

# GLOBAL YOUTH CLIMATE CHALLENGES GYCC 2023

Uniting Youth for a Greener Tomorrow  
: Deforestation

Sep 20(Wed.)~Sep 23(Sat.) | Bogota, Colombia



Ministry of  
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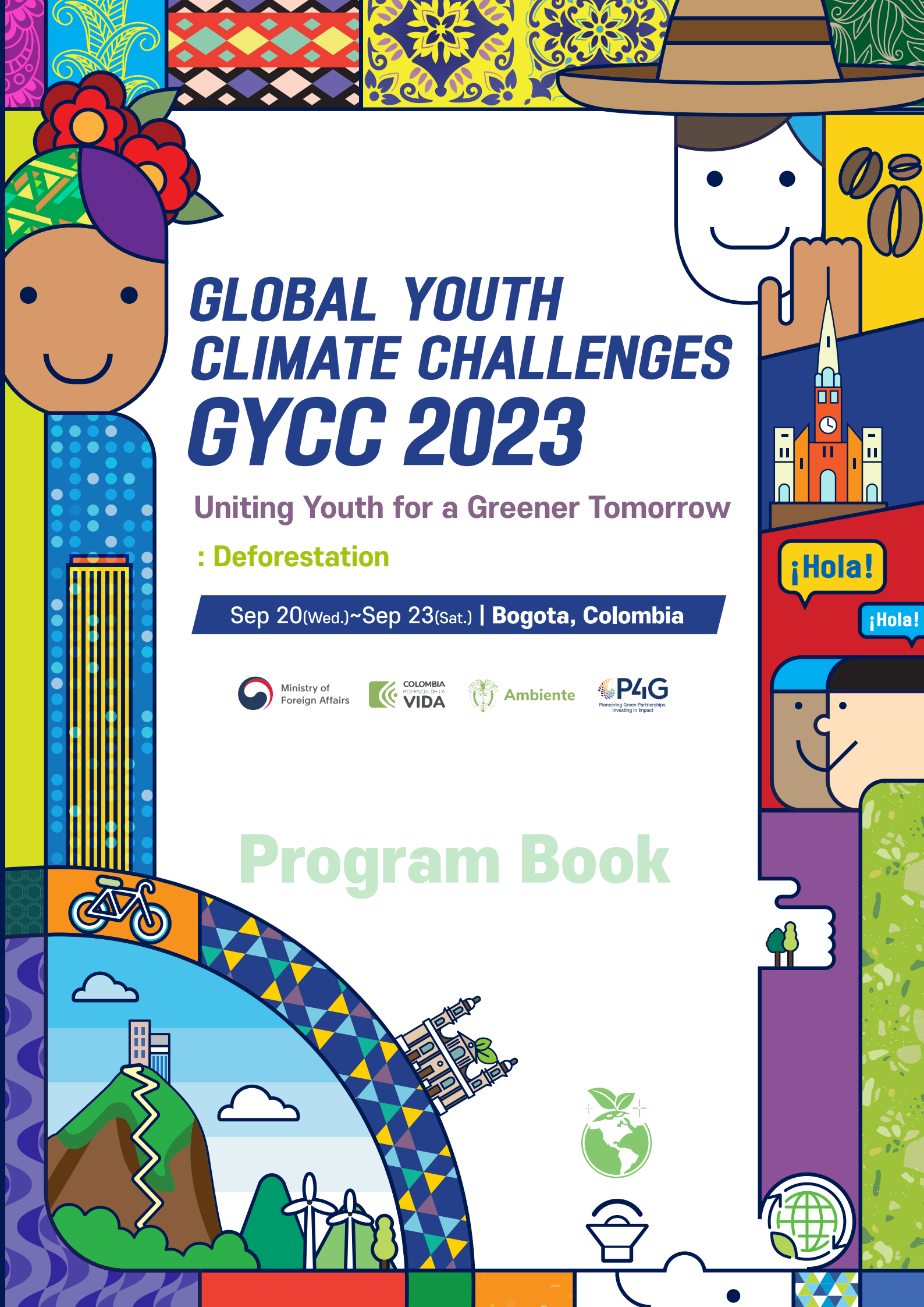


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P4G  
Pioneering Green Partnerships.  
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## Program Book



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**TEAM 1**

# **Sustainable Forest Based Bio-economy**

The Forest-Based Bio-economy



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## TEAM 1

# Sustainable Forest Based Bio-economy

## The Forest-Based Bio-economy

### The Forest-Based Bioeconomy

#### 1. Overview and Introduction

Team 1 consists of young global activists from various nations in South Asia including Sri Lanka, Nepal, and Iran. The team is primarily focused on The Forest-Based Bioeconomy as a subtopic under the theme of 'Deforestation' and the team 1 mainly focused on issues related to South and Central Asia. Following that team has been collaborating to explore applications and solutions to mitigate the effects of deforestation and climate change. In concordance, some objectives have been set in different periods of time.

So in the short term, team members decided to publish a biannual magazine to raise climate awareness in local communities. Meanwhile, the mid-term goal is to provide instructional materials to raise awareness among Asian children and youth. In the long run, the team aims to provide policy recommendations to policymakers, asking them to reinforce the laws in order to accomplish the sustainable development goals and prevent climate change effects.

#### 2. Background of the Topic

The Forest-Based Bioeconomy is a paradigm of economic and sustainable development that uses renewable forest resources to create a diverse range of products, services, and innovations while promoting environmental and social well-being. This concept emphasizes the ethical and efficient use of forest resources to create not only traditional products such as wood and paper, but also a wide range of bio-based products such as biofuels, bioplastics, biochemicals, and pharmaceuticals. The Forest-Based Bioeconomy seeks to shift away from a linear "take-make-dispose" model and toward a more circular and regenerative approach in which resources are used more efficiently, waste is reduced, and ecosystems are protected.

Youth perspectives on the Forest-Based Bioeconomy concept can provide valuable new insights into its potential influence and applicability. From a youth point of view, it could be described and examined as a strategy for improving the planet by wisely and sustainably using forests. Humanity is using forests to create a variety of fascinating things, such as materials for building things, clean fuels, and even medicine, rather than just cutting down trees for products like paper. This aids in environmental preservation, waste reduction, and the development of fresh responses to pressing issues. Analysis with a youth perspective could encompass various aspects, including;

- Environmental Consciousness and Literacy; Deforestation, climate change, and biodiversity loss are among the environmental challenges that young people today could be more conscious of. The idea of exploiting trees in a way that benefits people while protecting ecosystems and tackling climate change may appeal to youngsters when analyzing the forest-based bioeconomy from this angle.
- Educational Value and Youth Engagement; Examining the idea can offer educational possibilities in policy, economics, and environmental science. Young people might be motivated to pursue studies



## TEAM 1

# Sustainable Forest Based Bio-economy

## The Forest-Based Bio-economy

in sustainability-related disciplines and help shape future public policies. The idea may inspire kids to get involved in neighborhood and environmental projects. They may perceive chances to get involved in reforestation initiatives, sustainable land management, and resource conservation campaigns.

- Youth-Led Initiatives and Global Perspective; Young people have a reputation for being change-makers and being active in environmental advocacy and campaigning. They might be motivated to form collaborations, awareness campaigns, and youth-led projects that advance sustainable forestry and bio-based innovation as a result of their analysis of the forest-based bioeconomy. The youth of today are more globally connected than ever. They might see how the Forest-Based Bioeconomy, when analyzed from a global perspective, can help achieve global sustainable development goals, particularly in nations with abundant forest resources.

In brief, understanding how the Forest-Based Bioeconomy fits with young people's values, interests, and concerns is important when examining it from their point of view. It can elicit conversations on creativity, environmental stewardship, and the contribution of young people to creating a more just and sustainable future, which are explained in detail below as the action plan of team 1.

### 3. Explanation of the Action Plan

As indicated above, the team has presented timely suggestions to the deforestation issue in the focused region using its short-, mid- and long-term plans. One of the main concerns of the team was the importance of raising awareness on the issue to minimize its impact while encouraging everyone in society to participate in climate actions. As a result, team members presented the idea of publishing a web magazine which included contents not only in English but also in other languages. This would provide a better opportunity to reach out to many readers even to the ones who are not confident in English.

Secondly, the team addressed the importance of leaving no one behind in climate action, and so team decided to share the contents of magazine and or newly created contents with community workers, schools' teachers and local climate action groups where these materials can be used to educate people in the local community - particularly with those who are unable to access the web contents. In this way, the team intended to reach out to everyone to inform, and educate about the deforestation issue in the region and how forest-based bioeconomy can be a solution to many issues.

Finally, in order to boost the long-term plans oriented to policy making and planning, the team is considering requesting the leaders and decision makers to include the environment literacy as an important topic and subject to be addressed in the school curriculum. The undeniable point here is nothing can be achievable without promoting awareness and to promote awareness it is important to address the linguistic barriers. If there is real discussion of deforestation, reasons for deforestation and solutions to minimize the issue the contents should be available in every language and everyone should be able to have them and be aware about how even the general public can bring positive changes to these issues.



## TEAM 1

# Sustainable Forest Based Bio-economy

## The Forest-Based Bio-economy

### 4. Implementation

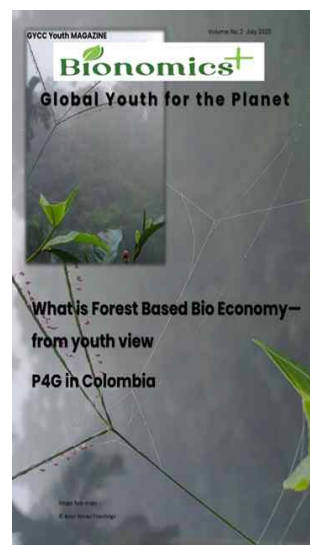
As an initiative step in implementing the team's action plan, various strategies were proposed. The main focus of the action plan is to emphasize the importance of including everyone in climate actions by addressing the linguistic barriers. In other words, team 1 identified that most of the environmental issues and contents/discussions are done in English and this may have a negative impact on reaching out to local people who have less ability to understand English. In order to address the problem, the team opted for a comprehensive solution that includes writing and disseminating a web magazine on climate change in different languages as previously mentioned.

The team has been successfully implementing the plan as can be verified with the first edition of the magazine published in December 2022 covering regional stories about bioeconomy, community forest management and sustainable production. Then later in July 2023, a second edition was completed where it emphasized environmental literacy. Despite challenges, the team will continue working on the magazine even after the annual conferences aiming to spread information and awareness to many people on and offline including local climate activity groups as a way of knowledge exchanging.

### 5. Outcome

Overall, the team completed two web magazines. The first magazine included the content about the projects in the local level to national level of various countries such as Bhutan and Nepal and Sri Lanka. The brief explanation on impacts and the achievements of the projects on the field of sustainability and nature, the adoption processes and the positive changes it has brought to the globe.

It mainly covers the topic of local culture and the history of local communities and their sustainable life ways which the world needs to know about and might be a pathway or help in generating the sustainable way to do certain things.





## TEAM 1

# Sustainable Forest Based Bio-economy

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Similarly, the second edition includes more of the national based plans and policies and pictorial stories about the youths and the country. This time making efforts to update information of three different nations and providing contents in local languages other than English. In the same way, describes in general about the global related issues and hold activities. There is also an entertainment section or better known as 'the fun corner' about climate action yet engaging for the readers making sure it is fresh and illustrating while avoiding monotony when going through the magazine.

Although it was challenging to reach out to many readers, the team has been working to find possible solutions to share produced contents through the Global Youth Climate Change (GYCC) social media pages, personal social media platforms. At the same time, the team is desiring to reach out to other regional climate activists and youth networks to share our work as a way of knowledge sharing and networking. On the other hand, the long-term approach is working on it diligently as a part of an environment literacy project seeking for expansion in other key languages that are part of the UN official languages such as Spanish or French involving more people and reaching different cultures. Thus, it is necessary to mention that the ultimate goal of this work is to educate more people in the regional and global level while creating a mindset that stands against deforestation and actively engage in activities not only to promote the idea of bioeconomy and or green economy but also to become part of global climate action in the end.

**TEAM 2**

# **Destruction of Ecosystem : Illegal Logging**

Deforestation & Illegal Logging



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## TEAM 2

# Destruction of Ecosystem : Illegal Logging Deforestation & Illegal Logging

## Report for P4G 2023: Deforestation & Illegal Logging



### About Edgar Foundation

Edgar Foundation is a youth led NGO registered under the Government of India that focuses on financial literacy and climate action. Research shows almost 73% lack knowledge about finance and make uninformed choices. Based on a recent world bank report -The global Findex Database 2021, indicates half of the world's unbanked adults live in 7 economies, of which India holds a major share of 17%. In order to bridge the gap to create a financially healthy and debt-free society. Edgar Foundation has set its vision to pioneer a radical transformation at root levels for societal change. The idea for this foundation was started as part of Amartya Sen's capability approach, which later on derives the essence of 'Hope' as a capability inspired by Abhijit Banerjee.

**Follow us:** <https://www.linkedin.com/company/edgar-foundation/>

**Contact:** [edgarfoundation.ef@gmail.com](mailto:edgarfoundation.ef@gmail.com)

### About GYCC

Global Youth Climate Challenges (GYCC) Youth Lab works closely with South Korea's '2050 Carbon Neutrality Commission (CNC)' to create yearly GYCC Conferences, where Youth lead and innovate SOLUTIONS to Climate Change.

### About P4G

P4G - Partnering for Green Growth and the Global Goals 2030 - is a new initiative, commenced in 2018, with the ambition of becoming the world's leading forum for developing concrete public-private partnerships at scale to deliver on the SDGs and the Paris Climate Agreement. We bring together business, government, and civil society organizations in innovative public-private partnerships to advance solutions that help meet humanity's greatest needs in five key areas: food and agriculture, water, energy, cities and circular economy.

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## TEAM 2

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging

### Acknowledgement

We would like to thank the working group members of GYCC 2022/23 Team 2 who contributed their ideas via discussions; Diego Manrique, Diego Arreola Fernandez, Serena Leka, Reynaldo Valdez Garcia, Gissele Rosalinda Chicas, Hannemari Peltola, Gawon Lee, Mari-Liis Bago. We are also grateful to the residents of Keelaimullaikudi Trichy, Tamil Nadu, India.

### Disclaimer

The views expressed in this report represent those of the authors and do not necessarily represent those of Edgar Foundation nor GYCC. The report is intended to promote discussion and to provide public access to results emerging from our work.

### Suggested Citation

Edgar Foundation, 2023. Report for P4G on Deforestation and Illegal logging. Edgar Foundation-GYCC-P4G. Pg 1-10.

### - Abbreviations -

<b>ADB</b>	Asian Development Bank
<b>FDI</b>	Foreign Direct Investment
<b>GIZ</b>	German Development Cooperation
<b>GoI</b>	Government of India
<b>GYDI</b>	Global Youth Development Index
<b>MoEFCC</b>	Indian Ministry of Environment, Forest, and Climate Change
<b>ODA</b>	Overseas Development Assistance
<b>UNCTAD</b>	United National Conference on Trade and Development
<b>UNEP</b>	United Nations Environment Programme
<b>UNICEF</b>	United Nations International Children Emergency Fund
<b>WEF</b>	World Economic Forum



## TEAM 2

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging

### Executive Summary

Deforestation and illegal logging is a global phenomenon. If we have to tackle climate change, we must protect our forests. What we proposed as an action plan is cost effective measures to reduce illegal logging and deforestation. It was more about strengthening local governance, public participation, and stakeholder engagement. Therefore, we teamed up with a financial institution (State Bank of India) and an NGO (Edgar Foundation) for the implementation of an action plan. The local community were given the importance of financial inclusion, collective security, transparency and accountability. Moreover, the afforestation programme was done with the active participation of the local community.

### Introduction

Illegal logging is the harvesting of timber in contravention of the laws and regulations of the country of harvest. It is a global problem with significant negative economic, environmental and social impact<sup>1</sup>.

According to the United Nations Office on Drugs and Crime (UNODC), a range of processes of “taking, trading - supplying, selling or trafficking - importing, exporting, processing, possessing, obtaining and consumption of wild flora, including timber and other forest products, in contravention of national or international law is referred as forest crime.

Illegal logging is associated with deforestation, climate change and a loss of biodiversity. Trees absorb and store carbon dioxide. If forests are cleared, or even disturbed, they release carbon dioxide and other greenhouse gas. Forest loss and damage is the cause of around 10% of global warming. Intrinsically, combating forest crime; illegal logging is vital to halting deforestation and the climate crisis. There's simply no way we can fight the climate crisis if we don't stop deforestation<sup>2</sup>).

### Background of the subtopic

Deforestation and illegal logging is a global phenomenon. Due to higher market demand and increased profitability of timber and its byproducts, crimes in forests across the world are emerging as a serious threat. However, research shows it has been more prevalent (i.e., 20-90%) in tropical regions especially Southern America, North and Central Africa, South Asia and South-East Asia (SEA)<sup>3</sup>. Deforestation in general leads to depletion of nature capital, loss of ecosystem services, displacement of indigenous communities. As a part of the solution measure, Nature Based Solutions(NBS), technological, and governance measures can be used to tackle deforestation and illegal logging.

### Action plan

Our team brought together ideas of improving transparency and accountability in the timber supply

1) <https://environment.ec.europa.eu/topics/forests/deforestation/illegal-logging>

2) <https://www.wwf.org.uk/learn/effects-of/deforestation>

3) Lin, J.-C.; Lee, J.-Y.; Liu, W.-Y. Risk Analysis of Regions with Suspicious Illegal Logging and Their Trade Flows. Sustainability 2021, 13, 3549. <https://doi.org/10.3390/su13063549>



**TEAM 2**

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging

chain to prevent deforestation and illegal logging. There were both technological measures and governance measures proposed. Firstly, it was about surveillance by GPS trackers, blockchain, and GIS (Best Available Technologies). Secondly, by strengthening decentralization and local governance through CSO's, public participation, and democratization approach.

### Feasibility of Action Plan

Proposed Measures	Technological	Local Governance
Feasibility Level		
Feasibility Level		

**Technological measures:** Even though measures proposed with reference to GIS /GPS and block chain would be a way to track and monitor the timber supply chain and combat deforestation, after doing PEST analysis, there were concerns on the cost of developing such an application. Moreover, it was also related to expertise on those subjects for sustained functioning of such an application. In line with that, it was not positively considered for further discussion related to implementation due to its feasibility issues.

**Governance measures:** Leveraging on existing resources by building connections between NGOs, financial institutions, and local indigenous communities was considered to be effective measures. Moreover, it builds collective security, strengthens local governance, and creates accountability.

### Implementation of the action plan





As a part of an action plan in order to strengthen local governance, the effective measure is by capitalizing on existing resources and tapping into channels that can strengthen the voice of local communities. Moreover, local governance, public participation, and decentralization can help in combating deforestation in the most effective and efficient way by building capacities of the local population through training and technical assistance. It is necessary to develop various education, communication activities to improve understanding among local communities.







**TEAM 2**

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging

Case Study - Tiruchirappalli, India.		
		<p>Country: India            Capital: New Delhi            Population: 1.4 Billion</p>
 <b>EDGAR FOUNDATION</b> <small>A Non-Profit Organization Registered and Recognized by Government of India</small> Breaking Poverty, Building Society		
<p>Edgar Foundation is a youth led NGO registered under the Government of India that focuses on financial literacy and climate action. Nature Conservation International back in 2001, notified 17 mega diversities in the world. In those identified countries, 12 are from the developing world, and India being one of them. In line with improving transparency and accountability based on our proposal. Edgar Foundation with State Bank of India Trichy did an Operation Green Sentinel-Afforestation programme on August 15, 2023. Here local communities were given information on financial inclusion, collective security, and access channels for improving livelihood.</p>		

### Outcomes of the Programme

SDG Goals	Targeted Hits	Indirect Hits
<b>4</b> QUALITY EDUCATION 	Financial literacy	Creation of financial inclusion and access to social security schemes
<b>8</b> DECENT WORK AND ECONOMIC GROWTH 	Minimize logging through alternative income production	Creation of local employment as a part of bioeconomy
<b>13</b> CLIMATE ACTION 	Afforestation Programme	Improved ecosystem services/carbon sinks
<b>17</b> PARTNERSHIPS FOR THE GOALS 	Collaborate with youth organizations, International organizations	Involvement of local youth for accountability



## TEAM 2

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging



As part of operation green sentinel local community in Keelamullakudi gave their land (quarter acre) for planting trees. Edgar Foundation and State Bank of India planted tree saplings. Moreover, to strengthen the local economy and also to provide support through loans for Self Help Groups (SHG) for creating bioproducts.

### Conclusion

To halt Illegal logging practice, strong political support and good governance are essential. Developing a strategic approach with inclusive and cross-sectoral stakeholder engagement is one of the key areas to focus on when combating illegal logging. Capitalizing and strengthening local governance is one of the effective measures through public participation. Case study introduced in this paper would be considered as the best practice.



## TEAM 2

# Destruction of Ecosystem : Illegal Logging

## Deforestation & Illegal Logging

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**TEAM 3**

## **Emerging Climate Technology : Deforestation**

Forestry Technology in North America and East Asia, and beyond



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## TEAM 3

# Emerging Climate Technology : Deforestation

Forestry Technology in North America and East Asia, and beyond

## FORESTRY TECHNOLOGY in North America and East Asia, and beyond

September 6, 2023

- Report Lead: Yoko Lu
- Inputs used: Hongju Jung, Konwoo(Andrew) Seong, Angela Zhong

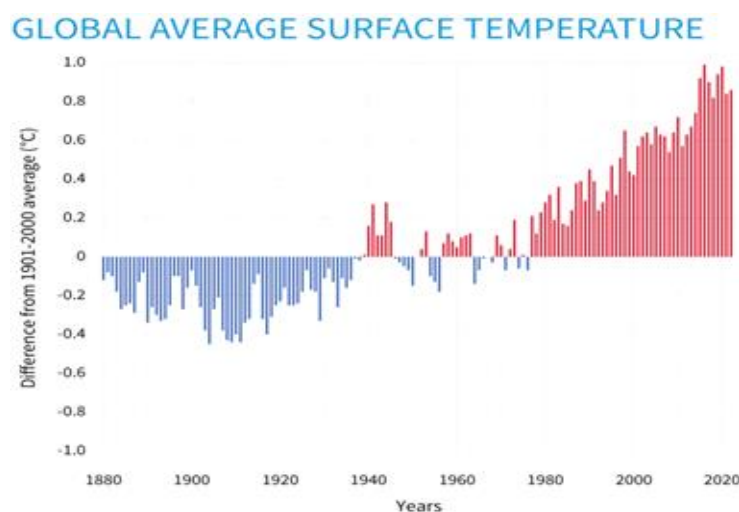
### Acknowledgment

We thank Il-Bin Jung, Forest Information Division, Korea Forestry Promotion Institute, who has kindly reviewed our project report, which is prepared for the Global Youth Climate Changes, at the 2023 P4G Summit in Bogota, occurring in September 22-23, 2023. The report entails direct recommendations and background information from the reviewer.

### Introduction

There are many causes for deforestation such as forest fires, agriculture, road building, and logging, and it is impossible to address them all at once. There are additional benefits, even if deforestation ends, we need to promote afforestation to reduce the existing stock of carbon in the atmosphere.

Since the 1880s, the carbon dioxide concentration has reached the threshold that significantly has an impact on the global temperature and the positively inclined trend has been observed ever since the 1950's (National Oceanic and Atmospheric Administration (NOAA) 2015) (Fig 1).



**Figure 1.** The trajectory of the global average temperature shows the significant increase since the 1950's. (Source: NOAA)

The global temperature increase shows that the triple planetary crisis, consisting of pollution, climate crisis, and biological or ecological crises (United Nations Framework on Climate Change (UNFCCC) 2022), is of immediate concern. It impacts our health and livelihood, in addition to the surrounding



## TEAM 3

# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

environment that we depend on. Human activities alter the carbon cycle, through the 'land use, land-use change and forestry' (LULUCF), a term coined by the UNFCCC (UNFCCC, n.d.). By growing more trees within the human settlement, the urban trees sequester atmospheric carbon from the greenhouse gasses, which ultimately mitigate climate change by storing carbon as the trees grow, (UNFCCC, n.d.), improving the urban air quality.

### The Problem: The Private Sector

Community engagement is one of the engagements in combating the deforestation that has a direct impact on their livelihoods, and it is a way to include everyone, including girls, women, Indigenous peoples, and local communities, to jointly collaborate to solve the problem. However, community engagement alone is insufficient. In addition to illegal logging, companies are logging and agricultural land continues to expand. According to the 2020 'State of the World's Forests' Report of the United Nations Food and Agriculture Organizations (FAO) and the United Nations Environment Programme (UNEP), forests covers 31 percent of the world and more than half of 4.06 billion hectares of the total forest area are "found in only five countries (the Russian Federation, Brazil, Canada, the United States of America, and China), [while] two-thirds of forests are found in ten countries". The expansion of agricultural land is "the main driver of deforestation and forest degradation and the associated loss of forest biodiversity" (FAO & UNEP 2020).

Although many large scale corporations, such as Nestle, Walmart, and Coca-Cola of the United States, LG Electronics and Lotte of South Korea, Yamaha and Saraya of Japan, and Alipay of China are promising to plant trees, many of their replantation projects have failed mainly due to the lack of the knowledge in the area and the sourcing of scientists and experts. While the intentions are well thought, "planting the wrong trees in the wrong place can actually reduce biodiversity, speeding extinctions and making ecosystems far less resilient" (Einhorn 2022). In China, for example, the Three-North Shelter Forest Program, also known as the Great Green Wall, "aims to plant trees to plant a band of trees stretching 4,500 kilometers across the northern part of the country; [however, the] analysis suggested that up to 85 percent of the plantings had failed because the non-native species chosen could not survive in the arid environments they were plopped into" (Gramling 2021).

### The Objective and its Reasonings

In order to ensure that the companies are held accountable for the replantation and that their projects do not interfere with the natural ecosystem, the goal to achieve is companies have pledges and make sure that these pledges are effective. A study led by ETH-Zürich in Switzerland used direct forest cover measurements to develop a model to estimate forest restoration potential on Earth (Bastin et al. 2019). They discovered that the Earth can support 25 percent of forests more than what we have today; this can be achieved by restoring 900 million hectares of forests which could store around 205 gigatons of carbon, meaning that atmospheric carbon can also be decreased by 25 percent, which is equivalent to nullifying around 20 years of carbon emissions caused by humans, or about half of the human-induced emissions since 1960 (Bastin et al. 2019).



## TEAM 3

# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

Sassan Saatchi of the National Aeronautics and Space Administration (NASA) positively reflects to the study conducted by Bastin et al. 2019, that the study directly addresses the issue more than the past work on forest restoration. He notes that the researchers used “new satellite-based land cover and land use maps, along with other climate and soil data and advanced techniques to arrive at their results”; however, he also cautioned that their results were not so different from the recommendations provided by the Intergovernmental Panel on Climate Change (IPCC) in 2018, which “suggested 950 million hectares of new forests could help limit the increase in global average temperature to 1.5 degrees Celsius” (Buis n.d.). Although these numbers are very close to each other, Saatchi highlights “the devil is in the details” (Buis n.d.).

The main objectives to achieve in the project is a three-fold dimension: information, accountability, and real impact. To make the pledges effective, information can also refer to education. Through the creation of the website where the methodology and the mapping platform are implemented, awareness on emerging climate technologies related to deforestation, afforestation, and reforestation can be raised to the public, including companies and young people. For the companies to be held accountable, their pledges for reforestation needs to be exposed, which also includes youth involvement. The impact of the overall project is to foster that the youth community is engaged in climate action, accountable climate action, and effective pledges from the private sector.

### The Focus and the Solution: The devil is in the details

To ensure that the projects do not harm the natural environment, we must go into detail. Considerations are the following: (1) Species effectiveness (Different trees have different speeds of maturity, reproduction, and carbon processing efficiency), (2) Biodiversity (Reforestation with a monoculture might result in ecosystems that will not function as efficiently as they did before), (3) Climate change (Regions will have different trajectories that will need to be accounted for), (4) Region (With the Earth already warming, effects vary geographically from tropical to boreal regions and depend on water and light availability), (5) Timing of planting (Plants require care as saplings. We need to ensure that the trees that are planted do not die off.), (6) Native species (It is important to acknowledge indigenous species and not introducing invasive ones), (7) Plant sexual diversity (Having only male trees has historically produced an abundance of pollen in cities (Hirschlag 2020)), (8) Development of soil (Trees cannot take root until the processing of primary succession occurs in damaged foundations), and in terms of the social aspect, (9) Economic benefits and expectations of the project (If the project is local). Not only does economic benefit mean the money that people have earned, but also includes finance as a result and where people have income obtained as well as whether they have skills to make money later on. When an initiative is established a long time ago, it can be strengthened over time. Within the environmental, social, and governance (ESG) sector, technology is for the community where they can be assisted to stand on their own, whereby opportunities can be created for local communities. In addition, Indigenous peoples and local communities can provide traditional knowledge that can be valuable in science and technology research.



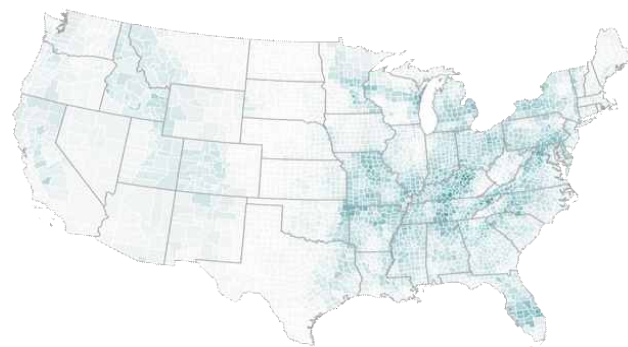
**TEAM 3**

# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

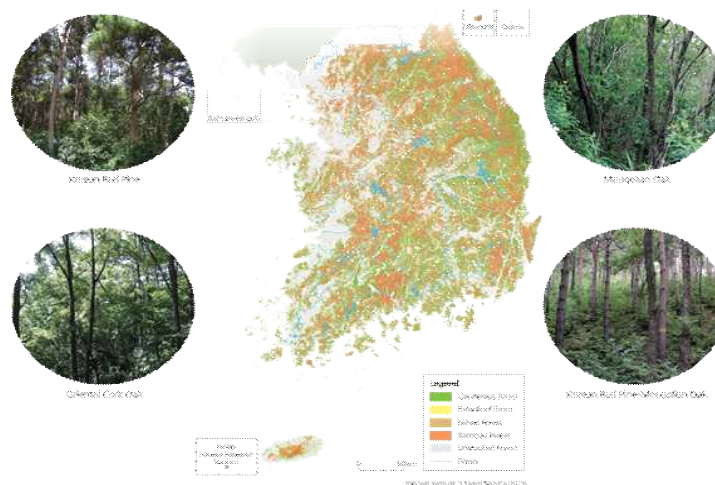
The main focus areas for the project are in the United States and South Korea. In North America, the bioregions are temperate forests, tropical forests, and boreal forests, while East Asia is predominantly northeast Asian deciduous forest biome and tropical dry forests.

The Restoration Hub, which is an online tool for assessing reforestation, identifies about 520,000 square kilometers for reforestation in the United States, reducing 333 million metric tonnes of carbon dioxide annually (Fig 2).



**Figure 2.** The parameters ‘Total Opportunity’ and ‘Acres’ in the Restoration Hub online assessment tool are used to identify the restoration area coverage in the United States. (Source: Restoration Hub)

In South Korea, according to the Daegu-Gyeongbuk Research Institute, the “annual cost of managing street trees is 6,828 won [(equivalent to \$5 USD)] per tree” and it is possible to periodically and carefully manage trees (Oh 2022). Forests are mapped according to the forest, based on the map from the National Institute of Forest Science (2013) (from the National Atlas of Korea for Children, compiled by the National Geographic Information Institute, Ministry of Land, Infrastructure, and Transport) (Fig 3), covering coniferous forests and broadleaf forests.



**Figure 3.** Coniferous forests are composed mainly of evergreen trees with needles for leaves, such as pine. Broadleaf forests are composed of deciduous trees that lose their leaves in winter, such as oaks, maples and birches. (Source: National Geographic Information Institute)



## TEAM 3

# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

The goal for the project is to develop similar maps by mapping the forest cover by identifying the tree species in detail by using remote sensing and/or artificial intelligence. An example of such technology is called LiveEO, which determines the tree species. Through using the satellite imagery, the trees are detected by combining the information collected from all the bands including the wavelengths and specific reflectance for each tree (LiveEO 2021).

### The Challenges and How to go forward towards the global scale

While LiveEO may be a sound solution to gather on-ground information effectively, the functions of LiveEO are narrower than those of the United Nations Food and Agriculture Organization (FAO). The FAO platform focuses more on acquiring shared technology while LiveEO is on analysis and provision that are provided by LiveEO itself. Developing countries often do not have access to advanced technology like LiveEO, so FAO developed know-hows so that everyone can use the FAO platform without so much difficulty. For analyzing and categorizing different types of tree species, satellite image is limited in regards to the technology we have today because of the rapid forest change. This cannot be analyzed by satellite images; they need to be at the micro-level. In Korea, for example, drones do not collect all areas, as operational recording is limited. Satellite is used to capture data in a large area while drone is used to cover small areas or through site surveys. An additional troublesome case in Korea was when Korea received high resolution images from Europe in 2013 (direct source from Il-Bin Jung). Korea was not able to resolve high resolution images freely and it was very difficult to operate when applying these images to the local images. This was just the case of Korea; every country is in a different situation. Some countries do not need to analyze data in small units. For example, in Korea, the minimum area for forest is hectare while the United States is acre. Therefore, in terms of forest management, spatial resolution that each country uses is different, thus different proposals for forest management, like the enriched ecological acceleration in biodiversity. Large countries like the United States and Russia may concentrate on the relationship between input and output, thus they do not need to deepen into small resolutions. On the other hand, for a small area, each country has different units for a small area, so technology applied for each area has difficulty in assessment if applied at the same time. Depending on the user, data content can be interpreted differently. When combining all the data and maps together, the final output can be assessed or managed at the global level. Then, the optimization can be applied, where indigenous peoples and local communities are encouraged to provide knowledge and the researchers collect key information from these groups themselves, in particular, education and training to be provided for the activities in different areas. Only such participants have general understanding on how to apply the system, but an individual does not need to have similar level or same type of understanding in technology.

Other than LiveEO, another example is the Gartner, Inc. of the United States. Some of the ten areas that are developed under Garner, Inc, are related to forests and this technology is developing rapidly. While this may be promising, democracy of technologies, which refers to the prevention of monopoly technologies and the transition to be open-sourced so everyone has access. This is based on the Gartner, Inc. concept.





## TEAM 3

# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

Historically, technology was separate from site work. Since technological development and site work were not evolving at the same time, we still have the delicacy to step forward and the analysis continues. People who remain in the middle and still collect by using the same technology are aged, therefore there is a shortage of labour. Mediators are retiring so two groups are separated with a large gap. Thereby, democracy of technologies becomes more crucial as time goes by. It is necessary to have support and training for local people with the expandable technology. Similarly, the aim for the global companies is global forests. This is the key concept of ESG management.

Private sectors around the world are more advanced in technology yet they often do not study their countries. For example, instead of surveying their own country, Germany spends more investment in providing service to developing countries like Africa and Latin America. This is not the same as the democracy of technology, otherwise it leads to the history of exploitation we suffered tremendously in the past. Consequently, it is necessary to provide education and training in developing countries to utilize the technology. Same level of information on the platform should be shared. In another example, many countries, such as the United States, Russia, China, and Europe agreed on the implementation of the global navigation satellite system (GNSS), which is akin to the global positioning system (GPS). During the Cold War, countries did not share satellite information so local conditions of other countries were not well understood. Through the combination of the GPS of the United States and GLONASS (GLObalnaya NAVigatsionnaya Sputnikovaya Sistema) of Russia, drone and LiDAR images were shared without much difficulties, since all data were on the same platform and shareable by all.

Recently, combining all the information through the Geographic Information System (GIS) (commercial versus personal use), for example, is a critical component. To operate this database system, it is recommended to use the same equivalent optimization system. There are many other similar softwares but functions are the same. Many companies can supply such software, but it is reduced to only one such software. Now, many of such software have changed subscription, which marks a significant difference in technology. Between the softwares as they are acquired by the companies, the Google Engine covers some parts but there is an immense limitation: If the company provides commercial software that is linked to Google as a third-party service, does it mean that the company is rogue? It is not wrong because the company understands democracy. The charge is affordable for many countries for an extended period of time. If more technology is provided, the demand is higher, so advanced technology needs to be supported, leading to more investment. This is not a problem in developed countries; however, the technological gap becomes wider and more serious in the developing countries due to the economic constraints.

To summarize, if we were to democratize technology, then it is easier to provide such service. However, we need to be aware that this has not been realized yet. Such technology cannot be fully supported between countries.



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### In a nutshell: To democratize through the community

While it may be cost ineffective and time consuming to deploy such a tool that involves a significant amount of technicality, the initial approach of the project is to design the website that includes education material and action that also involves youth activism. With the opportunities and the challenges shared on the platform, it is possible to garner a wide range of stakeholders and increase the potential to implement the project. The website aims to advise the corporate on how they can be part of the solution instead of being the problem. There are several ways to outreach and track the progress. Community input elements can be incorporated by introducing the survey and encouraging the respondents and the users to take action on signing the petition. Education on emerging climate technology can be strengthened, by including topics such as current solutions (i.e. similar to the 'Polluter Pay Principle') and future of climate technologies (i.e. climate change, agriculture, food production).

The online tool is just a platform; it is necessary to have the key players come into the equation and consult with these entities and work together to develop an action plan such as a joint recommendation or research paper. As aforementioned, agriculture is one of the key drivers for deforestation, and it is directly linked to the food security and well-being of humanity. Climate-induced natural disasters are all linked to the environmental destruction that significantly deteriorates the planet. The FAO and the United Nations Environment Programme (UNEP) are some of the UN organizations that can be partnered as they are directly working with the countries and regions. NASA and NOAA are some world renowned research institutes that provide the data and scientists that can contribute to the project. Similarly, the World Research Institute and the World Economic Forum are some of the international non-governmental organizations that are research-based with scientists from across the world. Indigenous communities provide traditional knowledge especially for the native tree species and knowledge sharing is promoted; therefore, the consultation with the Indigenous peoples are very important as they provide local knowledge so that the specific forest conservation efforts cannot be missed while working with the corporate sector, particularly those that have projects in areas that they do not work directly in. In terms of forest conservation, the forest land cover should be consistently monitored and special attention be paid to the new saplings.

At the final stage, the aim is to benchmark reforestation projects in different parts of the world and have the final product being recognized as a legal organization, so that the restored wood production can further enhance the forestry economy and that the wood export can be cost effective for all the countries and its citizens regardless of their economic status, and that all citizens have the equal access to the wood material.



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## Supplementary case studies on Reforestation Technologies and Projects

### A. Korea:

#### 1. Developing Smart Production Technology for Forest Resources

National Institute of Forest Science (NIFoS) introduced Smart farming systems and big data to forest greenhousing. This will help forest greenhouse to develop an automatic greenhouse control system program based on Cloud services for temperature control and irrigation. This technology will help to contribute to carbon neutrality and reduce damages that may be caused to climate change. It will also help increase work convenience and productivity while saving energy.

산림청 보도 자료		당신은 준비하셨습니까? 산림 스마트 생산기술	
보도 일시	2022. 6. 20(목) 09:30	제보 일시	2022. 6. 20(목) 09:30
담당 부서	국립산림과학원 산림기술개발연구소	책임자	홍철 전화번호 (02) 540-13001
		담당자	양우사 전화번호 (02) 540-11421

#### 산림자원 스마트 생산기술, 발전방안을 논의하다

- 국립산림과학원, 제2차 스마트 온실 운영 및 발전 연구회 개최 -

- 산림청 국립산림과학원(원장 박원)은 3일(화), 강원용 스마트 양묘 연구 성과와 기술을 공유하기 위한 “제2차 스마트 온실 운영 및 발전 연구회”를 개최했다고 밝혔다.
- 국립산림과학원 스마트 생산기술 및 빅데이터 연구 관련 부서와 강원, 충북, 경남, 전남 산림연구소가 연구자 30여 명이 참석하였다.
- 이번 연구회는 지역에 산림연구소들과 함께 산림용 스마트 온실 기술 연구 현황 및 새로운 공유하고 지역의 활력과 발전방안을 모색하는 자리로 되었다.
- 산림기술개발연구소는 강원용 스마트 온실 장점에 대해 규모·수준별 시설 기준을 제시하였고, 광주주스 서비스 기업 자율재배 온실 관제기 스마트 브로더와 스마트 냉방·관수 기술을 개발한 바 있다.
- 또한, 국내 최초로 모두 양간 이후의 보양·저온지방·해충 기준을 정밀하여 나무를 관리하는 지역에 최상의 품질로 생산할 수 있는 모두 주목 관리 시스템도 마련하였다.
- 국립산림과학원 산림기술개발연구소 황재홍 소장은 “산림용 스마트 온실은 기후변화 피해 예방, 작업 편의성 및 생산성 증대, 에너지 절약 등과 함께 탄소 중립에도 크게 기여시킬 것이다”라며 “지역 특성의 향상을 통해 스마트 온실 구축 기반을 마련하고 현장에 관한 기술들이 보급될 수 있도록 하겠다”라고 밝혔다.

이 영상 등과 함께 탄소 중립에도 크게 기여시킬 것이다”라며 “지역 특성의 향상을 통해 스마트 온실 구축 기반을 마련하고 현장에 관한 기술들이 보급될 수 있도록 하겠다”라고 밝혔다.

정부 관련 사진 (별도첨부)

#### 2. Mapping forests using LiDAR(Light Detection and Ranging) & Drone technology

<https://towardsdatascience.com/applications-of-lidar-in-forestry-13686e1b15a7>

- i. Active remote sensing sensor that emits laser signals to calculate distances based on the time delay of the returned laser pulses
- ii. Able to record a dense array of distance return values  
(e.g. in the order of several laser returns per square centimeters over ranges of 50m)
- iii. These return values are assembled into highly detailed 3 dimensional reconstruction of the surfaces.

#### Applications to forestry

- iv. Detect forest road routes and extract spatial data  
> Can help to overcome realistic difficulties in identifying and targeting roads that need repairing/maintenance





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- v. By comparing aerial LiDAR data, can identify topographical changes in forest road surfaces and slopes
  - > Can establish GIS database



### 3. Case: Using ICT technology to reforest the damaged forest sites of DMZ (Korean Demilitarized Zone)

In terms of ICT, digital twin is often referred to, where actual reality and virtual reality are combined, and it is one type of platform where the user can see the local conditions without paying a visit to that location.

Using satellite images, the Korea Forest Service found that forest density had significantly reduced over the years and found management urgent. The important note to be highlighted is that LiDAR cannot be used due to the military service zoning. This is not limited to Korea, but every country has the same situation within the forest mapping regime.

To reforest the DMZ, Korea Forest Service announced the '3rd DMZ Comprehensive Forest Management Measure'. In Korea, forest maps are drawn along all islands along the peninsula, including the DMZ.

- i. Using Artificial Intelligence(AI) and Deep Learning technology, they were able to automatically detect the damaged forest sites and restore the forest ecosystem and create a green space over 500ha.
- ii. Four forest ecological management centers in Yanggu, Yangyang, Inje and Hwacheon and the national forest management offices in the border area will use ICT technology to immediately respond to forest fires.

Source: <http://www.conslove.co.kr/news/articleView.html?idxno=76894>

### 4. Case study in Mapo District, Korea - Non-profit organization (Instagram: @before.it.melts)

'1,000 Tree Planters' is a group created to restore the ecological life of Noeul Park, located in Nanjido, Mapo-gu, which used to be a 100m-high mountain of garbage. They hope to give children a clean nature instead of trash by endowing them with cultural values of peace. This is a campaign organized by 'Gathering'.



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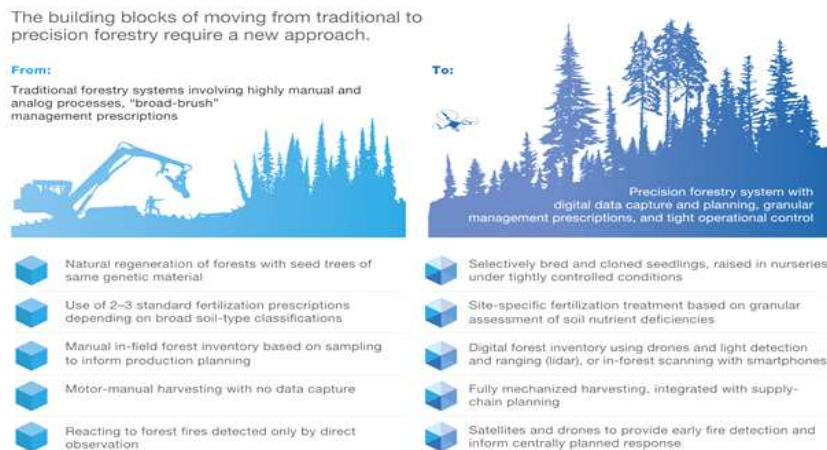
## Forestry Technology in North America and East Asia, and beyond

### B. United States / Global

#### 1. McKinsey & Company

(<https://www.mckinsey.com/industries/paper-forest-products-and-packaging/our-insights/precision-forestry-a-revolution-in-the-woods>)

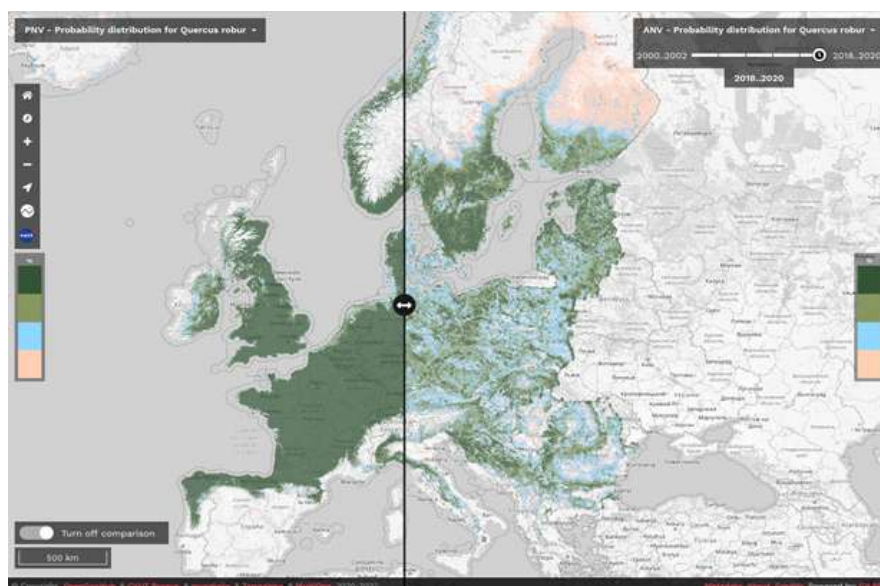
##### i. Precision Forestry



#### 2. EcoDataCube (Currently only in Europe)

([https://ecodatacube.eu/?base=OpenStreetMap%20\(grayscale\)&layer=Land%20Cover%20&zoom=4&eye=5000000&center=53.7139,17.0066&opacity=45&time=2019](https://ecodatacube.eu/?base=OpenStreetMap%20(grayscale)&layer=Land%20Cover%20&zoom=4&eye=5000000&center=53.7139,17.0066&opacity=45&time=2019))

The map below compares the estimated distribution for the pedunculate oak (*Quercus robur* L.) (left) with the actual distribution (right) at 30m resolution.





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# Emerging Climate Technology : Deforestation

## Forestry Technology in North America and East Asia, and beyond

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**TEAM 4**

# **Rapid and Threatening Desertification**

Rapid & Damaging Desertification in Africa



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**Gaeun JIN**



## TEAM 4

# Rapid and Threatening Desertification

## Rapid & Damaging Desertification in Africa

### Rapid & Damaging Desertification in Africa

### - African Youth Greener Future (AYGF) -

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## TEAM 4

# Rapid and Threatening Desertification

## Rapid & Damaging Desertification in Africa

### 1 Background of the subtopic

#### 1.1 Introduction

“Africa is so vulnerable to desertification as it affects around 45 % of Africa’s land area, with 55 % of this area at high or very high risk of further degradation; which is exposing millions of people to suffer from hunger and poverty as a result of the decrease in crop yields and production, leading to harsh economic insecurity in the African region”

#### 1.2 Definition of the problem

Desertification refers to the process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agricultural practices. Factors such as deforestation which lead to the cutting down of trees, which hold the soil together by their roots largely contribute to desertification. Removing the trees leaves the soil bare to wind and other elements which leads to desertification since the top soil is blown away, dried out or washed away by rain. In most regions, deforestation leads to land degradation, which refers to the result of human-induced actions which exploit land, causing its utility, biodiversity, soil fertility, and overall health to decline, hence desertification. Desertification results in persistent degradation of dryland and fragile ecosystems due to human activities and climate change.

#### 1.3 Root Causes

- Expansion and intensive use of agricultural lands and cultivation.
- Poor irrigation methods.
- Deforestation for various reasons such as urbanisation and farming
- Excessive use of pesticides and fertilisers.
- Mining, overgrazing and stripping of land resources.
- These unsustainable activities lead to adverse effects on the soil.
- Over-drafting of water sources.
- Soil pollution.

#### 1.4 Effects

- Drought and Famine
- Floods
- Loss of Biodiversity
- Overpopulation in Urban Areas

According to a report done, desertification affects around 46% of Africa. Affected regions include:

- Senegal, which is in **West Africa** is the country most affected by desertification in Africa. Desertification is one of the major causes of low agricultural production in Senegal, with 34% of arable lands in Senegal threatened by desertification.

<https://www.afrik21.africa/en/senegal-34-of-arable-lands-threatened-by-desertification/>.



## TEAM 4

# Rapid and Threatening Desertification

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- East Africa is also largely affected by desertification, with Kenya, Ethiopia, Somalia, Tanzania, and Djibouti being largely affected. Some of the effects observed especially in Kenya include; Drought and famine and floods during extreme rainfall. Such extreme events affect people directly, their cattle and livestock and availability of food. In regions such as Tanzania, widespread cutting of trees is of concern and poses a major risk of desertification.
- In North Africa, Sahel region fire is the major cause of desertification. In such regions degradation of land caused by desertification is causing people to move from farming in rural areas to urban areas, leading to pressure on water and other resources. In addition, Chad is currently experiencing the greatest vulnerability to desertification, with 58 % of the area already classified as desert, and 30 % classified as highly or extremely vulnerable.
- In South Africa, poverty related agricultural practices are the major causes of desertification in this region.
- The Central Africa region experiences the least threat compared to other regions Congo forest deforestation has been a major issue over the years caused by small-scale subsistence agriculture, clearing for charcoal and fuelwood, urban expansion, and mining.

## 2 Explanation of the action plan

### 2.1 Solutions Proposed

Restoration- Extensive use of chemical pesticides is degrading the soil quality, so soil restoration will help to prevent desertification.

Use of renewable energy - Renewable energy goes a long way in substituting the use of firewood as a source of energy for cooking, heating or processing harvests.

Raising awareness - Campaign / Education.

### 2.2 Target Audience

As per restoration & renewable energy;

1. Our target was farmers in rural areas.

As per education & awareness;

Our target was:

1. Organizations and NGOs (provider/enablers)
2. Youth climate activists (human resources)
3. Youth and students (targeted audience)

## 3 Implementation of the action plan

### 3.1 Restoration & Renewable Energy

The main goal is to spread green and sustainable farming techniques such as biogas toilets tech among



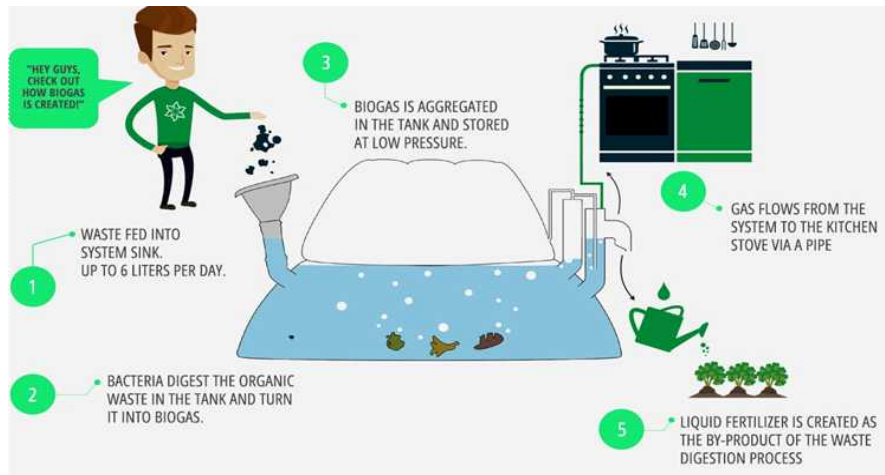


## TEAM 4

# Rapid and Threatening Desertification

## Rapid & Damaging Desertification in Africa

farmers in rural areas in order to combat desertification among agricultural micro-enterprises in rural areas to achieve sustainable farming and combat desertification.



### 3.2 Education and Awareness

The main goal is to raise public awareness of youth regarding desertification and deforestation; as well as to provide them with the right tools to engage effectively in addressing climatic issues.

3.2.1 Create informal educational initiatives to raise awareness in terms of restoration which included:

- Organising offline training sessions addressing climate change through our affiliated organizations.
- Launch a digital campaign focusing on youth to foster solid knowledge of desertification and other climatic issues in general such as plastic pollution.

3.2.2 Link youth and students with opportunities advocating for climate justice in terms of

desertification and deforestation: Part of promoting Youth Environmental Exchange Program

- Link youth to organisations and platforms like GYCC and other opportunities to foster further engagement.
- Provide participants with local, global opportunities such as the GYCC so that they work on their own action plans.
- Integrate youth within GYCC on-going action plans to be part of the change being created.

3.2.3 Create a diverse network of climate activists of youth from different countries in regions for potential further collaboration:

Create a regional social media network to gather participants from all of our country where they can:

- network
- share and exchange insights
- work together on future collaborations to
- Address climate issues





## TEAM 4

# Rapid and Threatening Desertification

## Rapid & Damaging Desertification in Africa

### 4 Outcome and Feedback

#### 4.1 Launch of African Youth Greener Future (AYGF)

(AYGF) is a proposal for our governments for an environmental exchange program in our African governments to enable youth in our region to exchange cultures within a context in which they're brought together to solve climatic issues. (AYGF) aims at:

- ① Develop a solid perspective of youth in terms of the climatic issues in the African region.
- ② Build bridges of understanding among youth in the African region.
- ③ Encourage participants to address regional climatic issues within a diverse teamwork context.

#### 4.2 Launch of the Plastic Free July on @African Youth Greener Future

Launched Plastic Less Campaign; a campaign aimed at greening local cafes to replace single-use plastic products with plastic-free products.

##### Steps

- ① Bring plastic-less idea to your favourite cafe
- ② Explain plasticless campaign to the cafe manager
- ③ Suggest the use of reusable cups and suggest discounts for those who provide their own cups.
- ④ Post your local cafe green experience on IG

#### 4.3 Launch of Greenguard Campaign - Rooting for tomorrow - @African Youth Greener Future

This campaign is a call for action targeting youth in the African Region to engage in addressing desertification through planting trees in their local communities.

##### Steps

- ① Planting Saplings - It is the easiest and most affordable.  
(A sapling is a young plant especially with slender trunk/stem)
- ② Greeting with Plants. You can use a potted sampling, or a flowering plant in a well decorated pot. Would you replace your christmas or birthday present for a green holiday where you receive or gift plants instead?
- ③ Generating awareness. Using friend groups and social contacts.



**TEAM 4**

# Rapid and Threatening Desertification

## Rapid & Damaging Desertification in Africa



**TEAM 5**

## **Biodiversity in the Forest**

Conservation and Restoration of Mangrove Forests



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**Rachel LAU**

**Frances Marielle Aralar NICOLAS**



## TEAM 5

# Biodiversity in the Forest

## Conservation and Restoration of Mangrove Forests

### Conservation and Restoration of Mangrove Forests

Mangroves are tropical plants found in areas with wet soils, salt water and exposed to periodic high and low tides. The mangrove forest has adapted to thrive in harsh environments. Firstly, mangroves can easily adapt to a low-oxygen environment. To be more specific, the red mangrove (*Rhizophora mangle*) can survive by absorbing air through lenticels in its bark at the most inundated areas [1]. In addition, black mangrove (*Avicennia germinans*) live on higher ground, therefore, many specific-purposed root-like structures known as pneumatophores stick up out of the soil working like straw for breathing with wide aerenchyma to facilitate transport within the plants [2]. Secondly, filtering of seawater within the root is possible. According to the research by Kim et al. in 2016, roots of the *Rhizophora stylosa* have biophysical characteristics of seawater filtration at their outermost layer and second layer since it can facilitate  $\text{Na}^+$  ion filtration [3].

These characteristics perform important roles in the survival of mangroves where other species can not survive. Because of the large network of the mangrove forest, it is home to many species. There are avifauna (i.e., *Accipiter cooperii*, *Collocalia esculenta*, and *Pluvialis squatarola*), reptiles such as *Crocodylus porosus*, *Varanus indicus* and *Fejervarya cancrivora*, mammals like *Nasalis larvatus*, *Sylvilagus palustris* and *Oryzomys palustris* and fish including *Macaca fascicularis*, *Ceropithecus* sp. and *Tragelaphus spekii* [4].

The mangrove's ecosystem consists of many different types of species, promoting a rich biodiversity. A diverse population is also directly related to the resilience of the mangrove's ecosystem. Genetic codes can be translated, making certain species of the ecosystem less vulnerable and disease-resistant [5]. One might think that biodiversity has no impact to human's life or health. However, this is not true. A rich biodiversity is able to support both human and societal needs. Mangroves are able to provide daily necessities such as food and water to local communities. In addition, mangroves have also provided the local communities a livelihood and aid in the development of medicines and pharmaceutical products. [6]

Besides providing a habitat for a rich biodiversity, the complex mangrove root system is able to filter nitrates, phosphate, and other pollutants in the water, improving the water quality. Their wide root network helps to bind and build soils. The roots located above ground slow down incoming waves, encouraging sedimentation, reducing coastal erosion. In summary, the mangroves' wide and complex root system is a natural coastal protection for the local communities by reducing coastal erosion and absorbing impacts of storm surges during extreme weather conditions. [7]

However, with these great benefits, the population of mangrove forests has decreased dramatically. Based on the Global Forest Resources Assessment (FRA) in 2020 published under the Food and Agriculture Organization of the United Nations, 113 out of 223 countries and territories have forest areas of mangrove swamps. The estimated area of mangroves is 14.8 million hectares globally. The area of mangrove cover has decreased by 1.04 million hectares within 30 years. [8] The decline in mangrove population is due to various factors ranging from shrimp farming, palm plantations, and anthropogenic



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## Conservation and Restoration of Mangrove Forests

(human-caused) activities which results in more gradual and permanent damage compared to tropical cyclones that cause temporary disruption [9].

There are four major factors affecting the growth and distribution of mangroves: climate, salinity, soil type, and tidal fluctuation. Mangroves are tropical species that thrive at temperatures above 19° C and are unable to survive below 10° C. Therefore, it is not present in countries with seasonal variations such as South Korea, Japan, China, and many more [10]. Also, as facultative halophytes, most mangroves are capable of living in freshwater waterlogged soil or muddy soil. Tidal fluctuations supports the growth of mangrove further inland due to freshwater and saltwater mixing. In our action plan, we will focus on Indonesia as it is home to the largest mangrove forest globally. [11]

The Indonesian government understands the importance of mangrove forest with these economic and ecological features and performs various actions for it. Firstly, the government of Indonesia has boldly committed to restore 600,000 hectares of mangroves by 2024, the world's largest mangrove restoration ambition to date [12]. The Environment and Forestry Ministry in 2021 issued an official guideline to encourage community participation and launched the Mangrove One Map to understand the extent and quality of mangroves spread in Indonesian property [13]. Increasing community ownership in mangrove management.

Mangrove conservation efforts will vary country to country given the socioeconomic conditions and political attitudes [14]. To maximise the impact of mangrove advocacy of our team, we have split our action plan into three phases - background studies, baseline establishment and collaboration with government and private sector.

### Phase 1

Based on a recent study in 2020, mangroves cover an area of about 147,359 km<sup>2</sup> around the world which is about 14.93% of the entire world's linear coastline. This might seem like a huge proportion but this was not the case back in 1996 [17]. The extent of mangroves have drastically dropped between 1996 and 2020. In four years, 5,245 km<sup>2</sup> mangrove forest cover has been lost [19], with the biggest decrease in mangrove forest cover in Indonesia. There is a need to deep dive and understand the causes of deforestation in Indonesia and what are the current efforts implemented by the government.

This background studies allows better appreciation of policies, law enforcement [16,18] put in place by the Indonesia government and community-led initiatives to help combat deforestation. This sets the basis for our action plan [22].

The Indonesia government aims to limit annual deforestation to 325,000 hectares between 2020 and 2030. This is in line with the forestry sector's goal for the country's Nationally Determined Contributions (NDCs) to the Paris Climate Agreement. A strong push from the government can be observed with multiple policies rolled out in tandem with strengthen law enforcement. It has proven to be effective [21] in preventing forest fires and land clearing. Besides ensuring forestry lands are not cleared rapidly, the



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government has also plans to invest resources to restore 2.4 million hectares of degraded peatlands. This was mandated by Presidential Regulation in 2016.

A moratorium policy was trialed in several areas in 2018 to ban the clearing of primary forests and peatlands [20]. A 45% decrease in deforestation was observed compared to 2002 to 2016 studies.

Despite all these efforts the rate of deforestation at specific key provinces have not declined, though an overall decrease national-wide [24]. Causes that continue to drive deforestation are urbanisation, short-term financial gains, unsustainable aquaculture practices and development [15]. This illustrates gaps in policy implementation and more effort is required to ensure all forestry land's deforestation rates are reduced to a minimum.

### Phase 2

Understanding from the nation perspective the policies and laws in place, allows for more targeted baseline study of the identified local community [14, 23]. A quiz was developed based on the research study conducted to determine specific gaps - knowledge, enforcement or behavioural. We hypothesise the lack of appreciation or knowledge for mangroves as coastal protection, carbon sinks, purification system and biodiversity support system is the main gap for increased deforestation of mangroves.

The quiz was designed to segregate responses base on the following:

- Age group
- Province
- Cohabitation with mangroves

These profiles will allow correlation with Indonesia government's observation of provinces with higher rate of deforestation and determine the corrective action required based on their age group and vicinity to mangrove forestry.

Quiz questions that identifies knowledge gaps include the key functions of mangroves:

1. Nutrient cycling
2. Binding of coastal sand/ soil
3. Purification of coastal water
4. Coastal defence
5. Carbon capacity of mangroves

On the other hand questions that identifies enforcement gaps includes:

1. REDD+ conservation efforts in place
2. Deforestation limits set annually
3. Restoration policy in place

Lastly, to identify gaps in communities' behaviour:

1. Sustainable farming practices



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2. Aquaculture practices
3. Eco-tourism practices

Each question will be assigned a score and participants will be graded and assigned respective 'groovey' levels - Baby groot, Teen groot and Mature groot. Overall, the 'groovey' levels will help gauge the overall approach to prevent deforestation.

### Phase 3

There are different approaches for the gaps identified, however, most if not all stems from the lack of knowledge and appreciation for the mangroves and actions in place around it. Educational material can be adopted to share with local communities based on their knowledge. The topics to be encompassed will include:

1. What are mangroves and its characteristics
2. Functions of mangroves and its associated benefits
3. Current state of mangroves in Indonesia
4. Policies implemented by the Indonesia government
5. Opportunities for reforestation efforts offered by non-profit organisations
6. Sustainable practices for industrial agriculture and aquaculture
7. Eco-tourism as a form of preservation and income for local communities

These topics are intertwined and related, however, it can also be consumed standalone to address the gaps in knowledge, enforcement or behavioural.

Knowledge gaps can be addressed by illustrating what and where are mangroves. Mangroves are trees and shrubs that are found along the coastlines from steep, rocky ledges to long, sloping sandy beaches and mudflats. The distribution of mangrove forests can be largely found in Southeast Asia. Indonesia is home to 20% of the global mangrove population. Collectively, Indonesia, Brazil, Australia, Mexico and Nigeria make up almost half of the population.

To gain an added appreciation of mangroves, the functions of mangroves can be illustrated to show importance and urgency to conserve them. Intertidal flats play a significant role in nutrient cycling and primary production in shallow coastal ecosystems.

Community-led initiatives and behavioural changes can be conducted through ecotourism tours to spread awareness. Organising field trips to evaluate the health of mangroves can be done. To determine the health of mangroves, it is possible to observe several parameters such as the mass of leaf loss, height, diameter of stem, stem density and leaf density.

Partnering with local non-profit organisations to actively promote reforestation activities will be able to induce behavioural changes and share the enforcement laws imposed by the local government.





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### Path forward

We acknowledge that these efforts are largely community based and minimal engagement is conducted with the private sector. We hope to bring our findings and partnership to develop a policy brief for the local government to adopt. Similarly, with the private sector, we aim to have a continuous partnership to incentivise the local community to practise sustainable agriculture and aquafarming.

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**TEAM 6**

# **Deforestation And Water Security: Watersheds And Quality Water** Páramos Ecosystems



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**Subtopic: Deforestation And Water Security: Watersheds And Quality Water**

**Specific Topic: Páramos Ecosystems**

## 1. Background of the Problem: Deforestation in the Paramos of South America, with a Focus on Colombia

The Paramos of South America represent a unique and fragile ecosystem that plays a crucial role in maintaining the region's ecological balance. These high-altitude tropical ecosystems are characterized by their distinct flora and fauna, as well as their role in regulating water resources that sustain local communities and downstream ecosystems. However, the Paramos are facing an alarming threat: deforestation. In particular, Colombia, as a country boasting a significant portion of these vital ecosystems, has witnessed a concerning increase in deforestation rates within its Paramos.

### i. The Importance of Paramos Ecosystems:

The Paramos are often referred to as "water factories" due to their remarkable ability to capture, store, and release water. These ecosystems act as natural sponges, absorbing rainfall and gradually releasing it over time, thereby regulating water flow in rivers and streams. This function is indispensable for providing clean and reliable water sources to both urban and rural communities downstream. The Paramos also contribute to carbon sequestration, help maintain biodiversity, and serve as habitats for various unique plant and animal species that have adapted to the extreme conditions of these high-altitude regions.

### ii. The Threat of Deforestation:

Deforestation in the Paramos severely threatens these ecosystems' delicate balance. Human activities such as agriculture, grazing, mining, and urban expansion have led to land clearing for various purposes. As trees are removed, the natural water regulation capacity of the Paramos diminishes, leading to increased erosion, decreased water quality, and disrupted hydrological cycles. Additionally, the loss of vegetation exposes the soil to harsh weather conditions, further accelerating erosion and soil degradation.

### iii. Colombia's Deforestation Challenge:

Colombia, with its rich biodiversity and extensive Paramos, faces a critical challenge in curbing deforestation. The country's diverse topography and climates make it particularly vulnerable to these impacts. Agricultural expansion, illegal mining, and other forms of land conversion have increased deforestation rates. This not only affects the Paramos ecosystems directly but also has cascading effects on downstream communities, agriculture, and overall ecosystem health.

### iv. Conclusion:

The deteriorating state of the Paramos ecosystems in South America, particularly in Colombia, underscores the urgency of implementing effective conservation measures. The area in South



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America plays a pivotal role in maintaining ecological harmony. These unique ecosystems, renowned as "water factories," regulate water flow, support biodiversity, and serve as habitats for specialized species. Nevertheless, the growing menace of deforestation, driven by human activities such as agriculture and mining, imperils this balance. Deforestation disrupts water regulation, exacerbates erosion, and threatens downstream communities and agriculture. Colombia's diverse landscapes are facing a pressing challenge to combat deforestation and its far-reaching consequences. The need for collaborative action is urgent, involving policymakers, communities, and businesses. By prioritizing awareness campaigns, enacting effective policies, and embracing sustainable practices, we can ensure the longevity of these vital ecosystems. Through collective efforts, the Paramos can continue to thrive and provide essential services for future generations.

## 2. Explanation of the action plan: "Hope for Paramos" Action Plan: Empowering Environmental Advocacy and Conservation

### i. Executive Summary:

This action plan outlines the comprehensive strategy of Team 6, "Hope for Paramos," a dedicated group within the Global Youth Climate Challenges (GYCC). "Hope for Paramos" is an online campaign, a dynamic initiative focused on raising awareness and promoting active engagement for the preservation of South America's paramo ecosystem, with a primary focus on Colombia. The campaign leverages bilingual content and social media channels to educate, inspire, and mobilize a diverse audience. This plan highlights our goals, tactics, and future expansion.

### ii. Introduction:

The "Hope for Paramos" campaign is rooted in the urgency of addressing climate change and protecting paramo ecosystems, critical components of global environmental resilience. Centered on online platforms, particularly social media, the campaign endeavors to inform, empower, and foster practical environmental action within communities. This action plan outlines our strategic approach to engaging the public, empowering local communities, and advocating for sustainable policies.

### iii. Action Plan Objectives:

- a. Bilingual Education: Deliver bilingual content (Spanish and English) across social media platforms to increase public awareness about the vital role of paramos in combating deforestation and securing water sources.
- b. Community Empowerment: Equip individuals with tailored guides for actionable change, fostering a sense of ownership and responsibility for paramo conservation.
- c. Cross-Cultural Engagement: Launch a compelling bilingual social media campaign to spark dialogue, promote awareness, and galvanize action among diverse audiences.
- d. Collaborative Partnerships: Forge alliances with governmental bodies, NGOs, and local stakeholders to amplify our campaign's impact and drive policy advocacy.



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### iv. Tactical Implementation:

- a. Multimedia Creation: Develop a range of bilingual multimedia resources, including articles, videos, and infographics, to convey the urgency and importance of paramo preservation.
- b. Local Action Guides: Tailor practical action guides to specific regions, empowering individuals to implement sustainability practices relevant to their local context.
- c. Social Media Engagement: Execute a bilingual social media strategy across platforms, using captivating visuals, hashtags, and interactive content to inspire public participation.
- d. Collaborative Workshops: Partner with relevant organizations to conduct online workshops, webinars, and events that encourage knowledge-sharing and tangible action.

### v. Performance Metrics:

**Audience Reach:** Monitor bilingual social media engagement, website traffic, and content shares to measure the campaign's impact and reach.

**Educational Effectiveness:** Assess knowledge enhancement through views, downloads, and feedback on bilingual educational materials.

**Partnership Growth:** Evaluate the quantity and quality of collaborations established with bilingual partners and stakeholders.

### vi. Future Expansion:

- a. Regional Reach: Extend the campaign's scope to other South American countries with vital paramo ecosystems, ensuring bilingual outreach.
- b. Global Connection: Translate campaign materials into key languages beyond Spanish and English to connect with international audiences.
- c. Policy Advocacy: Engage with policymakers at home and abroad, advocating for bilingual policies that promote paramo conservation and sustainable practices.
- d. Bilingual Website Hub: Establish an interactive website serving as a central repository for bilingual resources, updates, and opportunities for engagement.

### vii. Conclusion:

"Hope for Paramos" embodies our unwavering commitment to fostering environmental awareness, education, and tangible action. By engaging individuals in bilingual content, inspiring localized change, and building strategic partnerships, our campaign seeks to kindle a movement dedicated to the preservation of paramo ecosystems.



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### 3. Implantation Strategy of Team 6 Action Plan

Our action plan focused on promoting the paramos ecosystem in Latin America which have been planned to be implemented in the following steps:

#### i. Social Media Campaign:

Creating social media campaign to raise awareness about the importance of the paramos ecosystem. The campaign should be bilingual in English and Spanish to reach a wider audience. And it should include information about the ecosystem's role in sustaining the lives of millions of people specially in Colombia and Latin America, providing essential ecosystem services such as water production and irrigation. The campaign should also highlight the risks posed by economic activities such as afforestation, agricultural expansion, grazing, mining, inadequate water management, and urban encroachment. We have created our social media campaign under name of "Hope for Paramos", in Instagram and facebook.

*Inside this social media campaign we have defined a strategy to follow:*

- a. Identify target audience: Determine the target audience for the social media campaign. This include the local communities, policymakers, and environmental organizations.
- b. Create bilingual content: Develop bilingual content in English and Spanish that highlights the importance of páramos ecosystems, their unique features, and the threats they face. The content include mainly infographics as its attract more audience, and also we use photos, videos, and other engaging formats.
- c. Choose social media platforms: Select social media platforms that are popular in Latin America, we have chose Facebook and Instagram. These platforms will be used to share the content and engage with the target audience.
- d. Collaborate with researchers/ local communities: Work with researchers and local communities to create content that showcases their traditional knowledge and practices related to páramos ecosystems. This can help to build a sense of ownership and pride in the ecosystem. Besides, represent a reliable source to share the knowledge. And these how we enrich our content and keep updating our pages.
- e. Collaborate with environmental organizations to amplify the reach of the social media campaign and to leverage their expertise in conservation.
- f. Monitor and evaluate: Monitor the performance of the social media campaign and evaluate its impact on promoting páramos ecosystems. This can help to refine the content and strategy for future campaigns.

#### ii. Collaboration with Related Organizations:

Collaborate with related organizations working on the same field to share knowledge and resources. This could include government agencies, NGOs, and academic institutions. Collaboration could involve joint research projects, workshops, and conferences to promote the ecosystem's conservation and sustainable use. And currently we are in contact with Cumbres Blancas Org and Committee Santurban.



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### iii. Climate Change Mitigation and Adaptation:

Implementing climate change mitigation and adaptation measures in the paramos ecosystem. Climate change is likely to cause further impacts in the paramos functioning, distribution, and species composition, which might jeopardize the lives and livelihoods of human populations that depend upon this ecosystem. Therefore, it is essential to take measures to mitigate and adapt to the impacts of climate change.

By implementing these steps, it is possible to promote the paramos ecosystem in Latin America specially in Colombia and ensure its long-term sustainability.

## 4. Outcome and Feedback

### i. Social Media Campaign

Having pondered deeply about the implementation sector of the action plan, a google document was created with the content information that is to be uploaded unto our social media platforms. In total 4 posts and 1 reel have been uploaded (till now in August).

Post 1 and 2 tell of general facts about the Paramos, introducing the audience to what the Paramos ecosystem is and where it is located. The post also serves to direct the attention of the reader to the fact that the paramo is geographically influential in several countries.

Post 3 and 4 address the water security in the ecosystem through the situation of water regulation and the role the spongy moss plays in it. In hopes of delivering useful information to the social media users through the content, the posts were created with more in depth information. Post 3 has reached an audience of 32 accounts, which 14 of whom are potential followers. Post 4 has reached an audience of 18 accounts, which 8 of whom are potential followers.

Reel 1 was created to deliver information about the role of paramo to a larger audience. It has been played 101 times, reached an audience of 84 accounts, which 65 of whom are potential followers.

In total, having posted our first post in June, the account has 32 followers and has reached an audience of 102 accounts within the past 30 days.

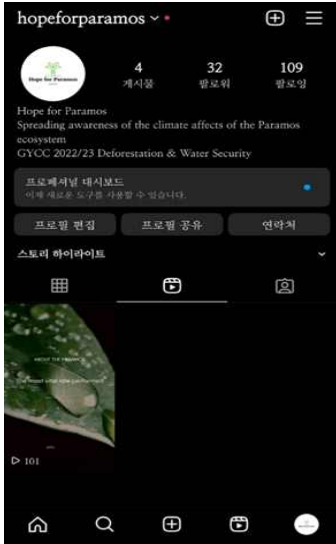




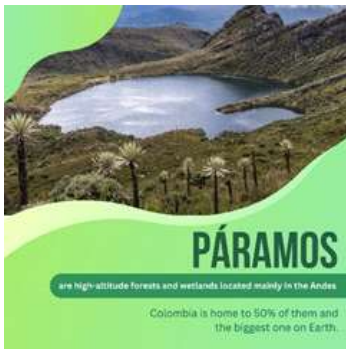
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# Deforestation And Water Security: Watersheds And Quality Water Páramos Ecosystems

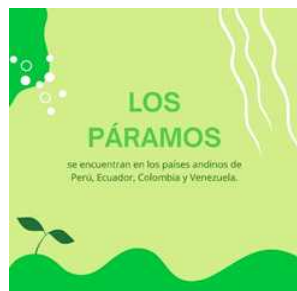
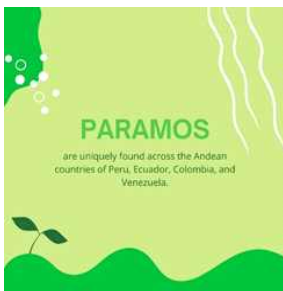
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[Post 1]



[Post 2]

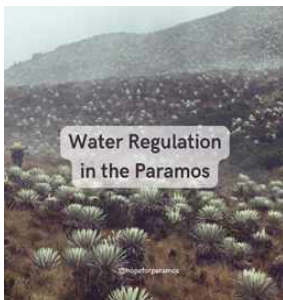
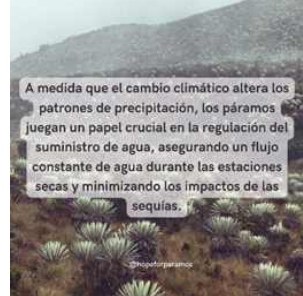
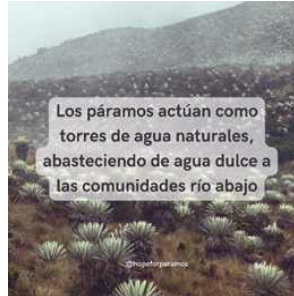




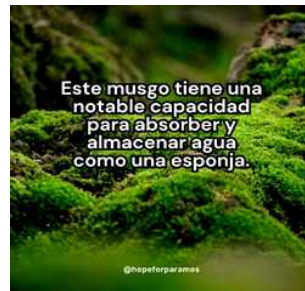
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[Post 3]



[Post 4]





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[Reel 1]



## ii. Collaboration with other Organizations

After several attempts to get in touch with several organizations, the organizations contacted responded with silence or the connections did not lead to continued endeavours. Most recently the Comité Santurban (@comite\_santurban) and Cumbres Blancas Org has been contacted via @hopeforparamos Instagram account. Feedback is currently being waited for.

# GYCC GLOBAL YOUTH CLIMATE CHALLENGES

