of two or more species in a global context.

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How these 4 levels of biodiversity are related between them

These levels of biodiversity are interconnected, and the health and stability of ecosystems depend on the interactions and balance between them. Loss or degradation of biodiversity at any of these levels can have cascading effects, leading to ecosystem imbalances and potential threats to human well-being. Therefore, conserving biodiversity across all four levels is essential for sustaining life on Earth and maintaining the planet's ecological and economic systems.

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Key Words

Research and monitoring, education and awareness, conservation policies and legislation, international cooperation.

Diversity, conservation, habitat restoration, protected areas, sustainable land use.

Ethical and cultural values, economic benefits, sustainability.

Buffer against unforeseen challenges.

Stability and resilience of ecosystems

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Key Words

4 level diversities: species, genetic, ecosystem and functional and the relationship between them.

Human survival and prosperity.

Global interconnections.

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Unit 2

Species-Based Approaches to Biodiversity Conservation

In the following, our participants, VET educators and VET learners will be introduced to the concept of one of the above mentioned approaches, especially the species-based one, to biodiversity conservation and their significance in preserving and managing ecosystems.

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The key aspects of species-based conservation

In this following section we will go through some of the key aspects of species-based conservation.

- **Research:** To begin with, let's start with research. Conducting studies to understand the biology, behaviour, and ecological requirements of the target species. Species-based research is fundamental to informed conservation decision-making. It provides the data and insights necessary to develop effective strategies to protect endangered or threatened species and maintain biodiversity. Such research often contributes to the broader field of conservation biology and ecological science, helping us better understand the complex relationships between species and their environments.

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The key aspects of species-based conservation

- **Habitat Protection:** Then there is the habitat protection. Preserving and restoring the natural habitats where the species live, ensuring they have suitable places to thrive. Habitat protection does not only benefit the target species but also supports the broader ecosystem and its biodiversity. It helps maintain essential ecological functions, such as pollination, nutrient cycling, and water purification, which are vital for human well-being. Ultimately, habitat protection is a proactive approach to ensure the long-term survival of species and the health of our planet's ecosystems.

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The key aspects of species-based conservation

- **Threat mitigation:** Moreover we can mention threat mitigation: which is identifying and mitigating specific threats to the species, such as habitat destruction, pollution, hunting, or invasive species. Threat mitigation is an ongoing process that requires adaptive management and a multi-pronged approach. Conservationists must continually assess and address the specific threats facing a species to ensure its survival and the preservation of biodiversity.

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The key aspects of species-based conservation

- **Breeding and Reintroduction:** Breeding and reintroduction comes next as implementing breeding programs in captivity, if necessary, and reintroducing individuals into the wild to bolster populations. However, breeding and reintroduction programs come with challenges. They require substantial resources, expertise, and long-term commitment. Success depends on addressing the underlying threats to a species, ensuring that released individuals can thrive in the wild, and avoiding unintended negative consequences, such as disease transmission to wild populations.

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The key aspects of species-based conservation

Effective breeding and reintroduction programs are part of a broader conservation strategy that includes habitat protection, threat mitigation, and research. When implemented carefully and strategically, these programs can play a crucial role in preventing the extinction of endangered species and restoring their populations in their natural habitats.

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The key aspects of species-based conservation

- **Legal Aspects:** The legal aspects are barely mentioned while legal protections are crucial to this point: advocating and enacting legal protections for the species, including designating critical habitats and regulating activities that harm them.Advocating for and enacting legal protections for endangered species is crucial in preserving biodiversity and safeguarding our planet's ecosystems. This effort involves various strategies, such as designating critical habitats and regulating activities that pose a threat to these vulnerable creatures. Critical habitat designation ensures that specific areas essential for a species' survival and recovery are legally safeguarded, allowing them to thrive.

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The key aspects of species-based conservation

Additionally, strict regulations on activities that harm these species, such as habitat destruction or illegal hunting, serve as a vital deterrent, promoting conservation and the coexistence of humans and wildlife. Legal protections like these are indispensable tools in our ongoing commitment to preserving the rich tapestry of life on Earth.

The key aspects of species-based conservation

- **Public Awareness:** We can not go further without mentioning one of the quite obvious points which is public awareness. Educating the public about the importance of the species and garnering support for its conservation. Public awareness campaigns should be designed with the specific species and local context in mind. They should convey a sense of urgency while also offering hope and actionable steps that individuals can take to contribute to species conservation. Ultimately, an informed and engaged public is a powerful force for protecting the world's biodiversity.

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To summarise species-based conservation is often employed for endangered, threatened, or keystone species that play critical roles in ecosystems or hold significant cultural or ecological value. This approach complements broader ecosystem-based conservation strategies, which aim to protect entire ecosystems and their biodiversity.

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Key Words

Research, habitat protection, threat mitigation, breeding and reintroduction.

Legal aspects and public awareness.

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Unit 3

Species-based conservation tools

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Species are complex systems, just like the environments they inhabit. Their conservation and management can also be complex, involving multiple and competing human interests. The integration of all stakeholders and their various concerns and contributions into the planning process can be key to success, but it can also add further difficulties to an already challenging task. Tools can help experts overcome these challenges, provided they are aware of the strengths and weaknesses of each of them.

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3.1. What tools can do and what tools can not do

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What tools can do when used in an effective process:

- Help groups to visualise problems more clearly.
- Help to integrate a broader range of ecosystem and human perspectives into decision making about species.
- Help build on (rather than duplicate) the work of others using the parameter databases, algorithms and analyses built into the tools.
- Help identify and clarify where there are gaps, uncertainties or disagreements in our knowledge of potentially important aspects of species biology, threats and conservation opportunities.
- Help identify the assumptions we make in our analyses and planning.

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3.1. What tools can do and what tools can not do

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What tools can do when used in an effective process:

- Help guide you through processes to move from information to decision-making more quickly.
- Save time and help us explore a wider range of alternatives by automating analysis or recurring processes.
- Help document the inputs and parameters used in the analysis and why decisions were made.
- Can help to build collaboration between different project participants by creating a forum where stakeholder groups can get to know each other and are encouraged to consider each other's goals and concerns.

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3.1. What tools can do and what tools can not do

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What the instruments do NOT do:

- Provide answers or decisions. However, they can provide quantitative results and visualisation for decision making.
- Eliminate the need for project-specific analyses. In fact, it may not be optimal to use an analytical tool if a project has severely limited management capabilities or if analyses need to be performed only a few times.
- Come with all the necessary data. Projects considering the use of the tool should consider whether the data needed to use the tool is already available and, if not, whether there is sufficient time and resources to collect the necessary data.

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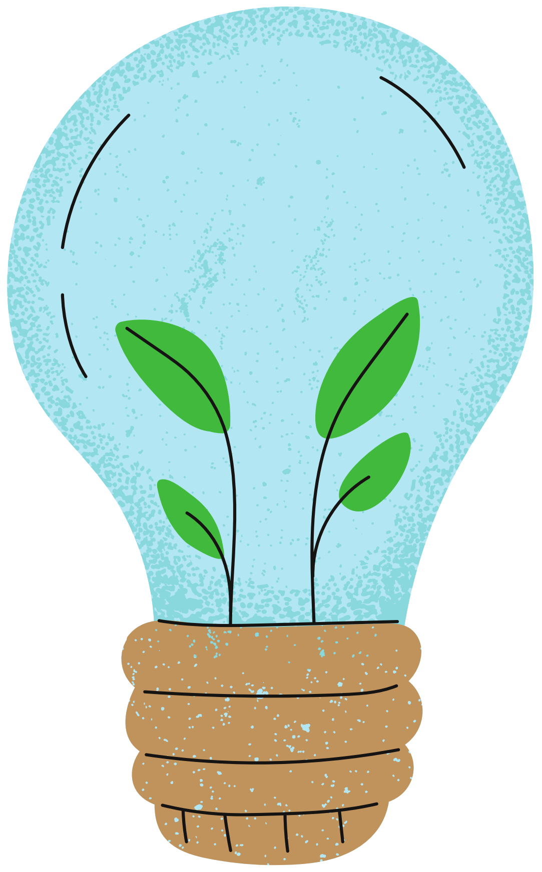
3.1. What tools can do and what tools can not do

What the instruments do NOT do:

- Avoid trade-offs between competing objectives. At the same time, they can facilitate the management and negotiation of these trade-offs.
- Replace the need for intensive human interaction and cooperation or eliminate conflicts. Inadequate integration of tools into the planning process can actually increase confusion and sometimes conflict.



3.2. The planning cycle of the species-based conservation

The following species-based Conservation conservation planning cycle is an adaptation of the cycle developed by Conservation Measures Partnership.

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3.3. Short list of some tools and their use

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There are many tools available useful for the species-based conservation strategies, here you will find some of them.

Data Assembly Tools

Data may need to be compiled at several stages of the conservation planning process, and the tools developed may be available or useful for any of these. These tools can help to organise the collection of detailed information on a species, as well as the biological and sociological issues associated with conservation, before the conservation planning process begins. No particular expertise is required, although some prior experience would be an advantage.

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3.3. Short list of some tools and their use

Red List Assessment Tool

This tool would be used to review the status of conservation planning practices. In this context, the Red List Assessment Tool would be used as a framework for collecting published and unpublished information on species distribution, threats, habitats, populations and trends to determine the conservation status of a species according to IUCN criteria (although this would not necessarily be formalised through the Red List Office). Understanding how to apply the Red List criteria is essential and it is advisable to gain some experience in applying these criteria in workshops.

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3.3. Short list of some tools and their use

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Red List Assessment Tool

In order to use the tool effectively, large amounts of high quality data on species biology, abundance, distribution, population growth rates, etc. are needed.

The Red List Assessment is a robust and organised method for collecting and interpreting data. One weakness is that people may desperately attribute a high status to the species concerned and believe that something is wrong if the species is not on the endangered species list. It is very important that facilitators understand the application and rules of the IUCN Red List categories and criteria.

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3.3. Short list of some tools and their use

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Population Viability Analysis

PVA can be used in Status reviews to assess extinction risk and assess the relative importance of threats. It can be used during the Plan of Action step to assess the relative effectiveness of different potential treatment interventions and to define key parameters for follow-up, and during the Evaluate and Adjust step, where new data from follow-up are used to assess progress.

With the help of special software, computer simulation models are created based on the current knowledge of the target species, the biology of the species and the external factors affecting the species.

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3.3. Short list of some tools and their use

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Population Viability Analysis

These models can then be used to predict the future state of the population or populations under study. For example, models can provide insight into immediate and future extinction risk under current conditions. The models can be used to: assess the relative contribution of identified threats to observed population declines; evaluating the relative impact of different management interventions on population recovery; and identifying aspects of a species' life history that have the greatest impact on population health to help design monitoring programs.

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3.3. Short list of some tools and their use

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Population Viability Analysis

Proper and responsible use of these tools requires special expertise. Data Requirements: This may vary by application. If the questions posed to the models require specific, quantitative answers, the data on which the models are based must be well-founded, complete and reliable. For more general questions and comparative studies, these requirements can be relaxed. Expert advice should be sought to ensure that the data is sufficient for the intended application.

If interpreted incorrectly, the results of the models can encourage confidence in results that are not justified given the underlying data. Expert advice should be sought.

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3.3. Short list of some tools and their use

RAMAS Software for Population Modeling

It can be helpful in the following steps: Review Status, Set Goals and Objectives, Plan Actions, Evaluate and Adapt. The user provides species-specific information such as current population size, survival rate, and fecundity. In addition, when available, maps in a standard GIS format can be used to describe the species' habitat and determine the spatial structure of its populations. The programs use this information to predict (project) the future size, structure and spatial distribution of species.

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3.3. Short list of some tools and their use

RAMAS Software for Population Modeling

This tool can be used to assess the status of species, predicting the risk of future population decline, population extirpation and species extinction. The user can create separate models for different scenarios that depict future impacts (such as climate change and land use change scenarios or harvest scenarios) or represent alternative conservation actions (such as resettlement, habitat corridors, protected areas, and harvest regulations). These can be used to assess hazards and evaluate the effectiveness of protection plans.

3.3. Short list of some tools and their use

RAMAS Software for Population Modeling

Expertise in focal species demography is required. Knowledge of the basic principles of population dynamics is required and can be obtained with the help of a related textbook (Applied Population Ecology). The program can be used with different levels of data. Data requirements depend on the ecology of the species and the specific question(s) being asked. More complex life stories and more complex and specific questions require more data.

The strengths of this tool include scientific credibility (based on many publications and hundreds of applications) and transparency (the detailed algorithm describes exactly what the program does).

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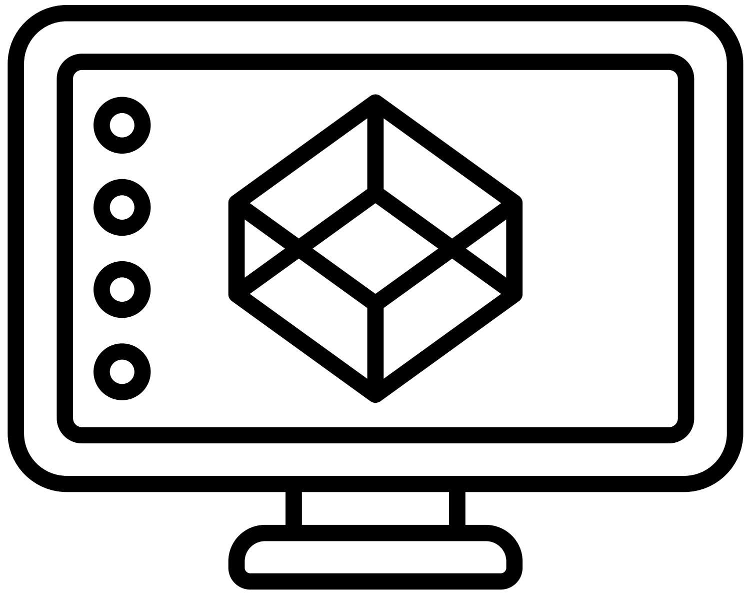
3.3. Short list of some tools and their use

RAMAS Software for Population Modeling

The tool is extremely flexible in representing a wide range of life histories, including plants, invertebrates and vertebrates (see case studies below). Moreover, it is relatively easy to use (and is also used in basic training); it includes an intuitive user interface, extensive help files, a detailed manual, and tutorials.



Shortcomings include the need for reliable, species-specific data and expertise (see above).

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3.3. Short list of some tools and their use

Habitat Suitability Modelling

This tool will be used in the status review phase for threat analysis and in the goal and objective setting and action planning phases of the process. Provides known and potential distribution maps of species based on habitat models. The process takes geographic information system (GIS) data and allows species parameters to be applied and interpreted geographically, to generate inferred ranges. During a threat analysis, this can help identify the nature and relative importance of threats.

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3.3. Short list of some tools and their use

Habitat Suitability Modelling

During the Plan Actions and Set Goals and Objectives phases, the preparatory work creates the basic map of what exists today. Scenarios are then designed and modeled that predict the future state of the landscape and habitat distribution under different possible circumstances such as increasing human footprint or climate change, creation of habitat corridors, etc.

This tool requires GIS and considerable specialised expertise and experience. This tool requires a large amount of valid, high-quality data.

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3.3. Short list of some tools and their use

NatureServe Vulnerability Index

This tool is used during the threat analysis component of the Check Status phase. This tool is used to assess the relative vulnerability of a species to climate change based on both exposure and sensitivity. The input is Excel based and is based on expert opinion and available peer-reviewed literature. Components of the tool include a species-specific analysis of: direct and indirect exposure to climate change, biological sensitivity, and documented/modelled responses to climate change. While the software tool itself is relatively simple and intuitive to use, the input is based on expert opinion, so access to expert knowledge in relevant areas is essential to properly interpret the results and application.

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3.3. Short list of some tools and their use

NatureServe Vulnerability Index

Data requirements: Details of species biology, population dynamics, species interactions and abundance (preferably expert opinion) are required for appropriate use. Additional spatial information on current species distributions together with the best available information on projected changes in temperature, precipitation and soil moisture at the finest scale possible will enable better interpretation of the overall impact. When available, documented species responses to climate change will influence and inform the outcome.

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3.3. Short list of some tools and their use

NatureServe Vulnerability Index

The strength of this tool lies in its ability to take into account the complex impacts of climate change and combine them into an interpretable index that incorporates both direct and indirect exposure, as well as species-specific sensitivity. It also provides a unique forum for gathering experts and recognizing potentially key factors contributing to a species' vulnerability to climate change.

As with many tools, the interpretation of the results will depend on the quality of the inputs. Transparency will be key, as supporting information can often be provided by experts where assumptions about inputs may be overlooked.

3.3. Short list of some tools and their use

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NatureServe Vulnerability Index

It will also be important to understand how the index will be used to make decisions or set priorities. Is a more vulnerable species more important than another? The tool is agnostic on this front, as it should be, but users should be cautious in assuming that it will provide the answers needed to “triage” climate change. Finally, the tool is species-based, with a terrestrial focus. Use in marine systems and complex habitats will be limited.

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3.3. Short list of some tools and their use

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Threats Analysis Processes

This tool is used during the threat analysis component of the Check Status phase. A process for brainstorming all direct threats to a species, habitat, or ecological system (e.g., habitat loss). Once these direct threats are identified, planners work to identify what the underlying factors or causes of those threats might be. These tools are easily understandable and do not require a high level of specialist expertise, although some prior experience is an advantage. What is most helpful is to have an experienced facilitator help stakeholders understand the conservation context of the threat analysis and distinguish the differences between direct threats and underlying factors.

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3.3. Short list of some tools and their use

Threats Analysis Processes

These tools are suitable for relatively data-poor situations, although in-depth knowledge of the site and context of the species and related conservation threats is more appropriate. Key strengths of this type of analysis include the opportunity for stakeholder groups to identify direct threats to the species or conservation objectives of interest and enable discussion as to why these have been identified. Weaknesses are generally user-based as understanding the difference between direct threats and underlying factors will be critical to the accuracy of the assessment. Likewise, the relationship between direct threats and other stressors (e.g. low reproductive rates) may be unclear.

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3.3. Short list of some tools and their use

Landscape Species Approach

It is used during the Plan Actions phase to help predict the results of potential actions. A spatially explicit mapping technique that defines the biological landscape of a species and its intersection with the landscape of human activities. Sufficient “focal landscapes” to meet species requirements are defined, and threats from human activity are assessed against biological requirements. It is designed to be used as part of a broader landscape species approach planning process. Experience and expertise required to use the tool: Effective application requires specialised expertise and experience. The tool is not suitable for use in data-deficient planning scenarios.

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3.3. Short list of some tools and their use

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Diagramming Tools

These tools can be used to assist the Action Planning phase of the process, helping to build a shared understanding of the system of interest and the likely impact of specific actions or strategies on it.

Influence diagrams, problem trees, decision trees, causal flow diagrams, and outcome chains all illustrate a given problem or proposed decision in a way that facilitates greater understanding and greater appreciation of alternative outcomes of a set of possible solutions. Covers a wide range of tools, many of which are easy to understand and can be used without specialist skills. These tools are generally adaptable to data scarcity situations, while others are specifically designed to handle uncertainty.

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These tools are generally simple and instructions for using them are readily available. They are particularly useful for dissecting and making transparent elements of situations on which there are many different perspectives.

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Key Words

- Data Assembly Tools
- Red List Assessment Tool
- Population Viability Tool
- RAMAS Software for Population Modeling
- Habitat Suitability Modeling
- NatureServe Vulnerability Index
- Threats Analysis Processes
- Landscape Species Approach
- Diagramming Tools

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UNIT 4.
Strategies for the conservation and sustainable use of species

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CITES

(Convention on International Trade in Endangered Species of Wild Fauna and Flora)

The convention was agreed in 1973 and entered into force in 1975. By 2009, 175 signatories had signed the agreement. Its aim is to prevent species threatened with extinction due to international trade. Parties act to prohibit international trade for commercial purposes in species on the Convention's list of endangered species and to regulate and monitor trade in other species that may become endangered or whose trade needs to be regulated to ensure that trade is controlled.

Roughly 5,000 species of animals and 29,000 species of plants are protected by CITES against over-exploitation through international trade.

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Captive Breeding Programmes

For the most endangered species, there are few viable alternatives to captive breeding programmes. These are designed to try to save survivors, ideally so that they can later be released back into the wild. In extreme situations, the species may become extinct in the wild. This type of programme only works if the cause of the organism's extinction is no longer present.

Another problem with captive breeding programmes is that the genetic base of the captive population is very small. During early attempts at captive breeding, when very small populations were not carefully planned, inbreeding depression quickly developed and genetic diseases began to occur.

Zoos and botanical gardens

Zoos and botanical gardens play an important role in the conservation of wildlife. Originally, these facilities were designed to preserve and display exotic animals, allowing naturalists and scientists to study them. Over time, they have become a repository for endangered organisms and are involved in breeding programmes for these creatures. Nowadays zoos' conditions are not any more sort of prisons lacking dignity, freedom and quality of life, but have largely improved as zoos focus their resources and objectives on species conservation, keeping perhaps fewer species in better conditions. Zoos and botanical gardens are also forming vast networks where organisms can be loaned or exchanged to maintain a larger genetic base for captive breeding programmes.

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Charismatic and flagship species

The fight for conservation often focuses on a single species. This species can be a keystone species in a particular ecosystem. It can be endangered and often aesthetically pleasing, such as a panda. By focusing on a particular species, we are saving the habitat of many species, perhaps less 'sexy' species, but still essential to the functioning of the ecosystem. For example, a number of habitats are set aside to protect the panda, but this also maintains habitat for other species. By saving these ecosystems for one species, many other species will also be saved. Technically it is better to save an area than to focus on one species, but the species approach serves a useful purpose with the same end result.

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Keystone species

Keystone species play a much greater role in maintaining the structure of ecosystems than other species. Nature provides a nice summary of scientific studies aimed at understanding this. A very successful strategy can be to determine whether a species is a keystone species in an ecosystem. By focusing on this species, trophic cascades can form and the balance (equilibrium) of the system can be restored.

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Key Words

- CITES
- Captive Breeding Programmes
- Zoos and botanical gardens
- Keystone species

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Conclusion

In conclusion, Module 3 provides a comprehensive understanding of species-based conservation and its implications for the green food industry. The module emphasized the ecological value of individual species and explored various strategies for their protection, including habitat restoration and captive breeding programs. Acknowledging both positive impacts on biodiversity and potential conflicts with the agricultural sector, the module highlighted the importance of careful planning and collaboration between stakeholders.

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Conclusion

By achieving the outlined learning objectives, participants are now equipped with practical skills, awareness of conservation strategies, and the ability to make informed decisions, fostering their active contribution to species-based conservation efforts. This knowledge is essential for achieving a delicate balance between safeguarding species and supporting the sustainable growth of the green food industry.

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