

# Individual Portfolio in Sustainable Development

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## OVERVIEW LEARNING GOALS

### Learning Goal 1

**Learning goal:**

To discuss the importance of generating learning pathways between indigenous communities and academia/stakeholders for the co-development and implementation of bioeconomy and biodiversity conservation projects.

**Motivation:**

The generation of learning pathways between actors (indigenous communities – academia/stakeholders) is important because it develops projects that last over time, allows for the constant updating of knowledge (win-win) between actors, and generates innovative and sustainable projects. At the same time, there are currently several projects generated in the field of bioeconomy where the importance of these learning pathways between indigenous communities and academia/stakeholders can be observed for the sustainable production and management of products, as well as in the implementation of biodiversity conservation projects. For me, it is of great interest to delve deeper into this topic since the field of bioeconomy is a development strategy that proposes the proper management of resources, it is an alternative to mitigate climate change, and it is a development model where local knowledge is revalued. Furthermore, I think that the generation of learning pathways allows indigenous communities and academia/stakeholders to strengthen their skills and projects due to the constant exchange of experiences and knowledge.

### Learning Goal 2

**Learning Goal:**

To discuss the importance of Biomimicry as a research field and its contribution to biodiversity conservation.

**Motivation:**

Biomimicry is an interdisciplinary approach to study and transfer principles or mechanisms from nature to solve design challenges. It is frequently differentiated from other design disciplines by its particular focus on and promise of sustainability. One of the most famous phrases in the biomimicry field comes from Leonardo Da Vinci: “Learn from nature: that is where our future lies”.

In this sense, caring for nature is essential to finding solutions to the problems facing our society (i.e. climate change). Unfortunately, the degradation of ecosystems, land use/change, and climate change are factors that are causing the loss of valuable biological information that could be used to solve problems or sustainably satisfy social needs.

Being able to raise awareness about the importance of biodiversity to solve current problems in a sustainable way through biomimicry motivates me a lot and allows me to continue entering this field of study that is relatively new on a global level.

## OVERVIEW LEARNING ACTIVITIES

- Learning Goal 1

### Learning activity 1

**Learning activity:**

Online Course: “Communicating value of Biodiversity”. Learning for nature. UNDP.

**Date/time/place:**

Self-placed.

Duration: 4 – 5 hours.

Date: 02 – 03 November 2023

<https://www.learningfornature.org/en/courses/communicating-the-value-of-biodiversity/>

**Nature of involvement:**

Student

**Motivation (including link with learning objectives):**

The value of communication about biodiversity allows projects to be generated at different scales on conservation and resource management, to generate effective work networks and for them to achieve clear objectives.

This course will allow me to develop skills in how to communicate the importance of biodiversity to different social groups, and also allow me to acquire certain knowledge about how to communicate the importance of biodiversity to develop projects between different actors. This activity aligns with my Learning Goal 1 since I will learn about strategies to find allied actors for the generation of projects in conservation and bioeconomy. In addition to being able to understand how communication about the value of biodiversity can generate various projects that satisfy people's needs.

**Collaboration with other students to organize the learning activity:**

N/A

**Title product:**

Title: “Let’s work together” template.

Description: The product created from activity 1 is a template for developing a communication plan from indigenous peoples to academia/stakeholders to generate bioeconomy or conservation projects. The template has been designed for communities in rural areas where access to this type of material is limited; Likewise, the language has been adapted for a greater understanding of the community. The template has been designed based on the understanding of the course information material.

Languages: Spanish and English

Number of pages: 2 pages

**Did you publish this product?**

It has not been published

**Collaboration with other students in the development of the product:**

N/A

### Learning activity 2

**Learning activity:**

Visit to bio-entrepreneurship carried out by indigenous communities in the Ecuadorian Amazon.

**Date/time/place:**

Rukullakta Community (PKR) – “Pueblo Kichwa Rukullakta (PKR)”. Napo - Ecuador

Date: 20 - 22 December 2023

Duration: 3 days.

**Nature of involvement:**

Assistant - Interviewer

**Motivation (including link with learning objectives):**

Being able to have an approach with an indigenous community that currently develops bioeconomy projects and at the same time implements conservation projects in its territory, will allow us to understand how this community has implemented its strategies in sustainable resource management, strengthening learning pathways and climate change mitigation. In addition, organizing this activity will allow me to develop skills in event organization, generation of work networks, and development of communication skills.

**Collaboration with other students to organize the learning activity:**

Yes, this activity was made in collaboration with Queenny Lopez.

**Title product:**

Title: “Bioemprendiendo desde la selva” - Bio-entrepreneurship from the jungle.

Description:

This product is a mini-documentary that seeks to make visible some of the various bioeconomy initiatives that are being developed by the Kichwa Rukullakta People. This product captures the essence of the nature of the tropical forest where these people live, in addition to their efforts in the development of bio-entrepreneurship.

The audience is the general public and is expected to serve as a visibility mechanism to create greater interest in community initiatives and future alliances with academia/stakeholders.

**Did you publish this product?**

Yes. The video was published on the official social networks of the Pueblo Kichwa Rukullakta.

Link: <https://www.instagram.com/reel/C2EI9bVN52u/?igsh=MWVobnYxaGpqYzQzeA==>

**Collaboration with other students in the development of the product:**

Yes, this activity was made in collaboration with Queenny Lopez.

- **Learning Goal 2**

**Learning activity 1**

**Learning activity 1:**

Online Webinar: “Rewilding, Restoration, and the Future of Nature Recovery”

**Date/time/place:**

Self-placed.

Duration: 1h15min.

Date: 24 November 2023

<https://www.naturerecovery.ox.ac.uk/events/event/rewilding-restoration-and-the-future-of-nature-recovery/>

**Nature of involvement:**

Participant

**Motivation (including link with learning objectives):**

Being able to learn in greater detail about the studies carried out by scientists in the areas of conservation, restoration, and protection of ecosystems in recent years will give me a better perception of the current state of ecosystems at a global level and will allow me to update concepts and learn more about conservation strategies that can be implemented today. In this sense, updating myself on this topic will allow me to strengthen the products of my objective 2, which is “to discuss the importance of Biomimicry as a research field and its contribution to biodiversity conservation” and also link my activity 2 which will focus on Biomimicry topics.

Finally, the description of the webinar titled “Rewilding, Restoration, and the Future of Nature Recovery” is of interest to me since it describes the current state of biodiversity loss at a global level and details some conservation strategies such as restoration and rewilding.

**Collaboration with other students to organize the learning activity.**

N/A

**Title product**

Poster: Biodiversity Conservation and Nature Recovery: Strategies to halt biodiversity loss.

This poster is a product that seeks to summarize and disseminate current data on biodiversity conservation and recovery strategies and also provides general data on drivers that currently cause biodiversity loss. This poster seeks to reach an audience close to the academy, mainly students, but also the general public since it contains information that is easy to interpret.

In short, this poster seeks to bring the reader closer to overwhelming data on the drivers causing habitat degradation, as well as providing an approach to current biodiversity conservation strategies.

**Did you publish this product?:**

It has not been published

**Collaboration with other students in the development of the product.**

N/A

**Learning activity 2**

**Learning activity 1:**

**Book reading:** “Biomimicry. Innovation Inspired by Nature” by Janine Benyus.

**Information gathering:** Searching about some current Biomimicry projects.

**Date/time/place:**

Self-placed.

Duration: 1 week

Date: 12 – 16 February 2024

**Nature of involvement:**

Student

**Motivation (including link with learning objectives):**

Reading one of the pioneering books in the field of Biomimicry will allow me to learn basic concepts, and ideas proposed by its author about innovation and nature, and above all, understand why Biomimicry is a multidisciplinary field of research that needs to be developed as a strategy to direct the population towards more effective and sustainable ideas in various fields (engineering, biology, conservation, medicine, design, architecture, economics, business, etc.) and that considers nature as the great teacher. Furthermore, I am motivated to delve into the world of biomimicry since I am sure that this field of research promotes the conservation of biodiversity through innovation through information abstracted from nature.

Finally, since this book was published in 2000, searching for projects that are currently being carried out motivates me to become familiar with projects that are currently generating change and promoting conservation.

**Collaboration with other students to organize the learning activity.**

N/A

**Title product:**

Podcast: “Biomimicry for Biodiversity Conservation” Episode 1: “Six insights on how Biomimicry promotes conservation.

The podcast was developed to provide relevant information about Biomimicry, a field of research that can provide valuable ideas and knowledge for the conservation of biodiversity. This podcast is designed for the general public and shares the definition of Biomimicry and some insights about why biomimicry helps biodiversity conservation.

Because Biomimicry is still a field little known by society and academia, it is necessary to create digital material that contributes to its dissemination.

**Did you publish this product?**

It has not been published

**Collaboration with other students in the development of the product.**

N/A

## PROCESSES AND PRODUCTS

- **Learning Goal 1**

### Process and Product Activity 1

**Critical self-reflections related to activity 1: Online Course: “Communicating the value of Biodiversity”. Learning for nature. UNDP.**

The United Nations “Communicating the Value of Biodiversity” Course is a virtual resource designed to help people who are not experts in communication to integrate communication into their work. It provides tools to communicate about biodiversity with different audiences more effectively: policymakers, stakeholders; and development workers who wish to conserve and sustainably use biodiversity but lack technical expertise. Since my goal 1 is “to discuss the importance of generating learning pathways between different actors”, I think that this activity aligns properly and will improve my skills to communicate my ideas to different target audiences; and also, to learn about different techniques and media to promote the formation of alliances or learning pathways between actors (in this case between indigenous communities and academia/stakeholders).

The course comprises five modules, each addressing different topics on how to improve our communication skills and, especially, how to generate networking using methodologies and communication channels properly. In my opinion, all the modules were very useful for me. I have learned how to analyze the audience with whom I am going to communicate, how to choose adequately different actors depending on the situation, objectives, ideas, and beliefs, how to negotiate with these actors to find the best outcomes for all the participants in a sustainable way, how to create a communication plan

to promote my ideas or projects, and how to manage different social issues along the way (i.e., gender equality, conservation of biodiversity).

The most interesting thing for me was being able to develop my skills to develop a communication plan adequately and effectively towards different types of actors (local community, stakeholders, politicians), since in my professional training (as a biologist) we frequently focus on analyzing data and share these with our community (academia). During and after my learning process, I think and reflect that this course has been important to have a solid foundation in how ideas and objectives about bioeconomy and biodiversity conservation should be communicated appropriately to generate solid networking that involves several actors, that there is equal participation, that seeks dialogue to generate equitable benefits. Likewise, I have been able to reflect on the need to share knowledge with indigenous communities that do not have access to these types of resources. For this reason, the product of this activity has been to develop a template that allows indigenous communities to develop their communication plans in a friendly and easy way. The "Let's work together" template is a template that summarizes a large part of the "Communicating the value of Biodiversity" course and that allows the user to adequately organize their ideas and relevant information to develop bioeconomy projects together with other actors (academia/stakeholders).

I think that this course achieved my Learning Goal 1 since it is one of the initial and fundamental steps to generate learning paths between actors (indigenous communities and academia/stakeholders). I think that being able to develop networking with actors who share the same objectives allows us to generate solid projects that benefit everyone involved. Finally, I now see more clearly the importance of developing communication skills on biodiversity to generate strong networking that helps us develop solid learning pathways among the actors involved.

**Product related to Activity 1 – Goal 1.**

- Spanish version: Plantilla “Trabajemos juntos”

# Trabajemos juntos con y para el medio ambiente!



Desarrolla un plan comunicacional desde tu comunidad hacia la academia/stakeholders para impulsar proyectos de bioeconomía o conservación.

## Por qué es importante?

- Revaloriza el conocimiento ancestral
- Fomenta tu identidad cultural
- Crea redes de trabajo entre actores
- Implementa vías de aprendizaje equitativas (win to win)
- Cambio en nuestra conducta hacia el medio ambiente
- Promueve el desarrollo local y sostenible

## PLANTILLA “TRABAJEMOS JUNTOS”

1) Define tu idea/problema a resolver



2) A quién quieres comunicarlo?  
- Grupo objetivo



3) Define tu objetivo



4) Quiénes pueden ser tus aliados? Cómo llamarías su atención?



5)Cuál es el mensaje que tienes para ellos?



6) Cómo quieres divulgar tu mensaje?Cuál será la forma ideal?



7) Quién estará a cargo de enviar el mensaje?  
Designemos tareas!



8) Establece fechas para tus tareas



9) Cuánto es nuestro presupuesto?



10) De qué forma sabremos que lo estamos haciendo bien?





# Trabajemos juntos con y para el medio ambiente!



Desarrollar un plan comunicacional desde tu comunidad hacia la academia/stakeholders para desarrollar proyectos de bioeconomía o conservación.

## CONSEJOS PARA LLENAR LA PLANTILLA "TRABAJEMOS JUNTOS"

### 1) Define tu idea/problema a resolver

Ten clara la idea que la comunidad quiere desarrollar. Ten claro los problemas que afectan a la biodiversidad de tu área



### 2) A quién quieres comunicarlo? – Grupo Objetivo

Incorpora personas o grupos objetivos que compartan tus ideas (homogéneos); será más fácil comunicarte con ellos. Selecciónalos sabiamente, ellos pueden ser tus aliados.



### 3) Define tu objetivo

Define tus objetivos de manera específica, medible, realista y que puedas dar seguimiento en el tiempo



### 4) Quiénes pueden ser tus aliados? Cómo llamarías su atención?

Escoge aliados con buena reputación y credibilidad.

Si colaboras con aliados en tu plan de comunicación recuerda mantener el control de tu mensaje y tus objetivos.



### 5)Cuál es el mensaje que tienes para ellos?

Tu mensaje debe ser claro y específico. Utiliza palabras entendibles para tu grupo objetivo.

Realiza un pre-evaluación de tu mensaje con delegados de tu grupo objetivo.



### 6) Cómo quieres divulgar tu mensaje?Cuál será la forma ideal?

Escoge el medio de comunicación más común entre tu grupo objetivo. Revisa tu presupuesto.



### 7)Quién estará a cargo de enviar el mensaje? Designemos tareas!

Delega tareas a personas por periodos largos de tiempo.

Si en tu comunidad hay gente especializada en una tarea, pídele apoyo para su ejecución.



### 8) Establece fechas para tus tareas

Diseña un cuadro de tareas y delegados, así como las fechas con eventos o actividades importantes.



### 9)Cuál es nuestro presupuesto?

Revisa cuidadosamente tu presupuesto.

Una vez establecido el medio de comunicación, busca por opciones gratis o que pertenezcan a algún aliado en tu proyecto.



### 10) De qué forma sabremos que lo estamos haciendo bien?

Evalúa constantemente tu progreso y las tareas delegadas.



- English version: Template "Let's work together".

# Let's work together for the environment!



Develop a communication plan from your community to academia/stakeholders to promote bioeconomy or conservation projects.

## Why is it important?

- Revalue ancestral knowledge
- Promote your cultural identity
- Create and improve networking skills.
- Implement equitable learning paths (win to win)
- Change in our behavior towards the environment
- Promotes local and sustainable development

## "LET'S WORK TOGETHER" TEMPLATE

1) Define your idea/problem to solve



2) Who do you want to communicate it to? - Target group



3) Define your objective



4) Who can be your allies? How would you get their attention?



5) What is the message you have for them?



6) How do you want to spread your message? What will be the ideal way?



7) Who will be in charge of sending the message? Let's designate tasks!



8) Set dates for your tasks



9) How much is the available budget?



10) How will we know that we are doing it right?



# Let's work together for the environment!



Develop a communication plan from your community to academia/stakeholders to promote bioeconomy or conservation projects.

## TIPS FOR FILLING OUT THE "LET'S WORK TOGETHER" TEMPLATE

### 1) Define your idea/problem to solve

Be clear about the idea that the community wants to develop. Be clear about the issues that affect the biodiversity of your area



### 2) Who do you want to communicate it to? - Target group

Incorporate people or target groups that share your ideas (homogeneous); It will be easier to communicate with them.  
Select them wisely, they can be your allies.



### 3) Define your objective

Define your objectives in a specific, measurable, realistic way that you can track over time.



### 4) Who can be your allies? How would you get their attention?

Choose allies with good reputation and credibility.  
If you collaborate with allies in your communication plan, remember to maintain control of your message and your objectives.



### 5) What is the message you have for them?

Your message should be clear and specific.  
Use words that are understandable to your target group.  
Carry out a pre-evaluation of your message with delegates from your target group.



### 6) How do you want to spread your message? What will be the ideal way?

Choose the most common means of communication among your target group.  
Review your budget.



### 7) Who will be in charge of sending the message? Let's designate tasks!

Delegate tasks to people for long periods of time.  
If in your community there are people specialized in a task, ask them for support in its execution.



### 8) Set dates for your tasks

Design a table of tasks and delegates, as well as dates with important events or activities.



### 9) How much is the available budget?

Review your budget carefully.  
Once the means of communication is established, look for free options or those that belong to an ally in your project.



### 10) How will we know that we are doing it right?

Constantly evaluate your progress and delegated tasks.



## Process and Product Activity 2 – Goal 1

### **Critical self-reflections related to activity 2: Visit to bio-entrepreneurship carried out by indigenous communities in the Ecuadorian Amazon.**

This activity is part of my first objective which seeks to understand the importance of generating learning pathways between indigenous communities and academia/stakeholders to develop bioeconomy projects that promote the conservation of biodiversity. For this, this activity consisted of visiting the indigenous community “Pueblo Kichwa Rukullakta – PKR”, learning how its social organization has developed, knowing in detail how its process of implementing bio-entrepreneurships promoting the conservation of biodiversity has been, and understanding how they communicate their knowledge and products to generate alliances with other actors.

The process to develop this activity consisted of three important parts: the first was the approach with the leaders of the community to socialize the reason for our visit; second, the visit to the community and its different projects in bioeconomy and interaction with the community, and, third, the processing of the information collected for the understanding and development of a mini-documentary about the community and its activities (product 2).

The development of each part of this activity was enriching for me for many reasons: during the first part, developing an effective channel of communication between the academia (Queenny and me) with the indigenous community, allowed us to communicate our interests and objectives in knowing the work done by the community. I think that the first contact between the actors is very important to get to know each other, understand what their goals and objectives are, and look for themes or ideals that are shared; that is, creating a link between the actors. During the second part of this activity, visiting three different bio-entrepreneurships (handy-crafts made with plant tissues, “living medicine” farm, and cultivation and production of Guayusa leaf derivative products), allowed me to learn about the process of communicating their ideas and products so that they can be implemented, obtain greater added value, and promote forest conservation. For example, the guayusa tree is a sacred plant used by the Amazonian communities of Ecuador. Its leaves are used to prepare a drink that has been classified, among ancestral people, as energizing and providing strength to people. The community's initiative to generate learning pathways between the community and Academia led them to contact students and professors from national universities to carry out studies on the properties of Guayusa leaves. Thanks to this, it is currently known that guayusa has a greater amount of caffeine than coffee, has a high content of Theobromine, essential vitamins, and minerals (magnesium, calcium, zinc, vitamin C and D), and is the plant species with the highest antioxidant content recorded to date. Currently, they are working together with two national universities in the study of guayusa leaves and the sustainable production of this species.

Finally, the development of the third part of this activity has allowed me to improve my communication skills about bioeconomy projects that promote the conservation of biodiversity. The preparation of a mini report (in cooperation with my partner Queenny) has allowed me to strengthen my skills acquired in activity 1 and complement them to achieve my objective 1. I think that being able to communicate our ideas and progress is a good start in developing learning pathways between indigenous communities and academia/stakeholders. In this case, the mini report seeks, first, to briefly present the projects developed by the PKR community, its lifestyle, and sustainable management of resources that promote the conservation of biodiversity; and secondly, to encourage the participation of other actors that entails the generation of learning pathways among all those involved.

In conclusion, this activity has adequately complemented my activity 1. My skills in communication techniques, identification of an audience and appropriate actors, and designing a communication plan have been very useful to be able to have a correct approach towards the PKR People and likewise, identify the learning pathways that they have forged with other actors, and finally create a multimedia product that shows the result of the work carried out by this indigenous community in the development of bioeconomy projects that promote the conservation of biodiversity. I think it has been a very valuable activity to achieve my goal 1.

**Product related to Activity 2 – Learning Goal 1.**

Mini-documentary: “Bioemprendiendo desde la selva” - Bio-entrepreneurship from the jungle.  
(Product made in collaboration with Queenny Lopez)

The video was published on the official social networks of the Pueblo Kichwa Rukullakta - PKR.

Link: <https://www.instagram.com/reel/C2EI9bVN52u/?igsh=MWVobnYxaGpqYzQzeA==>

- **Learning Goal 2**

### Process and Product Activity 1

#### **Critical self-reflections related to activity 1: Online Webinar: “Rewilding, Restoration, and the Future of Nature Recovery”.**

This activity is part of my second objective to seek to discuss the importance of biomimetics and its contribution to biodiversity conservation. In this sense, I thought that first I should update myself on conservation concepts and strategies and find out if conservation experts speak of biomimicry as a direct or indirect strategy (research field) for the conservation of biodiversity.

To fulfill this idea, I attended the webinar titled “Rewilding, Restoration, and the Future of Nature Recovery” given by James Bullock, an expert in ecosystem conservation. This webinar was structured into three important sections: the first section gave me information on alarming data on biodiversity loss over time; In the second section, the lecturer showed the main drivers that are affecting the different ecosystems and their synergistic interactions; in the last section, he delved into different strategies that allow the care and conservation of biodiversity. Due to the importance of this topic, as a product of my activity, I have designed an academic poster with the most relevant information from the webinar and some other studies carried out by experts in conservation strategies. I think it is essential to be able to disseminate this type of information among students from different academic areas.

This Webinar has been very useful to achieve part of my objective, there are two important events that I can highlight from this lecture. First, although the data on the rapid extinction of species is increasing, I think it is not the most important data when talking about biodiversity loss. From my point of view, I consider that studying and discussing the drivers that trigger biodiversity loss and their strategies to mitigate or reduce them are more relevant. In this sense, this webinar was very useful to me because I better understood how the synergistic interaction between the drivers (land use and sea change, climate change, pollution, overexploitation, and invasive species) increases the degree of impact on the degradation of the different ecosystems and that the driver impact degree differs depending on the ecosystem; For instance, in marine environments the interaction between climate change and overexploitation are the drivers that cause the most loss of biodiversity, while for terrestrial environments they are land use change and climate change. In addition, I also found it very interesting that during this webinar the underestimation of research data on biodiversity loss was discussed. In this sense, most conservationists mention that, despite the great efforts made on this issue, much remains to be done in terms of precision and prediction of results.

Second, although the concept of biomimetics was not addressed as a strategy to promote biodiversity conservation, some conservation strategies were presented, including restoration, rewilding, and the new paradigm called Survival Ecology. These strategies promise to be useful according to experts, and I think that currently restoration and rewilding projects are helping the resilience of degraded ecosystems. Additionally, during this webinar, I heard for the first time the paradigm on survival ecology, a paradigm that seeks a change in the current vision of conservation, making it more holistic where the human being is considered part of the natural system, is aware of biotic alterations and due to climate change and encourage your conservation activism.

In conclusion, I can say that although this webinar did not include Biomimicry as a tool or field of study to promote conservation, it has left a lot of information about the drivers that cause the loss of biodiversity and strategies that are valid to restore degraded environments. and promote conservation, much more so if they are carried out jointly.

**Product Activity 1 – Goal 2: Poster: Biodiversity Conservation and Nature Recovery: Strategies to halt biodiversity loss.**

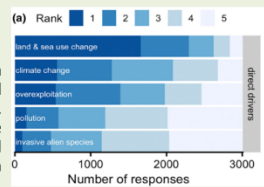
# Biodiversity Conservation and Nature Recovery: Strategies to halt biodiversity loss

- Biodiversity conservation and the implementation of new strategies to conserve it are extremely important and need to be executed, here are some facts why:
- Biodiversity experts estimated that about 30% of species have been globally threatened or driven to extinction since the year 1500.<sup>9</sup>
- Biodiversity loss will likely decrease ecosystem functioning and several ecosystem services will be affected by environmental alterations due to climate change.<sup>5</sup>
- Biodiversity loss and its impacts may be greater than previously thought, due to higher estimates provided for understudied taxa and because of the alteration of the interactions between species.<sup>5,9</sup>

## 1. What are the main drivers of biodiversity loss?

The drivers for biodiversity loss act in different magnitudes and depending on the area. In terrestrial environments, land use change and climate change are the main drivers, climate change and overexploitation were the main drivers for the loss of biodiversity in marine environments; land use change and pollution are the main drivers for the loss of biodiversity in fresh water systems.<sup>5</sup>

Despite the research efforts on these drivers, there are still several knowledge gaps (e.g. lack of knowledge about the total number of species and their ecology, uncertainty in modeling techniques).<sup>3,5</sup>

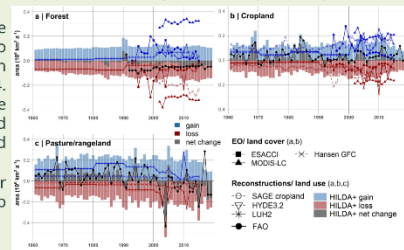


## 1.1 Land Use Change

Global land use change is nearly four (3.7) times greater than previously thought.<sup>8</sup>

Land use change is the driver that contributes to biodiversity loss through biotic homogenization. Moreover, Climate change biodiversity loss and food security depends on land use change.<sup>8</sup>

However, it is still not clear how local changes scale up spatially to regional levels.

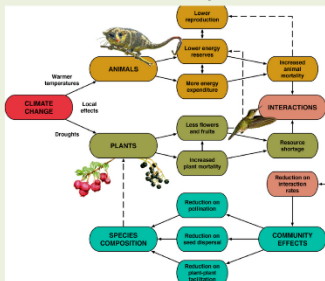


Winkler et al., 2021

## 1.2 The role of Climate Change

“Ecological interactions are the backbone of biodiversity”.<sup>3</sup>

Climate change can exacerbate the effects of land use change, overharvesting and invasive sp. distribution.<sup>1,5</sup> Species interactions and dynamics are important in an eco-evolutionary community. Biotic factors such as trophic interactions and temperature-dependent competition are important in shaping species' eco-evolutionary response to climate change.<sup>1</sup>



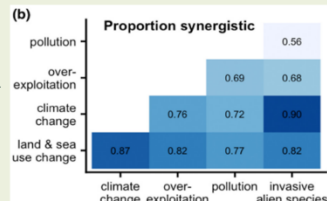
Fontúrbel et al., 2021

## 1.3 Synergistic interactions

“Experts expected the pair of drivers to synergistically reduce biodiversity to a greater degree than the sum of their individual effects”.<sup>5</sup>

Isbell and colleagues (2023) show that 87% of experts surveyed mention synergistic interactions between climate change and land and sea change, moreover, 56% of them mentioned an interaction between pollution and invasive species.

Due to these interactions, biodiversity loss is being underestimated



Isbell et al., 2023

## 2. Strategies for biodiversity conservation

### 2.1 From conservation to Survival Ecology

Gardner & Bullock (2021) suggest a new paradigm called Survival ecology: “conservation aims may best be achieved by refocusing and reframing conservation around the safeguarding of an Earth system that supports both human civilisation and other life into the future”.

This transition requires a shift in conservation objectives, key actions, theory of change.



Modified from Gardner & Bullock, 2021

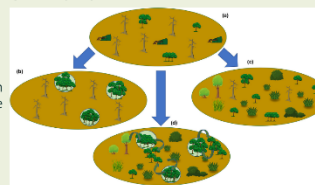
### 2.2 Restoration

Restoration to enhance the adaptation to be more resilient to future change.<sup>2</sup>

Ecological restoration focuses on restoring an ecosystem to a known established point; Bullock and colleagues (2021) suggest a new paradigm that focuses on the re-establishment of ‘indigenous reference’ ecosystems and the species, communities and features defining them.

Future restoration should enhance ecological complexity and emergent properties at multiple scales.<sup>2</sup>

“Restoration to set sites on different pathways & create biodiversity hotspots”.<sup>9</sup>



Pettorelli & Bullock, 2023

### 2.3 Rewilding

Rewilding aims to establish self-sustaining and complex systems, with inter-ecological processes that promote and support one another while gradually reducing human interventions.<sup>9</sup> Rewilding should be main part of restoration to halt biodiversity loss while also enabling ecosystems to mitigate human-induced climate change in a resilient manner.<sup>7</sup>

Rewilding to “soften” landscape, create variety and ensure its dynamics and resilience.<sup>9</sup>



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## Process and Product Activity 2 – Goal 2

**Critical self-reflection related to activity 2. Book reading: “Biomimicry. Innovation Inspired by Nature” by Janine Benyus. And information gathering:** Searching about some current Biomimicry projects.

This activity is complementary to achieving my objective 2 about discussing the importance of Biomimicry as an area of research for the conservation of biodiversity. This activity consisted of three parts: first, reading one of the fundamental books within this field, the book “Biomimicry. Innovation Inspired by Nature” by Janine Benyus; second, investigating some biomimicry projects focused on conservation; the third part and as a product of this activity, to create a podcast where I talk about some ideas that I was able to abstract from all the material I read about how Biomimicry promotes the conservation of biodiversity.

The development of each part of this activity was enriching for me for many reasons: Firstly, Janinne Benyus' book shows how different organisms have evolved to meet their needs in the face of different obstacles; and in turn, how human beings can learn from these adaptations (morphological, chemical, systemic), emulate them and use them efficiently and sustainably for the benefit not only of the human being but of the entire planet. Furthermore, Biomimicry is a multidisciplinary field of research where experts from different areas converge for the same purpose, design from and with nature. I think that human beings can learn, and amend their mistakes, by finding solutions in nature that will allow them to find more sustainable and effective ways in different circumstances. Despite this, the field of Biomimicry is in an early stage and it needs all people, whether involved in academia or not, to consider nature as our best teacher.

While reading the book, I realized that some of the examples of Biomimicry described in the book were related to different areas such as architecture, design, engineering, biology, and how these projects were developed. I found all these projects very interesting, but for my goal (conservation) there were not many examples. For this reason, I decided to search for projects that have been developed in recent years and that will be linked to conservation topics. For instance, it was very enriching to learn about technologies such as textured bio-concrete surfaces that allow the regeneration of coral reefs and the conservation of surrounding species. Additionally, this decision allowed me to learn about institutions, experts in Biomimicry, and innovative and sustainable projects for my final purpose, which was to develop a podcast.

Finally, making a podcast as the product of my second activity -discussing the importance of Biomimicry to promote conservation- and that it can be assimilated by the general public, encourages me to continue researching this field and in turn, continue improving my scientific communication techniques. I can say that, in a sense, the activities of my objective 1 have also helped me carry out this podcast.

In conclusion, this activity has increased my knowledge about biomimicry, generated in me a greater desire to carry out projects that promote the conservation of ecosystems, and increased my communication skills.

**Product Activity 2 – Goal 2: Podcast “Biomimicry for Biodiversity Conservation”. Episode 1:** Six insights on how Biomimicry contributes to biodiversity conservation. By Francisco Ramirez Castro.

[https://kuleuven-my.sharepoint.com/:u:/g/personal/diegofrancisco\\_ramirezcastro\\_student\\_kuleuven\\_be/ETI4YxwpkGIOjKkC4ekAqkB9eDB0w-RyiEOY-4w6OPcYQ?e=jQJbrT](https://kuleuven-my.sharepoint.com/:u:/g/personal/diegofrancisco_ramirezcastro_student_kuleuven_be/ETI4YxwpkGIOjKkC4ekAqkB9eDB0w-RyiEOY-4w6OPcYQ?e=jQJbrT)

## CONCLUDING CRITICAL SELF-EAVUATION ON ENTIRE PORTFOLIO PROCESS

Without a doubt I can start this self-evaluation by mentioning that the process and products carried out for this portfolio allowed me to meet the objectives that I set out to achieve during the development of this portfolio. But achieving these goals was not an easy path to follow. In the following lines, I share with the reader my self-evaluation during this beautiful learning process. The overall learning goal of my portfolio was to identify the topics that interest me related to biodiversity conservation, and topics in which I still have lack of knowledge such as learning pathways, science communication tools, and communication skills. During the initial stage, being able to define the activities that best fit my objectives was difficult; I had to look for innovative activities of current importance on biodiversity conservation, that involve several actors and that fit with the potential products I wanted to develop for this portfolio. After several hours of reflection on the activities, I think that the activities selected were correct, and at the end of each activity, I was able to develop different products of which I am proud.

My objectives were based on the discussion about the importance of generating learning pathways between different actors for the creation of conservation and bioeconomy projects and on the discussion about the importance of biomimicry as a field of research for the conservation of biodiversity. Proposing these objectives in that order, I think it was essential to cover topics that may involve one or more various actors such as the general public, indigenous communities, and academia/stakeholders; making it more interesting and enriching at every step in the development of this portfolio. Each of the activities I carried out (Online course about biodiversity value, visiting the Guayusa bio-entrepreneurship in the Ecuadorian Amazon, webinar on biodiversity conservation strategies, and reading the fundamental book on biomimicry), generated a lot of new and critical knowledge about conservation strategies, strengthened my thinking about the need for networking between different actors (e.g. indigenous communities - academia/stakeholders) and made me reflect on the importance of communication and generation of learning pathways between actors. In fact, I think that the first activity I did (Communicating the value of biodiversity) was essential for the total development of this portfolio and being able to expand my creativity when thinking about the products for each of my activities.

However, all activities played a fundamental role, positively contributed to the development of this portfolio, and supported my professional and personal growth. For example, visiting an indigenous community that promotes bioeconomy projects for the conservation of biodiversity was a very valuable opportunity to learn up close the mechanisms and strategies, and ancestral knowledge that indigenous peoples have as models of sustainable life and full coexistence with nature. On the other hand, I can also say that attending the webinar “Rewilding, Restoration, and the Future of Nature Recovery” was the activity that contributed the least to one of my objectives since it did not consider biomimicry as another strategy for biodiversity conservation. However, knowing about the strategies that academia (researchers) is promoting on different mechanisms for the conservation and regeneration of biodiversity is invaluable and, above all, should be made more visible and known by the general public; Thus, it was also very valuable to me because it reinforced my knowledge previously acquired in this master program.

Regarding the products developed for this portfolio, I firmly believe that I learned about new learning pathways methodologies, and communication and didactic tools; I discovered in myself new skills that

allowed me to develop products that perhaps in the past I would have thought were very complex to make. I feel very satisfied with the products I developed because some of them have turned out to be successful and generate a positive impact. For example, the mini-documentary on the Bio-entrepreneurship of the Guayusa leaf managed to connect the indigenous community with the NGO (The Nature Conservancy) for the joint creation of new sustainable projects on bioeconomy and conservation. Likewise, the template “Let's work together” (product 1, goal 1) is being used by some indigenous communities in the Ecuadorian Andes to generate sustainable projects with local universities. Finally, although developing a podcast continues to be a challenge for me (my second experience making a podcast in this master's program), it left me with a pleasant impression of how important this tool can be today to generate awareness or share knowledge with more people who are not familiar with academia.

In conclusion, I must say that the impact of this portfolio was huge for myself. I gained a lot of software skills as well as I got more in-depth information for my academic development and personal growth. While it is true that I am not an expert in biodiversity conservation, learning pathways, science communication, and biomimicry, I think that my skills and knowledge on these topics are much more solid than before starting this portfolio. Additionally, I have improved my skills and creativity in disseminating information to different people. Finally, I thought that creating this portfolio as part of the master's program in Sustainable Development is essential to encourage the student to explore topics, alternative tools, and spaces for knowledge exchange that are not covered during the regular courses. Without a doubt, developing this portfolio will serve me throughout my professional career linked to the implementation of sustainable strategies for the conservation of biodiversity.