Korean Society of Forest Science

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

This work was supported by the Korean Federation of Science and Technology Societies(KOFST) grant funded by the Korean government.

International Symposium on Ecosystem Restoration for Green and Peace Asia

14:00-18:30 August 18, 2021 (Alpensia, Pyeongchang, Republic of Korea)

KOREAN SOCIETY OF FOREST SCIENCE | UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

1. Background

Globally, forests absorb and store approximately 30% of current carbon emissions in their biomass and soils and within wood products, and serve as home to 80% of the world's terrestrial biodiversity. Forests also play a major role within economies worldwide, with an estimated value of $150 trillion (www.globalforestsummit.org).

Asia is Earth's largest and most populous continent, covering an area of 44,579,000 km^2 (approximately 30% of Earth's total land area and 8.7% of Earth's total surface area). This continent has long been home to the majority of the human population and was the site of many of the first civilizations. Asia is notable not only for its overall large size and population, but also for its large and dense settlements, as well as its vast but barely populated regions. Asia's 4.5 billion people constitute roughly 60% of the world's population.

Asia's economy is growing rapidly, led by a rising middle class, but it faces major policy challenges such as inequality, uncertain land tenure, unsustainable land use, loss of biodiversity, food insecurity, and climate change. In addition, agricultural expansion and unsustainable land use change has made the region one of the world's largest sources of greenhouse gas emissions.

Unsustainable land use can be at the root of a health crisis. Desertification, land degradation, and drought lead to social and environmental challenges such as reduced livelihoods, forced migration, water scarcity, and biodiversity loss. These problems put millions of people at risk.

In particular, deforestation and forest degradation have resulted in both environmental damages – soil erosion, land degradation, and biodiversity loss – and socio-economic damages such as insecure food, water and health, as well as the loss of people's cultural identity and dignity. In order to mitigate and combat these emerging challenges, governments and international organizations among various stakeholders have expended significant effort. Investing in healthy land as part of a green recovery is a forward-looking solution and a smart economic decision. Restoration of land-based ecosystems can help reverse biodiversity loss and protect against future crises.

This year's World Environment Day marks the formal launch of the UN Decade on Ecosystem Restoration (www.decadeonrestoration.org), a global initiative that will promote and support the revival of natural spaces degraded mainly due to human activities.

Ecosystem restoration means assisting in the recovery of ecosystems that have been degraded or destroyed, as well as conserving ecosystems that are still intact. It is an opportunity to prevent, halt, and reverse degradation; an attempt to recover the lost balance and ensure that both humans and nature have a sustainable future.

The UN Decade on Ecosystem Restoration aims to fight the degradation of ecosystems on every continent. It could help end poverty, combat climate change, and prevent mass extinction (www.decadeonrestoration.org).

The UN Decade on Ecosystem Restoration is an opportunity to help turn the tide and create a sustainable future for Earth's nature and Earth's people. To develop a network among forest-related institutions in Asian region, policymakers and international organizations will be invited to share their ideas for Ecosystem Restoration for Green and Peace Asia.

International Symposium on Ecosystem Restoration for Green and Peace Asia

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KOREAN SOCIETY OF FOREST SCIENCE | UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

2. Objectives

The objectives of this symposium are as follows:

i. To share successful cases and lessons learned, and current projects or programs on ecosystem restoration;
ii. To discuss effective and efficient strategies for ecosystem restoration for Green and Peace Asia; and
iii. To strengthen a cooperative network for ecosystem restoration at the regional level among Asian countries and international organizations.

3. Date/Venue

This symposium will be held **from 14:00 to 18:30 on Wednesday, August 18th, 2021 (UTC/GMT +9 Time Zone in Seoul, Korea)** in hybrid format (in-person and virtual).
https://us02web.zoom.us/j/87515872362?pwd=dVovaFVIME8yZmFHaWxad2xSRjI0Zz09
Meeting ID: 875 1587 2362 | Passcode: 430339

4. Organizers

Korean Society of Forest Science
Institutes of Green Bio Science and Technology, Seoul National University

5. Sponsors

Pyeongchang County
Gangwon Convention & Visitors Bureau
Korean Federation of Science & Technology Societies
National Institute of Forest Science
International Union of Forest Research Organizations (IUFRO)
Korea Forest Service

6. Contact person

Prof. Ho Sang KANG (silvi1@snu.ac.kr, hosang.kang@gmail.com)
(Chair of International Exchange Committee, Korean Society of Forest Science and
Collaboration Professor, Institutes of Green Bio Science and Technology, Seoul National University)

International Symposium on Ecosystem Restoration for Green and Peace Asia

18 August 2021 (Alpensia, Pyeongchang, Republic of Korea)

KOREAN SOCIETY OF FOREST SCIENCE | UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

Title	Invited Speakers
1st Session (14:00 – 16:00 UTC/GMT +9 Korean Time, 18 August 2021) Moderator: Dr. Ho Sang KANG (Chair of International Exchange Committee, KSFS)	
Welcoming Remark Dr. Jungkee Choi (President of Korean Society of Forest Science)	
Congratulatory Remark Dr. Don Koo Lee (Emeritus professor, Seoul National University)	
Ecosystem Restoration and Forest Conservation in Cambodia	H.E. Dr. Chea Sam Ang Secretary of State, Ministry of Environment, Cambodia
Greening the former bottom of the Aral Sea (Aralkum) in Uzbekistan	H.E. Dr. Abdushukur Hamzaev Deputy Chairman,State Forestry Committee, Director General, Forestry Research Institutes, Uzbekistan
Why much forest landscape restoration become an economic enterprise?	Dr. Robert Nasi Director General, Center for International Forestry Research (CIFOR)
Restoration and Reforestation Models Initiated by AFoCO	Mr. Ricardo Calderon Executive Director, Asian Forest Cooperation Organization (AFoCO)
Promoting a Green and Resilient Mekong Region through Mekong-Korea Cooperation	Dr. Suriyan Vichitlekarn Executive Director, Mekong Institute (MI)
Conservation and Sustainable Management of Biodiversity and Ecosystem in ASEAN Region	Dr. Theresa Mundita S. Lim Executive Director, ASEAN Centerfor Biodiversity (ACB)
Health Break (16:00-16:20 UTC/GMT +9 Korean Time)	
2nd Session (16:20 – 18:30 UTC/GMT +9 Korean Time, 18 August 2021) Moderator: Dr. Su Young Woo (President-elect, KSFS)	
International Cooperation on Forest Initiated by Korea	Dr. Eun Sik Park Director General, Korea Forest Service, Republic of Korea
Challenges and National Strategy for Ecosystem Restoration in Philippines	Dr. Portia Lapitan Retired Professor and Vice Chancellor, University of Philippines at Los Banos, Philippines
Successful Forest Restoration in Vietnam; Challenges and Lessons Learnt	Dr. Bui The Doi Vice President, Vietnam National University of Forestry, Vietnam
Ecosystem Restoration on Ex-Mining Areas in Indonesia	Dr. Irdika Mansur Associate Professor, IPB University, Indonesia
Restoration and Sustainable Management on Burnt Areas in Mongolia	Dr. Oyunsanaa Byambasuren Director, Fire Management Resource Center-Central Asia Region and Professor, National University of Mongolia
Integrating Bioenergy and Landscape Restoration - Lessons from Indonesia	Dr. Himlal Baral Senior Scientist, Climate Change, Energy and Low Carbon Development, CIFOR

International Symposium on Ecosystem Restoration for Green and Peace Asia

Welcoming Remarks

Dear all distinguished scholars and participants!

On behalf of the Korean society of forest science, I would like to congratulate the International Symposium on Ecosystem Restoration for Green and Peace Asia today. I think that there are many changes in everyday life around you due to the Corona pandemic situation.

In addition to the Corona crisis, climate change has caused major disasters such as forest fires, floods, droughts, and landslides, and this disaster will lead to a biodiversity crisis and the greater disasters on Earth. In order to prevent this, I think that the only way to save the earth is to restore the devastation caused by our humans and to pursue sustainable management. In this context, forest is now a common task that must be solved together to survive global life, not just a matter of a particular country.

In this regard, I hope today's symposium will be a time to think about the peaceful Asian continent through ecosystem restoration. Asia is the largest of the six continents, with 60 percent of the Earth's total population and the fastest in economic development. However, a large amount of forest has been damaged due to long-term human activities, and ecosystem restoration is desperately needed.

This is not a problem confined to Asia. Looking back on the history of human civilization, starting with the agricultural revolution, the mechanical, electrical, and digital industrial revolutions have devastated forests, polluted water and air, and made the earth sick. We are now at the point of a new civilization that needs to save the global village through the forest revolution. In this regard, I think today's symposium is an important event that causes the forest revolution.

Especially, Pyeongchang, where the symposium is held today, is the center of artificial forests that restored the devastated land. Through the restoration, Pyeongchang is said to be the forest capital because it has become the most forested and biodiversity-rich place in Korea. Furthemore the 2014 UN Convention on Biological Diversity and the 2018 World Winter Olympics were held here in Pyeongchang.

Pyeongchang is now reborn as a city that inherits forest and peace to descendants through ecosystem restoration. I hope that Pyeongchang's successful ecosystem restoration lesson will be spread to Asia including each country and international organizations participating in the symposium and this spirit will be inherited.

Finally I would like to extend my special thanks to Professor Hosang Kang, Chair of the International Exchange Committee, Korean Society of Forest Science for preparing today's symposium and wish everyone who attends the symposium a good success. Thank you.

August 18, 2021

Prof. Jungkee Choi
President
Korean Society of Forest Science

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

ECOSYSTEM RESTORATION

International Symposium on Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Congratulatory Remark

Dr. Don Koo LEE, Prof. Emeritus
of Seoul National University
Former President of IUFRO (2006-2010)

Congratulatory Remark

Excellencies from Cambodia, Uzbekistan, CIFOR, AFoCO, Mekong Institute, ASEAN Center for Biodiversity, Mongolia, the Philippines, Indonesia, Vietnam and the Korea Forest Service, who are participating in today's Symposium via on or off lines! Distinguished participants! Good afternoon.

Many congratulations to Prof. Jeong Ki Choi, President of the Korean Society of Forest Science as well as to Dr. Ho Sang Kang, Institute of Green Bio Science of Seoul National University for the success of today's International Symposium on "Ecosystem Restoration for Green and Peace Asia". Today's Symposium is generously supported by the International Union of Forest Research Organizations (IUFRO; www.iufro.org), which is the global network for forest science cooperation interconnecting forests, science and people. The topic on ecosystem restoration has been dealt by IUFRO Divisions 1 and 8 as well as its Task Forces.

Forests are immensely important: a home for all biodiversities, including humans. They provide food, feed, energy, outdoor recreation and amenities, healing and inner peace, and green spaces. Roles of the forests are countless!

We must sustain forest resources for the future generation. Forest resources contain trees, water, various organisms and soils. Soil is basic to all living organisms, particularly to humans. Soil and human body are not two different components: they have the same trace elements (身土不二).

If humans are sick, then they seek the doctor or go to the clinic to recover from illness. If automobiles are sick, then we may take them to garage or repair shop for fixing. But, if forests are sick, then there are no places for them to go for healing.

Asia is the largest continent in the world with a population of about 4.5 billion (60% of the world's population). It contains a land area of 45 million km^2, which is 30% of the earth's area. It is a home to enormous biodiversity and natural resources.

Now, altogether we are seriously facing the covid-19 pandemic globally. This problem on pandemic probably originated from forest degradations by humans. In order to address this problem on degraded forest ecosystems, we have lots of opportunities, such as this symposium, to share our success or failure stories/lessons learned during the restoration of degraded forests. We need to help one another to restore forests especially among the countries from this Symposium. During this pandemic, no countries can sustain their lives alone or keep their ecosystems healthy alone. Thus, a very simple approach is to provide vaccines or treatment techniques to those countries who have none or with limited supply. We should protect human lives as we are stewards of God's creation and we have an important role in maintaining our ecosystem.

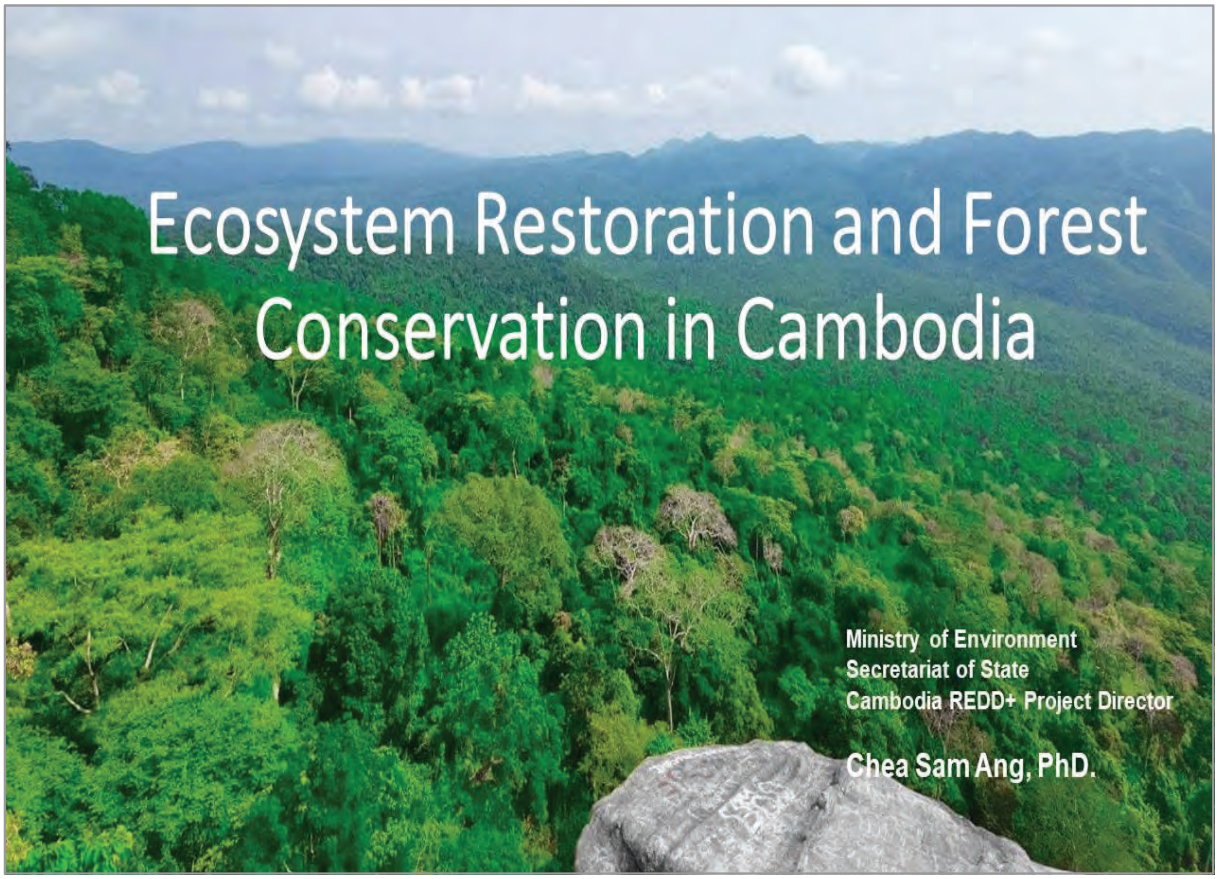
We no longer live alone and keep peace alone! Relationship, partnership and cooperation are now needed! In this Symposium, please feel free to exchange your knowledge and wisdom as well as experiences. We are foresters with open and broad minds who draw the beautiful and healthy pictures on the earth, not on small papers or city gardens, but in real life.

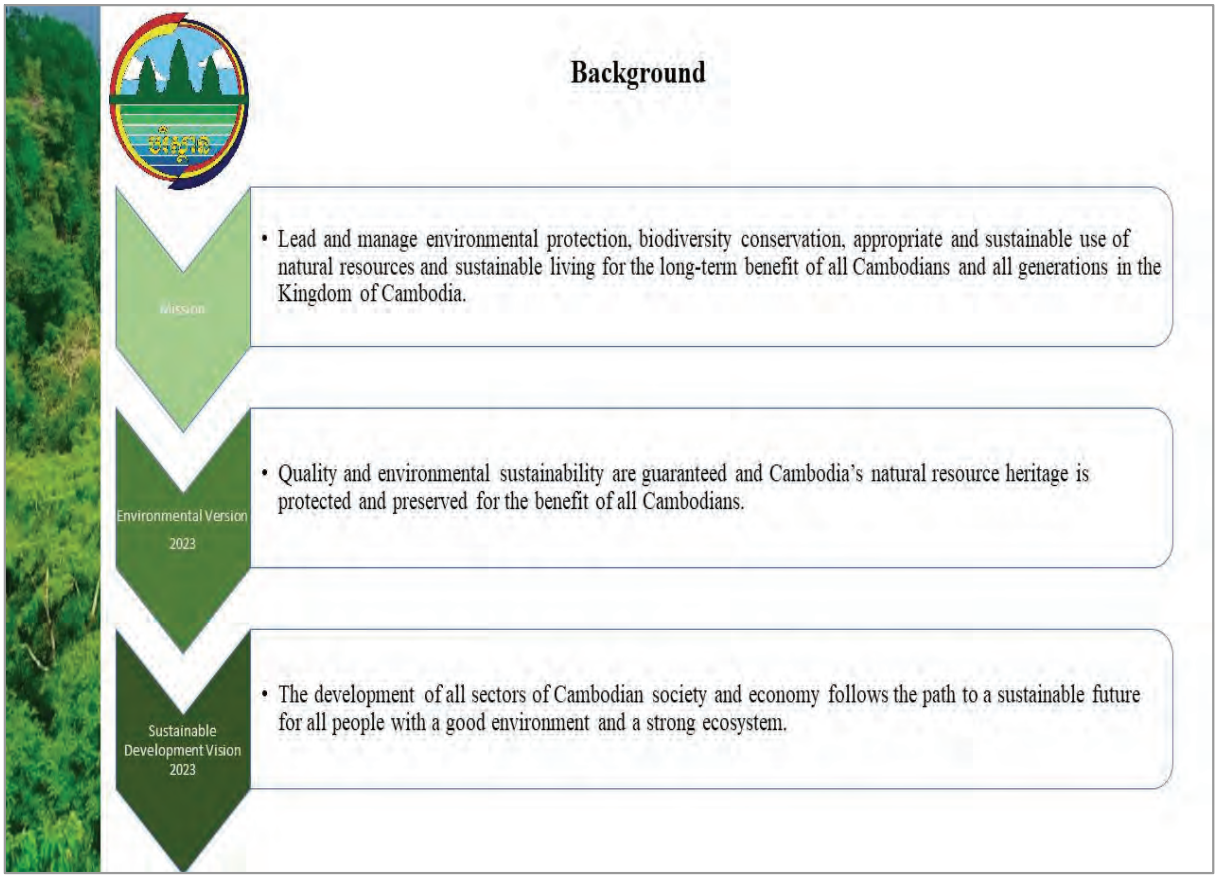
Lastly, let us sustain our good relationship, close partnership and continuous collaboration not only during this current situation but also for the future. Congratulations again to all.

I thank you so much for your attention!

Dr. Don Koo LEE
Professor Emeritus of Seoul National University
Former President of IUFRO (2006-2010)

International Symposium on Ecosystem Restoration for Green and Peace Asia


Ecosystem Restoration and Forest Conservation in Cambodia
Ministry of Environment
Secretariat of State
Cambodia REDD+ Project Director
Chea Sam Ang, PhD.


Background
Mission
• Lead and manage environmental protection, biodiversity conservation, appropriate and sustainable use of natural resources and sustainable living for the long-term benefit of all Cambodians and all generations in the Kingdom of Cambodia.
Environmental Version 2023
• Quality and environmental sustainability are guaranteed and Cambodia's natural resource heritage is protected and preserved for the benefit of all Cambodians.
Sustainable Development Vision 2023
• The development of all sectors of Cambodian society and economy follows the path to a sustainable future for all people with a good environment and a strong ecosystem.

Forest Governance Reform in Cambodia

Before Governance Reform in Cambodia

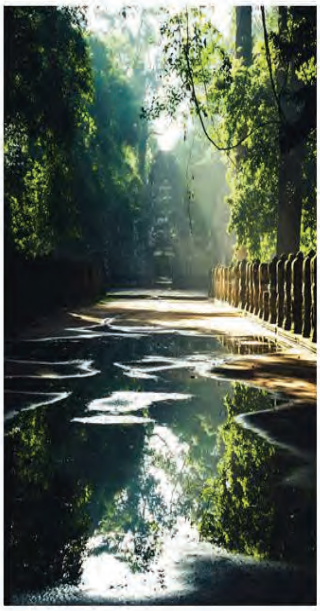
- MAFF (FA and FiA): 6-7 million ha
  - Production Forests including Community Forestry
  - Protection Forest
  - Conversion Forests
  - Mangrove and flooded forests
- MoE: 3 million ha
  - Protected Areas including Community
  - Protected Area

After the reform (after Feb 2016)

- MAFF (FA and FiA): 1-2 million ha (TBC)
  - Production Forests including Community Forestry
  - Protection Forest
  - Conversion Forests
  - Mangrove and flooded forests
- MoE: 7 million ha
  - Protected Areas including CPAs + Protection Forests transferred from MAFF + corridors (added in December, 2016)

Decentralization reform (Oct, 2016)

- Transfer of power in Natural resource Management (NRM) from central to subnational level governments.



National strategic and Report for Climate Change and REDD+

As part of the Paris agreement, Cambodia has developed:

- The REDD+ National Strategy (2017)
- Two FRL (2017 and 2021)
- The Safeguards Information System (2018)
- Presented the Biennale Updated Report with the REDD+ annex
- Updated the NDC (2021)

Cambodia has completed the REDD+ readiness phase and is transitioning to the Implementation and Result Based Payment.

National strategic, policies and plans for the management of Protected Areas systems

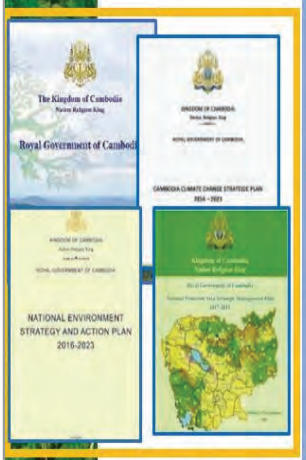
Protected areas play a significant role in promoting sustainable development, conserving biodiversity, and improving the livelihoods of local communities who depend on them.

To ensure that these protected areas are sustainably managed for the benefits of current and future generations, the National Protected Area Strategic Management Plan (NPASMP) was promulgated in 2017 by the Royal Government of Cambodia.

This policy is supported by:

- National Strategic Development Plan,
- the National Strategic Plan on Green Growth,
- The National Biodiversity Strategy and Action Plan,
- the Cambodia Climate Change Strategic Plan, t
- he National REDD+ Strategy and
- the National Environmental Strategy and Action Plan

Implementing RGC policy and strategies to support Ecosystem Restoration and Forest Conservation in Cambodia



- ....
- Continue to establish new protected areas
- Promote the effectiveness of REDD + Programme by reducing greenhouse gas emissions from deforestation and deforestation, sustainable forest management and increasing carbon stocks
- ....

Three strategic missions:

- achieving a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gas emissions from the forestry sector.
- improving livelihood opportunities of local communities to reduce their dependence on forest products

Four strategic Objectives:

- Prioritize and strengthen conservation
- Enhance sustainable management
- Expand community participation and benefit
- Strengthen institutional capacity and collaboration

Three strategic Objectives:

Objective 1: Improve effectiveness of monitoring, land use management, and forest strategies

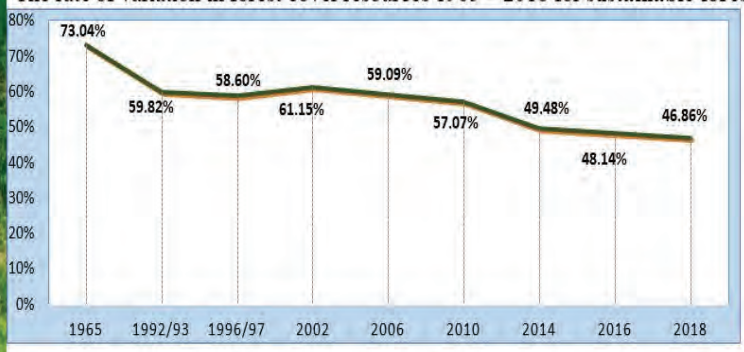
Objective 3: Promote stakeholder participation and enhance capacities, knowledge and awareness to implement the national strategy

National Strategic Development Plan (2019-2023) → Zero emission strategy by before 2040 → National Protected Areas Strategic Management Plan 2016-2030 → National REDD+ Strategy

How to Achieve Environmental Version by 2030

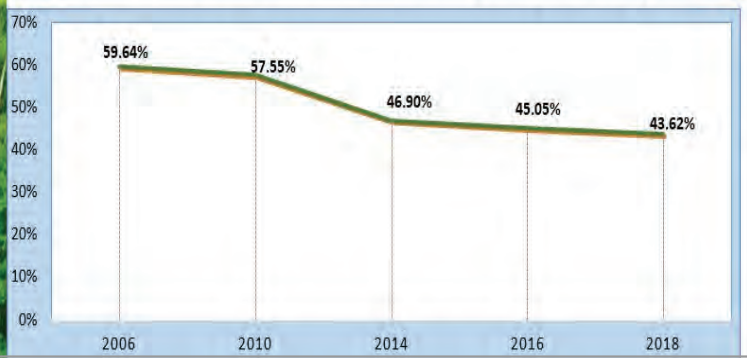
Forest cover monitoring in Cambodia

The rate of variation in forest cover resources 1965 – 2018 for **sustainable forest management**



Forest *refers to a unit of an ecosystem in the form of wetland and dry land covered by natural or planted vegetation with a height from 5 metres on an area of at least 0.5 hectares, and canopy crown cover of more than 10%.*

The rate of variation in Land use/cover 2006 -2018 **under REDD+ report**

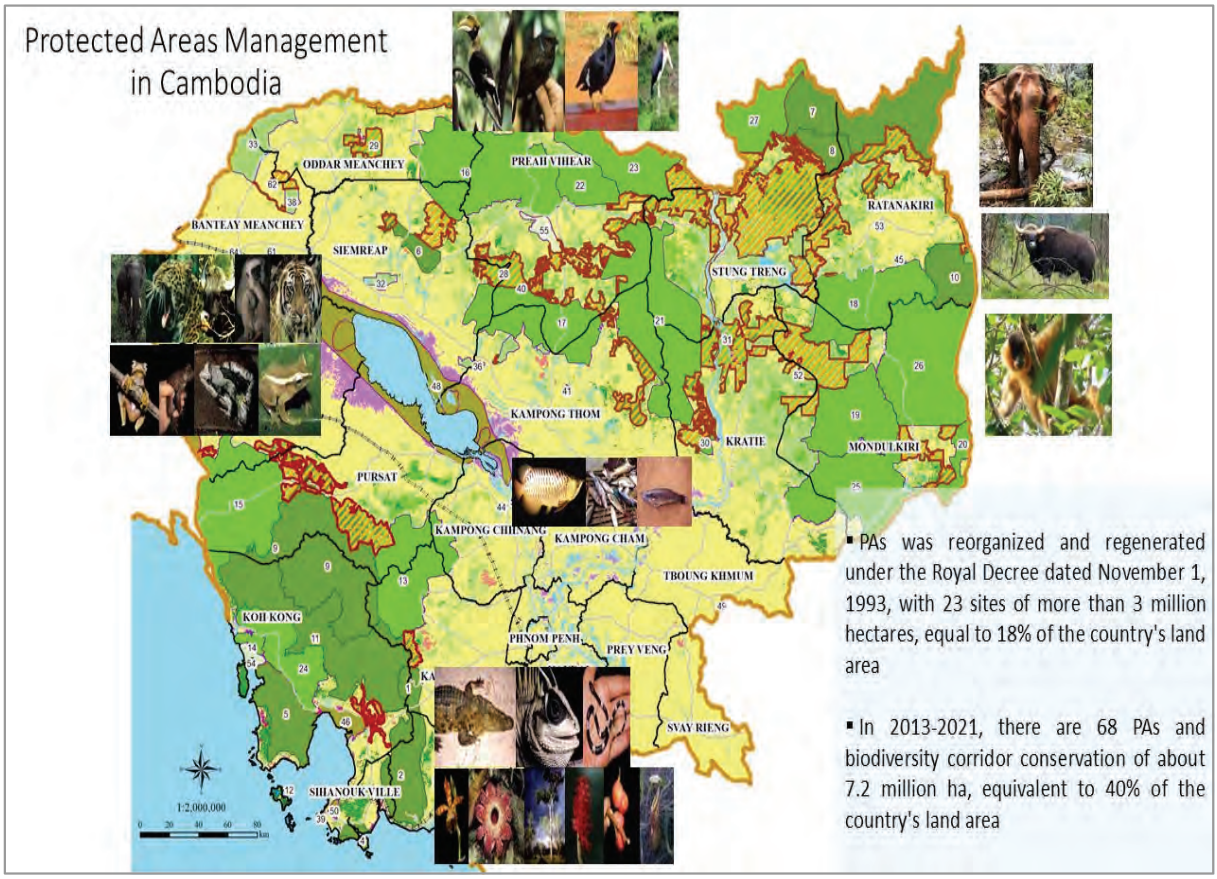


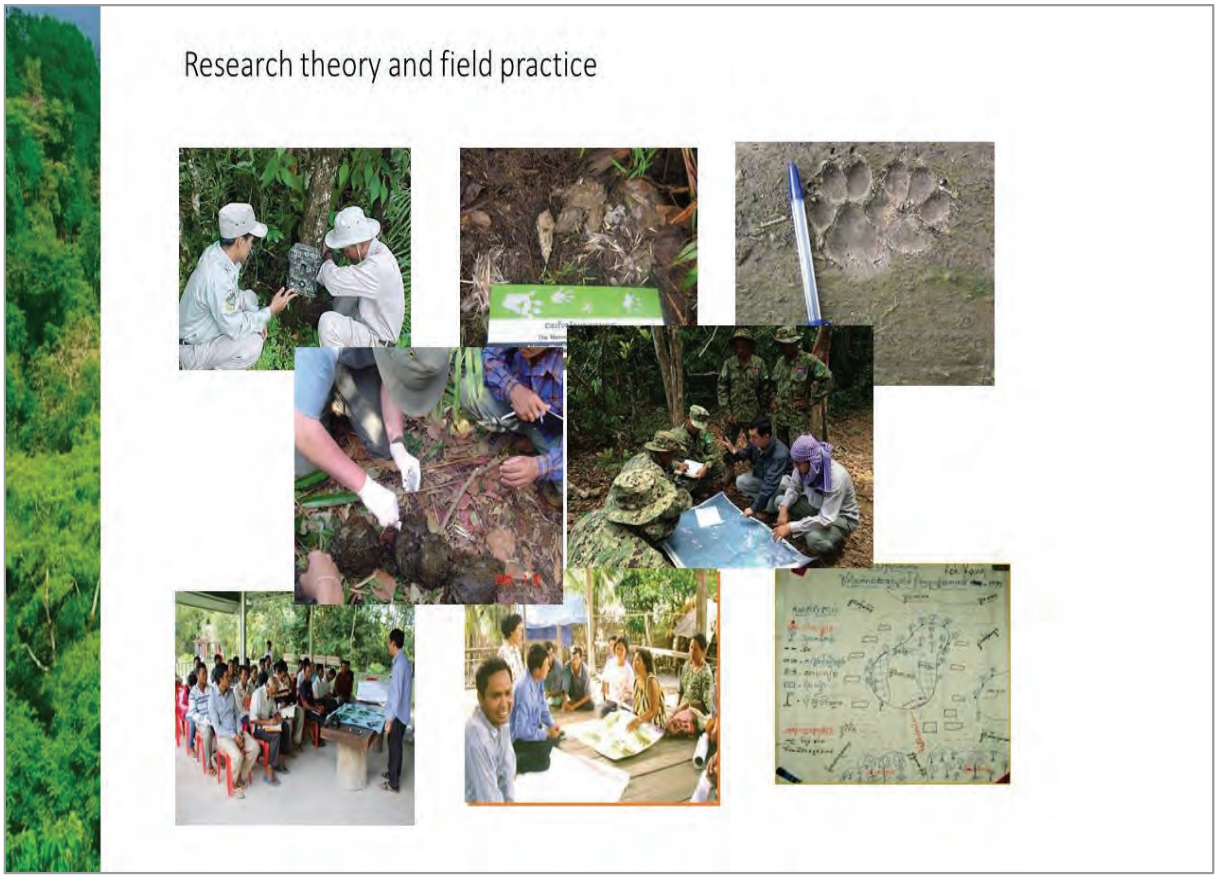
REDD+ programme are natural forest regrowth and areas under afforestation or reforestation .

National Commitment and Efforts to restore the ecosystem and forest conservation

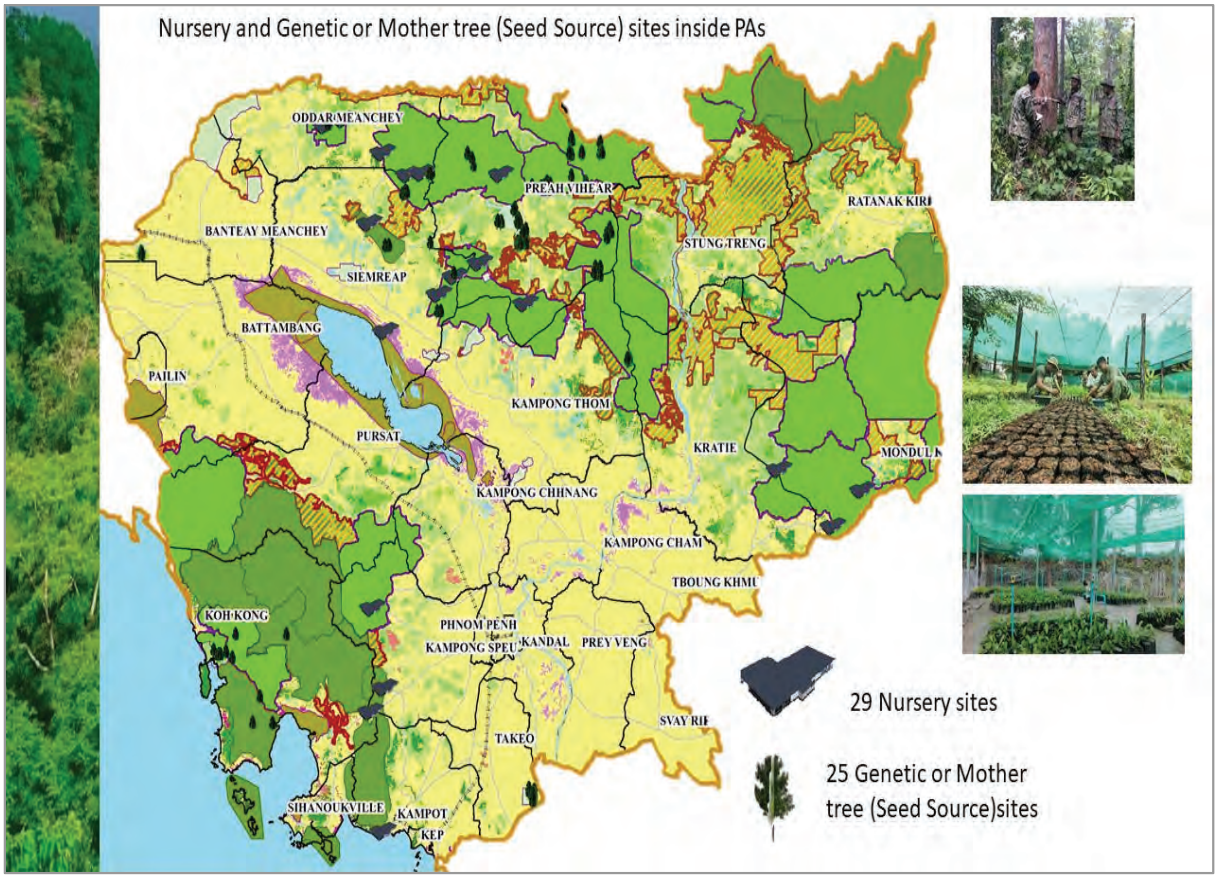
Cambodia has strongly effort on the ecosystem restoration and forest conservation through :

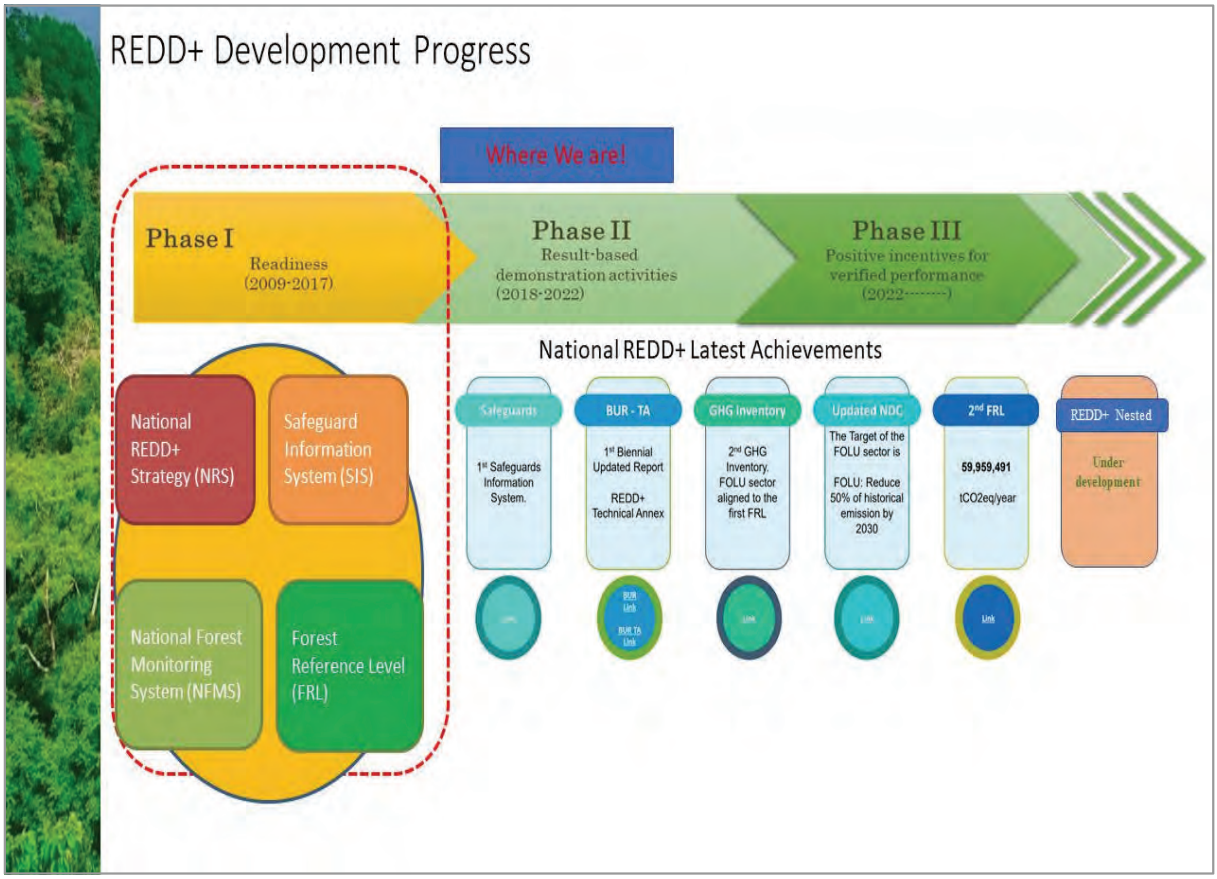
- National Abor Day is celebrated every year on 9th July, from 1990
- National Environment Day is celebrated every year on June by encourage stakeholder and people planning tree
- Increasing National protected Area : 68 PAs including biodiversity corridor conservation of about 7.2 million ha, equivalent to 40% of the country's land area
- Establishment of Community in Protected Area (CPA) 174 places about 2.9 million Ha (MoE, 2020)
- Establish Community Forestry (CF) 636 places about 52,000 Ha
- Under the production forest 80 sites of forest extension and reforestation was establish cover an area about 500,000ha
- Establish Nursery Botanical Garden and Genetic or Mother tree (Seed Sour sites inside PAs

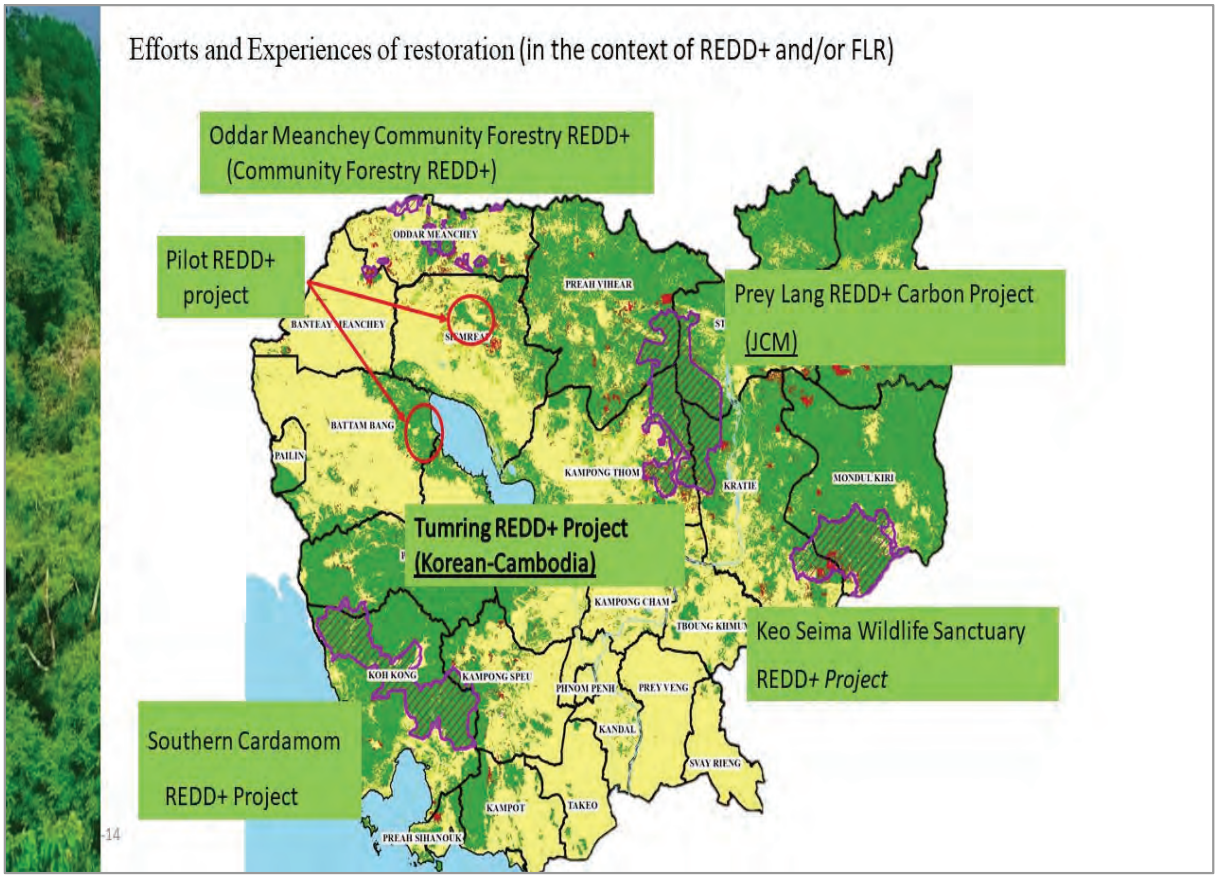

Protected Areas Management
in Cambodia
ODDAR MEANCHEY
PREAH VIHEAR
BANTEAY MEANCHEY
SIEMREAP
RATANAKIRI
STUNG TRENG
KAMPONG THOM
KRATIE
MONDULKIRI
PURSAT
KAMPONG CHHNANG
KAMPONG CHAM
TBOUNG KHMUM
KOH KONG
PHNOM PENH
PREY VENG
SVAY RIENG
SIHANOUK-VILLE
1:2,000,000
▪ PAs was reorganized and regenerated under the Royal Decree dated November 1, 1993, with 23 sites of more than 3 million hectares, equal to 18% of the country's land area
▪ In 2013-2021, there are 68 PAs and biodiversity corridor conservation of about 7.2 million ha, equivalent to 40% of the country's land area


Research theory and field practice

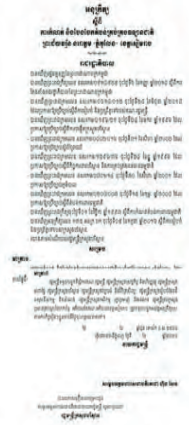

Law enforcement and land encroachment


Nursery and Genetic or Mother tree (Seed Source) sites inside PAs
ODDAR MEANCHEY
PREAH VIHEAR
RATANAK KIRI
BANTEAY MEANCHEY
STUNG TRENG
SIEMREAP
BATTAMBANG
PAILIN
KAMPONG THOM
PURSAT
KRATIE
MONDUL KIRI
KAMPONG CHHNANG
KAMPONG CHAM
TBOUNG KHMU
KOH KONG
PHNOM PENH
KAMPONG SPEU
KANDAL
PREY VENG
SVAY RIE
TAKEO
SIHANOUKVILLE
KAMPOT
KEP
29 Nursery sites
25 Genetic or Mother tree (Seed Source)sites


REDD+ Development Progress
Where We are!
Phase I
Readiness
(2009-2017)
Phase II
Result-based demonstration activities
(2018-2022)
Phase III
Positive incentives for verified performance
(2022-------)
National REDD+ Strategy (NRS)
Safeguard Information System (SIS)
National Forest Monitoring System (NFMS)
Forest Reference Level (FRL)
National REDD+ Latest Achievements
Safeguards
1st Safeguards Information System.
BUR - TA
1st Biennial Updated Report
REDD+ Technical Annex
GHG Inventory
2nd GHG Inventory. FOLU sector aligned to the first FRL
Updated NDC
The Target of the FOLU sector is
FOLU: Reduce 50% of historical emission by 2030
2nd FRL
59,959,491
tCO2eq/year
REDD+ Nested
Under development

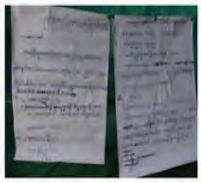

Efforts and Experiences of restoration (in the context of REDD+ and/or FLR)
Oddar Meanchey Community Forestry REDD+
(Community Forestry REDD+)
Pilot REDD+ project
Prey Lang REDD+ Carbon Project
(JCM)
Tumring REDD+ Project
(Korean-Cambodia)
Keo Seima Wildlife Sanctuary
REDD+ Project
Southern Cardamom
REDD+ Project
ODDAR MEANCHEY
PREAH VIHEAR
BANTEAY MEANCHEY
SIEMREAP
BATTAM BANG
PAILIN
KAMPONG THOM
KRATIE
MONDUL KIRI
KAMPONG CHAM
TBOUNG KHMUM
KOH KONG
KAMPONG SPEU
PHNOM PENH
PREY VENG
KANDAL
SVAY RIENG
KAMPOT
TAKEO
PREAH SIHANOUK
14

Sustainable management through zoning, reforestation and strengthening laws enforcement under REDD+ demonstration project in Phnom Kulen National Part



- Prepared management plan and zoning of Phnom Kulen National Park
- Prepared the sub-decree of management plan and zoning

Support the restoration on degraded /encroached forest land in Protected Areas



- Support the restoration on degraded /encroached forest land in Production forest
- Support capacity building to Park Rangers on SMART Patrolling

- Support the restoration on degraded /encroached forest land in Production forest (Flooded forest)
- Community Nursery established


Challenging and conclusion
Land use conflict in and around the PAs
Lack of information and data on biodiversity and natural resources
Forest land grabbing
Immigration people and new settlement (villages)
Forest demarcation and Forest land registration
Mining
Illegal logging, Illegal fishing and Poaching
Construction of new infrastructure
Human Resource and Equipment
Limit fund support


Thank you

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on
Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

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Greening the former bottom of the Aral Sea (Aralkum) in Uzbekistan

H.E. Dr. Abdushukur Hamzaev

Deputy Chairman, State Forestry Committee,
Director General, Forestry Research Institutes,
Uzbekistan

GREENING THE FORMER BOTTOM OF THE ARAL SEA (ARALKUM) IN UZBEKISTAN

Forest research institute Uzbekistan

Abdushukur Hamzayev
Deputy Chairman - State committee of forestry,
Director - Forestry Research Institute

Republic of Uzbekistan

FORESTS

BASIC COUNTRY DATA

Population: 34 million
Area: 44,7 million km2
Climate : dry, sharply continental.
Forest estate: 11,4 million ha
Forested area: 3,3 million ha
Forest cover: 7,2 %
Forest per inhabitant: 0,10 %
Ecosystems: 7 species
Flora: 4,500 species (9% endemic)
Fauna: 14,900 species of invertebrates and 714 species of vertebrates
Protected Natural Territories: 3.5 million hectares

2

DISTRIBUTION OF UZBEK FOREST FUND BY REGIONS

FORESTS

Mountain range

1.5 million hectares

(14 %)

Valley

0.26 million hectares

(1 %)

Desert area

9.5 million hectares

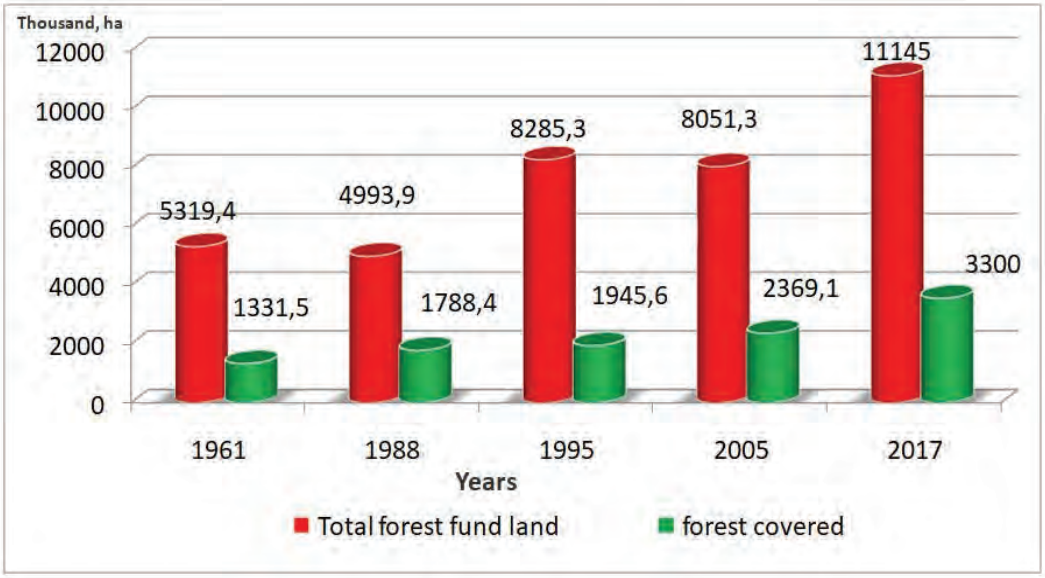
(84 %)

Tugai region

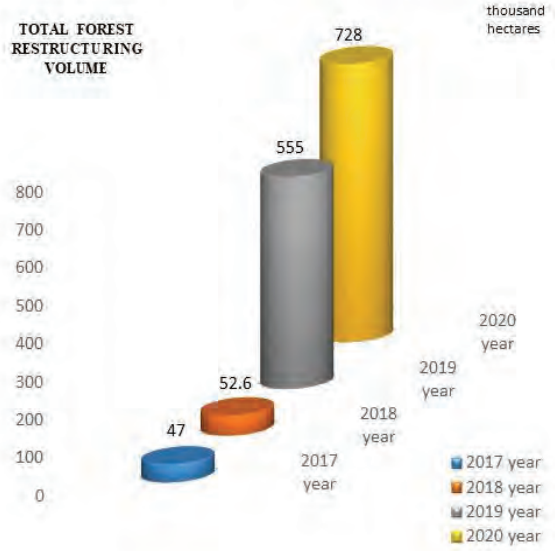
0.119 million hectares

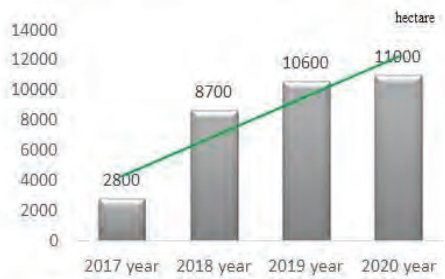
(1 %)

FOREST DENSITY DYNAMICS OF UZBEKISTAN



Forest afforestation indicators for 2017-2020





Efficient use of lands has been established by planting pistachio, almond walnut plantations in the mountainous and foothill lands of the Forest Fund.

The Aral Sea problem

FORESTS

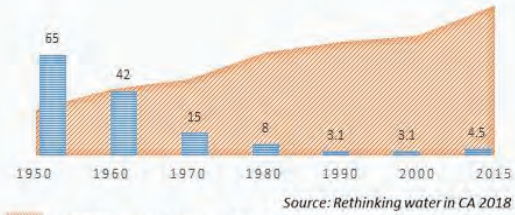
Drying of the Aral Sea is considered one of the most serious anthropogenic environmental crises of the twentieth century. The problem that has arisen, practically, in the course of a single generation, for its environmental, climatic, socio-economic and humanitarian consequences, poses a direct threat to the sustainable development of the region, health, the gene pool and the future of people living in it.

6

Situation over the past 60-65 years in the Aral

FORESTS

The volume of water decreased by more than **30 times.**
Sea area has decreased by almost **9 times**
Sea level decreased by more than **29 m**
The coastline retreated **hundreds of miles**



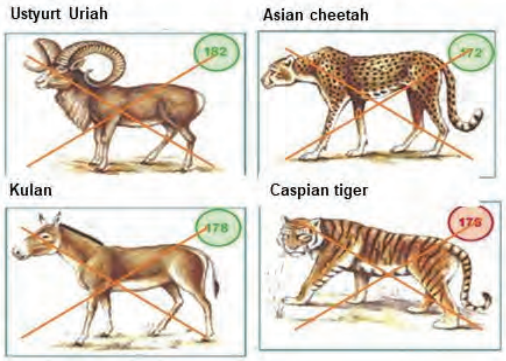
To date (October 2018), the sea has the following indicators:
Water volume - 43.34 km3
Water surface area - 2 845 km2

7

Environmental effects

FORESTS

Loss of biodiversity:
- valuable species of fish
- plants
- waterfowl
- animals



Change cover:
- reduction of tugai, reed, meadow and tugai vegetation
- increase in areas of saline, sandy and sandy plains

8

On the dried bottom of the Aral Sea one can see similar highly saline areas. From such areas about 90-100 million tons of salt and sand are blown into the atmosphere every year.

An initiative put forward by the Head of State

FORESTS

This project was supported by the President, and a large amount of practical work was launched in the fall of 2018. For information: in the last 40 years, a total of 450 thousand hectares have been afforested, while in 2018-2021, 2.2 million hectares have been planted with greenery.

10

Land preparation work on the dried bottom of the Aral Sea




Land preparation work:

- *2019 year - 1126,0 thousand hectares;*
- *2020 year - 166,3 thousand hectares.*

Information on seeds and seedlings of salt-tolerant desert plants and their species planted on the dried bottom of the Aral Sea (including figures and percentages).




The process of receiving saxaul seeds prepared by the local people




As part of research projects on the creation of forest melioration plantations on the dried bottom of the Aral Sea, a technology has been developed by the scientists of Forestry scientific research institute for growing planting material of desert plants in nurseries that have been introduced in Karakalpakstan, on the territories of the forest enterprises Muinak, Karauzyak, Takhtakupyr.


On the total resources involved in the afforestation of the Aral Sea

2019

In 2019, more than 2,000 workers, more than 500 pieces of equipment and machinery, as well as 2 aircraft and 1 hang glider were involved. 1532 tons of desert plant seeds and more than 15 million seedlings were used for afforestation.

2020

In 2020, more than 2,500 workers, more than 700 units of machinery and equipment, as well as 4 aircraft and 2 hang gliders were involved. More than 2,869 tons of desert plant seeds and more than 40 million seedlings were used for afforestation.

2021

In the spring of 2021, more than 700 workers, 600 pieces of equipment and machinery, as well as 4 aircraft and 3 hang gliders were involved. More than 1,511 tons of desert plant seeds and more than 12 million seedlings were used for afforestation.

In total, in 2018-2021, afforestation works on the dried bottom of the Aral Sea were carried out on 1663.1 thousand hectares

The condition of the saxaul planted in 2019-2020

Desert plants planted in 2019-2020 (tamarix, karaburak)



Work on the construction of greenery on the dried bottom of the Aral Sea conducted by the scientists from the Forestry Research Institute.

105-130 км. Кўчат-2019-20 N 45°15' 14.0" E 58°59' 01.9"

Videos

FORESTS

Here you can watch the video.

19

THANK YOU FOR YOUR ATTENTION!

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International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on
Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Why much forest landscape restoration become an economic enterprise?

Dr. Robert Nasi
Director General,
Center for International Forestry Research (CIFOR)


Why must forest landscape restoration become an economic enterprise?
Robert Nasi, CIFOR
CIFOR
World Agroforestry
International Symposium on Ecosystem Restoration for Green and Peace Asia,
18 August 2021
CGIAR
Forests, Trees and Agroforestry
Global Landscapes Forum
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Outline
• Land degradation: scope, costs and liabilities
• The case for more forest and trees and the need for Forest Landscape Restoration at scale
• The economic case for Forest Landscape Restoration
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Restoration of degraded land into Forests in South Korea

- **Drivers of deforestation**
  - Over exploitation
  - Expansion of ag. lands
  - Korean War
- **Drivers for restoration**
  - Govt led efforts
  - Economic development
  - Social/community support

Bae et al. 2012 and WRI, 2014

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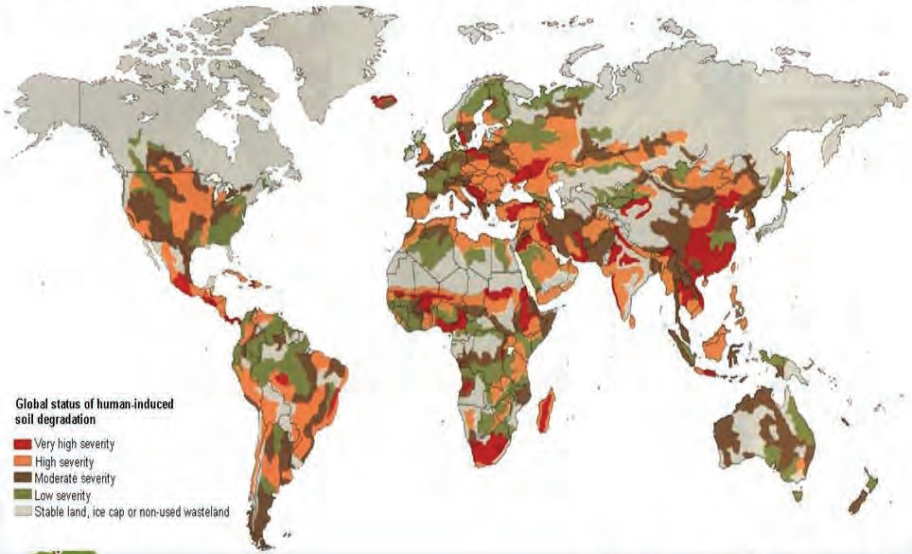
Land degradation is a pervasive, systemic phenomenon: it occurs in all parts of the terrestrial world and can take many forms. *IPBES, 2018*



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Economic, social costs and liabilities
• Around 12 million hectares of land are lost each year to degradation.
• Harming the wellbeing of at least 3.2 billion people,
• More than 10% of annual global GDP in lost ecosystem services
"The global economy will lose a whopping US$23 trillion by 2050 through land degradation," whereas the cost of taking immediate action, estimated to be around US$4.6 trillion, is "only a fraction of the predicted losses."
https://sdg.iisd.org/news/country-profiles-reveal-global-cost-of-land-degradation/
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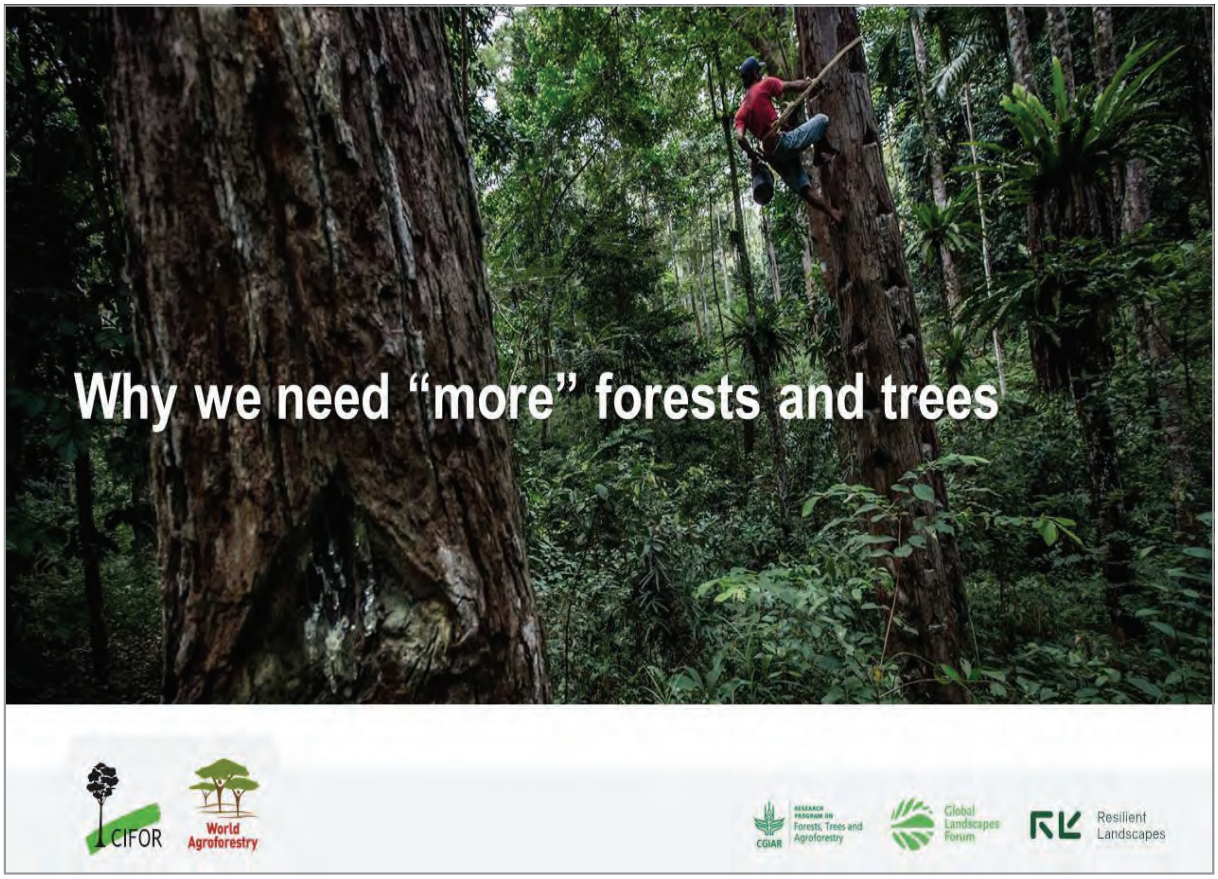
In Alice in Wonderland, the Red Queen says "... here we must run as fast as we can, just to stay in place. And if you wish to go anywhere you must run twice as fast as that".


Why we need “more” forests and trees
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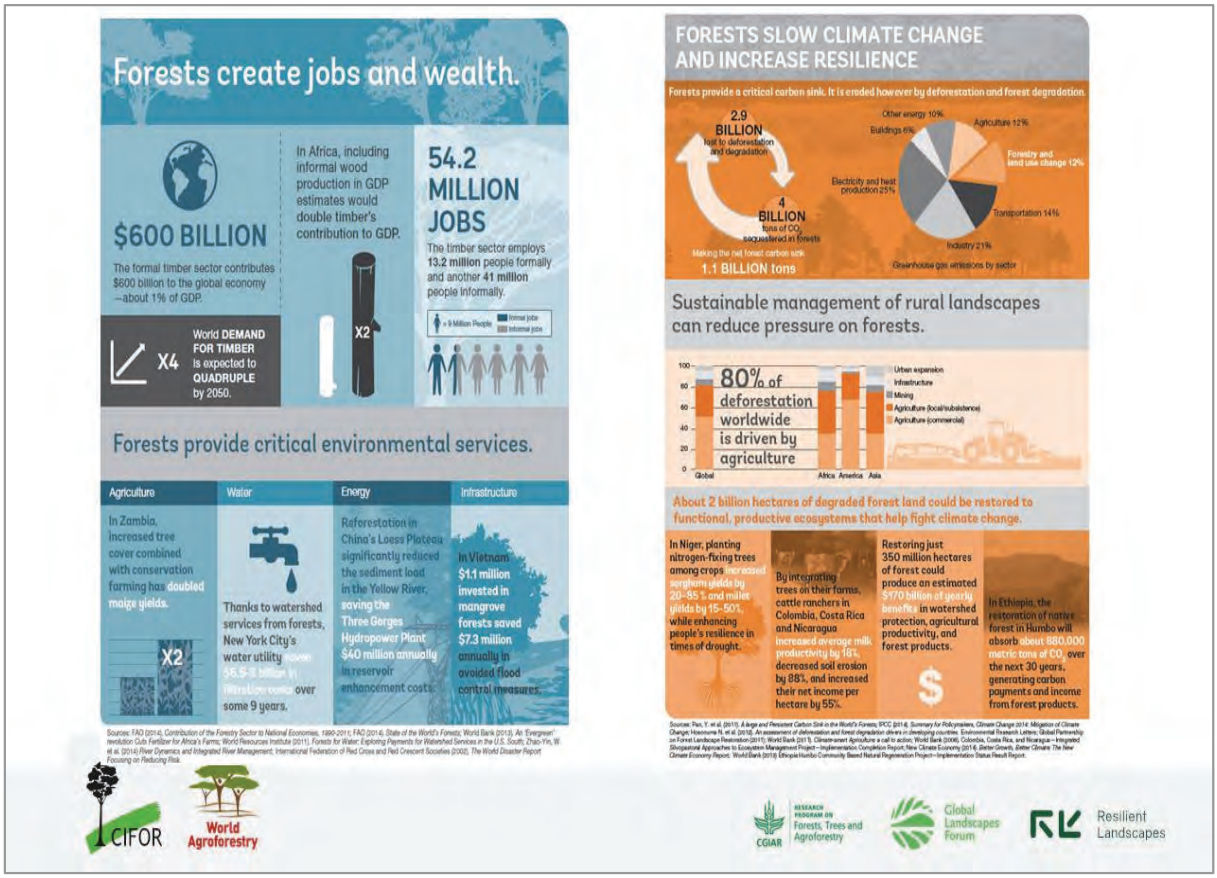
Forests create jobs and wealth.
$600 BILLION
The formal timber sector contributes $600 billion to the global economy —about 1% of GDP.
In Africa, including informal wood production in GDP estimates would double timber's contribution to GDP.
X2
54.2 MILLION JOBS
The timber sector employs 13.2 million people formally and another 41 million people informally.
X4
World DEMAND FOR TIMBER is expected to QUADRUPLE by 2050.
Forests provide critical environmental services.
Agriculture
In Zambia, increased tree cover combined with conservation farming has doubled maize yields.
X2
Water
Thanks to watershed services from forests, New York City's water utility saved $6.5-8 billion in filtration costs over some 9 years.
Energy
Reforestation in China's Loess Plateau significantly reduced the sediment load in the Yellow River, saving the Three Gorges Hydropower Plant $40 million annually in reservoir enhancement costs.
Infrastructure
In Vietnam $1.1 million invested in mangrove forests saved $7.3 million annually in avoided flood control measures.
FORESTS SLOW CLIMATE CHANGE AND INCREASE RESILIENCE
Forests provide a critical carbon sink. It is eroded however by deforestation and forest degradation.
2.9 BILLION lost to deforestation and degradation
4 BILLION tons of CO2 sequestered in forests
Making the net forest carbon sink 1.1 BILLION tons
Other energy 10%
Buildings 6%
Agriculture 12%
Forestry and land use change 12%
Electricity and heat production 25%
Transportation 14%
Industry 21%
Greenhouse gas emissions by sector
Sustainable management of rural landscapes can reduce pressure on forests.
80% of deforestation worldwide is driven by agriculture
Urban expansion
Infrastructure
Mining
Agriculture (local/subsistence)
Agriculture (commercial)
Global
Africa
Americas
Asia
About 2 billion hectares of degraded forest land could be restored to functional, productive ecosystems that help fight climate change.
In Niger, planting nitrogen-fixing trees among crops increased sorghum yields by 20-95 % and millet yields by 15-50%, while enhancing people's resilience in times of drought.
By integrating trees on their farms, cattle ranchers in Colombia, Costa Rica and Nicaragua increased average milk productivity by 16%, decreased soil erosion by 88%, and increased their net income per hectare by 55%.
Restoring just 350 million hectares of forest could produce an estimated $170 billion per year benefits in watershed protection, agricultural productivity, and forest products.
$
In Ethiopia, the restoration of native forest in Humbo will absorb about 880,000 metric tons of CO2 over the next 30 years, generating carbon payments and income from forest products.
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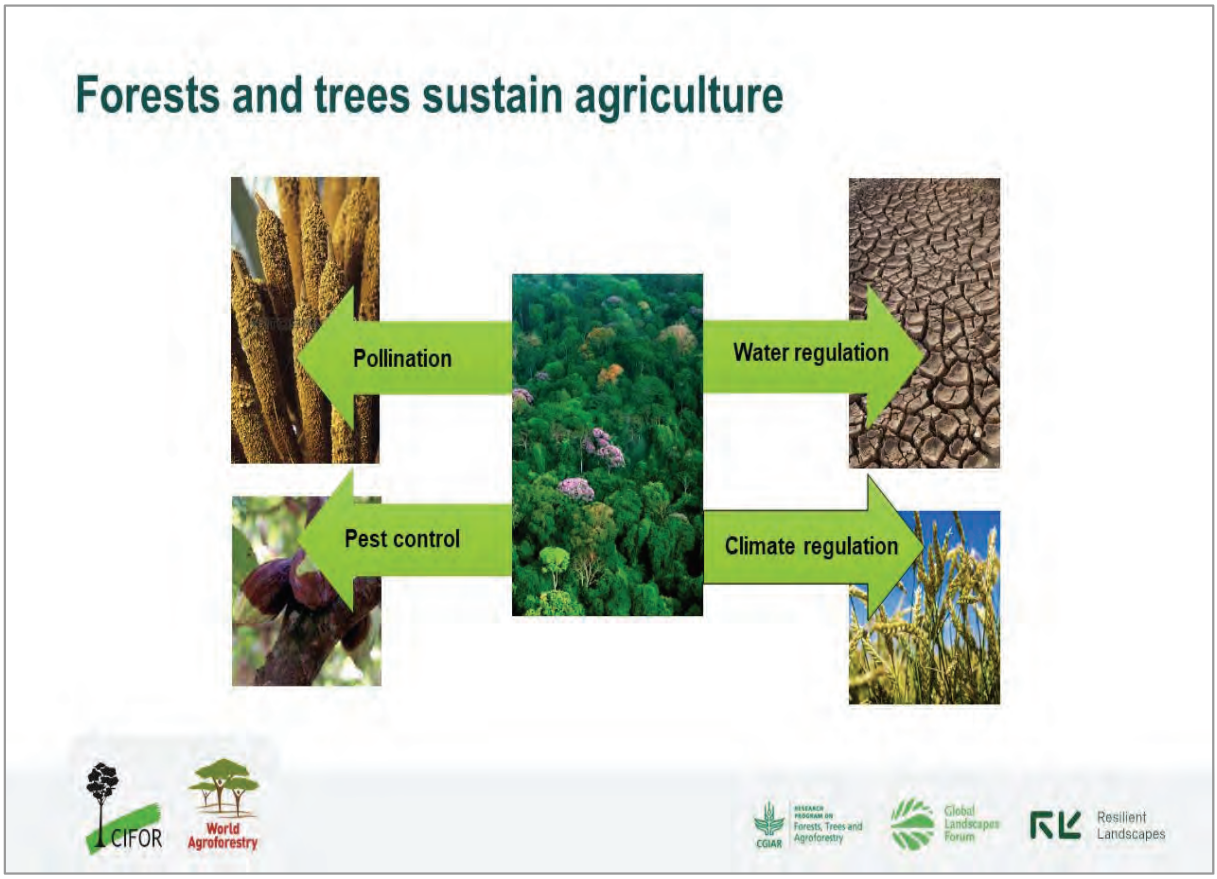
Forests and trees sustain agriculture
Pollination
Water regulation
Pest control
Climate regulation
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Forests occupy 1/3 of the earth's land area.
An estimated 1/3 of the global population depends on forest goods and services such as food, woodfuel, medicines, employment and income.
Current estimated global net forest loss is 3.3 million hectares per year; much of which – about 80 percent – is to make room for agriculture.
But this can change...
...more than 20 developing countries have improved food security while mantaining or increasing forest cover.
Forests and the 4 dimensions of food security
Food availability
Access to food
Food utilization
Stability over time
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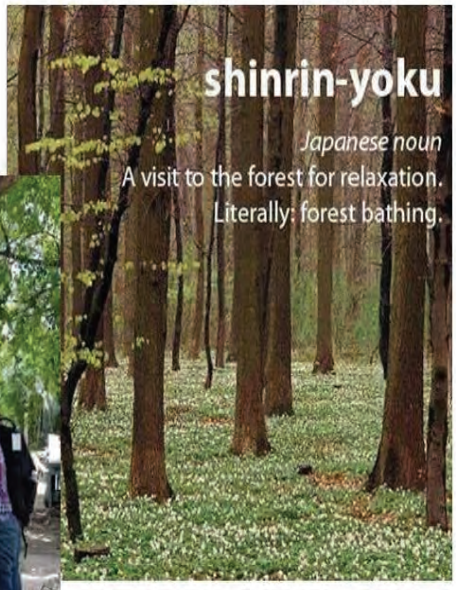
Well-being



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Bio-economy

Wood in construction...

- **2.2 t of CO_2 are avoided by using 1 t of wood** instead of Portland cement
- Better **thermal efficiency**
- **Material use** is reduced by 50% compared to concrete

Product categories	Average substitution effect kg C / kg C wood product	Average substitution effect kg CO_2 eq. / kg wood product
Structural construction	1.3	2.4
Non-structural construction	1.6	2.9
Textiles	2.8	5.1
Other product categories	1–1.5	1.8–2.7
Average across all product categories	1.2	**2.2[a]**

Wood-based textiles...

- Global production of textile fibres:
  - 93 Mt (2016)
  - 250Mt (2050)
- **Carbon footprint from "new" wood-based textile fibres can be up to 9 times lower than synthetic ones**

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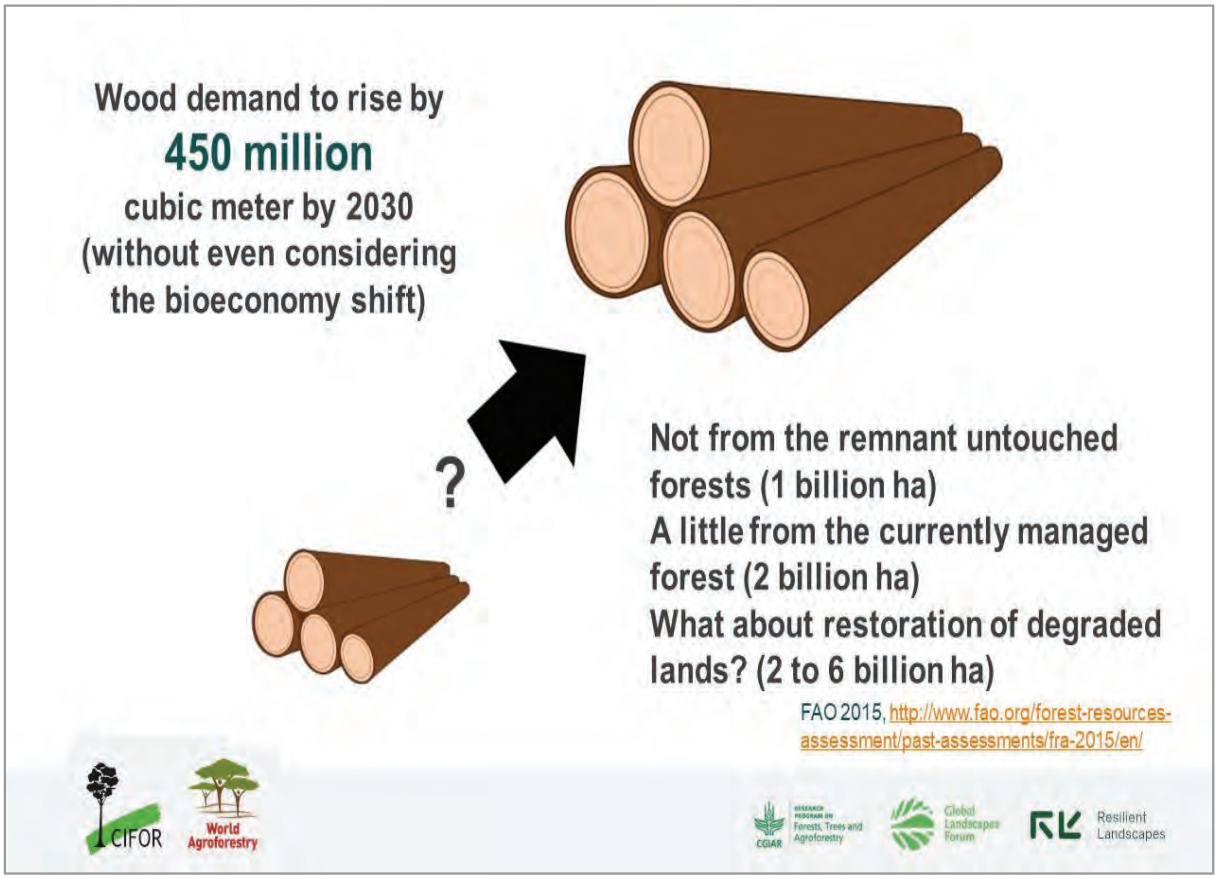
Wood demand to rise by
450 million
cubic meter by 2030
(without even considering
the bioeconomy shift)
?
Not from the remnant untouched forests (1 billion ha)
A little from the currently managed forest (2 billion ha)
What about restoration of degraded lands? (2 to 6 billion ha)
FAO 2015, http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en/
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The "economics" of Forest Landscape Restoration
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Who should / How to finance restoration?

The challenge for advocates of forest restoration is to make it financially viable.

Global Funding for Conservation and Restoration

WORLD RESOURCES INSTITUTE

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FLR targets, priorities and estimated budget required

Restoration target / priority	Description	Steward/driver	Estimated budget required (billion USD)*	
The Bonn Challenge	By 2020, 150 million hectares of land will be under restoration activities globally.	IUCN & GPFLR (2011-2020)	359	36
Initiative 20*20	By 2020, 20 million hectares of land will be under restoration activities in Latin America.	Latin American Countries & WRI (2014-2020)	48	8
New York Declaration on Forests	Have 150 million hectares of degraded landscapes and forestlands under restoration by 2020 and significantly increase the rate of global restoration thereafter, which would put at least an additional 200 million hectares under restoration activities by 2030.	United Nations Climate Summit (2014-2030)	837	49
AFR100	The AFR100 is a pan-African country-led restoration effort to bring 100 million hectares of degraded landscapes in Africa under restoration by 2030.	African Countries & World Resources Institute (2015-2030)	239	16
Sustainable Development Goals	SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	United Nations (2015-2030)	4780	318

*using TEEB figure US$2390 per ha

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The economic case for restoration...
• The world is facing two interdependent environmental crises: the accelerating destruction of nature and climate change. Corporate citizenship is an integral part of the problem and solution to these twin threats. Over half of global GDP, or $44 trillion, is potentially threatened by nature loss, making restoration an economic priority in the decade ahead. Halting environmental degradation and deforestation, conserving remaining natural sites and restoring those at risk, paired with rapid Paris Agreement-aligned emissions reductions are increasingly recognized hallmarks of a robust corporate response.
https://www.forbes.com/sites/worldeconomicforum/2021/06/04/3-reasons-companies-are-investing-in-forest-conservation-and-restoration-and-how-they-do-it/?sh=68f319af11e0
© 2007 Europa Technologies
Image © 2007 TerraMetrics
Google


Restoration: an economic activity?
$6.3 trillion lost per year to land degradation
Net benefit $0.7 – $9 trillion by achieving Bonn Challenge
$7–30 in economic benefits for every dollar invested
HUGE COSTS TO SOCIETY...
IMPRESSIVE RETURNS...
WHY ARE WE NOT DOING IT ?
WRI, 2017;
Cost of ecosystem loss
Cost of ecosystem loss 2-5% of GDP per year (Science, 2002)
(damage-costs, replacement & restoration costs, etc ...)
7.3 Trillion $/y 2012 (13% of global GDP)
(TEEB for Business Report, May 2013)
Investing in nature (restoration) pays !
Rescuing environmentalism (and the planet)
„Every dollar invested ... saves anywhere between 7,5 and 200 US$ in damage & repair costs"
TheEconomist (23 April 2005)
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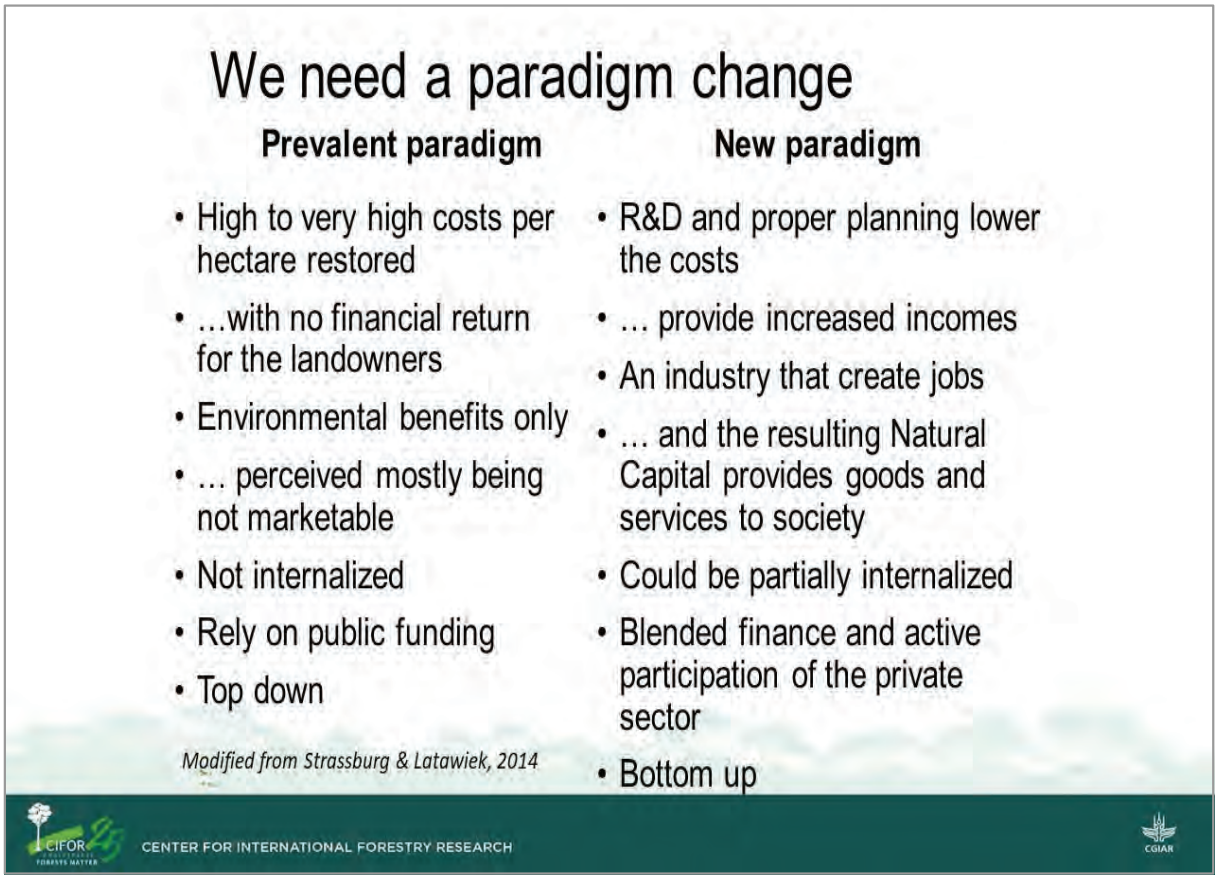
We need a paradigm change
Prevalent paradigm
New paradigm
• High to very high costs per hectare restored
• …with no financial return for the landowners
• Environmental benefits only
• … perceived mostly being not marketable
• Not internalized
• Rely on public funding
• Top down
• R&D and proper planning lower the costs
• … provide increased incomes
• An industry that create jobs
• … and the resulting Natural Capital provides goods and services to society
• Could be partially internalized
• Blended finance and active participation of the private sector
• Bottom up
Modified from Strassburg & Latawiek, 2014
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UN Decade on Ecosystem Restoration
LEAD AGENCIES
COLLABORATING AGENCIES
FUNDING PARTNERS
GLOBAL PARTNERS
TEN MORE YEARS TO RESTORE THE PLANET
IN THE SPOTLIGHT
SOUTH AFRICA: REVERSING LAND DEGRADATION WOULD BENEFIT ECONOMY
WHAT IS ECOSYSTEM RESTORATION?
HEALING TROPICAL FORESTS FOR SPIRITUAL RENEWAL
RESTORATION IMPLEMENTERS
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THANK YOU
https://www.cifor-icraf.org/restoration-for-resilience/
cifor.org | worldagroforestry.org | fooststreesagroforestry.org | globallandscapesforum.org | resilient-landscapes.org
The Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) envision a more equitable world where forestry and landscapes enhance the environment and well-being for all. CIFOR–ICRAF are CGIAR Research Centers.
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RESEARCH PROGRAM ON
Forests, Trees and Agroforestry
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International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on
Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Restoration and Reforestation Models Initiated by AFoCO

Mr. Ricardo Calderon

Executive Director, Asian Forest Cooperation Organization (AFoCO)

RESTORATION AND REFORESTATION MODELS INITIATED BY AFoCO

International Symposium on Ecosystem Restoration for Green and Peace Asia

Ricardo Calderon

18 August 2021

AFoCO

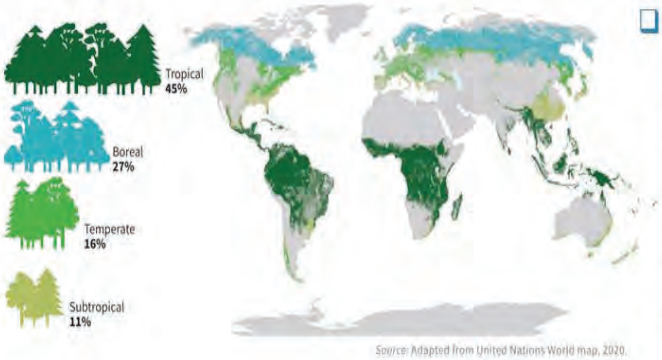
AFoCO

Table of Contents

AFoCO

I. Introduction

- Forests of Asia covers **549 million** ha and account for the **14% of the global forests** cover, plays a variety of ecosystems services for the **4.5 billion of people or roughly 60% of the world population**.
- The tropical forests of Southeast Asia plays important roles in biodiversity conservation, provision of ecosystems services and global carbon balance.



- Without proactive measures and concerted efforts from governments, developmental organizations, private sector and civil society organizations; forests of Asia are at risk of reduced capacity for climate mitigation, limited provisions of ecosystems services, biodiversity loss and reduced economic growth potential.

AFoCO

II. Asian Forest Cooperation Organization (AFoCO)

- AFoCO is a **treaty-based inter-governmental organization** that was adopted in 2015 and formalized in 2018. Its precursor, the ASEAN-ROK Forest Cooperation was formally established in 2011.
- It was duly registered with the Secretariat of the **United Nations under Treaty Collection** Number 55833, Multilateral.
- It has two Principal Organs: **The Assembly** represented by the Heads of Forestry of the Party Members and **The Secretariat** based in Seoul, Republic of Korea. The Regional Education and Training Center In Myanmar is a Subsidiary Organ of the Secretariat.
- The **United Nations General Assembly**, recognized AFoCO as an intergovernmental organization and granted **Observer** Status to AFoCO on December 15, 2020.

II. Asian Forest Cooperation Organization (AFoCO)

- AFoCO was included in the OECD-DAC list of **ODA-eligible international organization** from 2021 reporting and authorized to undertake fundraising and receive donation by the Republic of Korea.
- The **Headquarters Agreement** between the Republic of Korea and the Asian Forest Cooperation Organization entered into force on July 2, 2021.
- Presently AFoCO has **Thirteen Parties** and **Two Observers**. Membership to AFoCO is open to countries which are geographically located in Asia.
- AFoCO promotes **partnership** with institutions and countries beyond Asia through joint programs .

III. Geographic Coverage

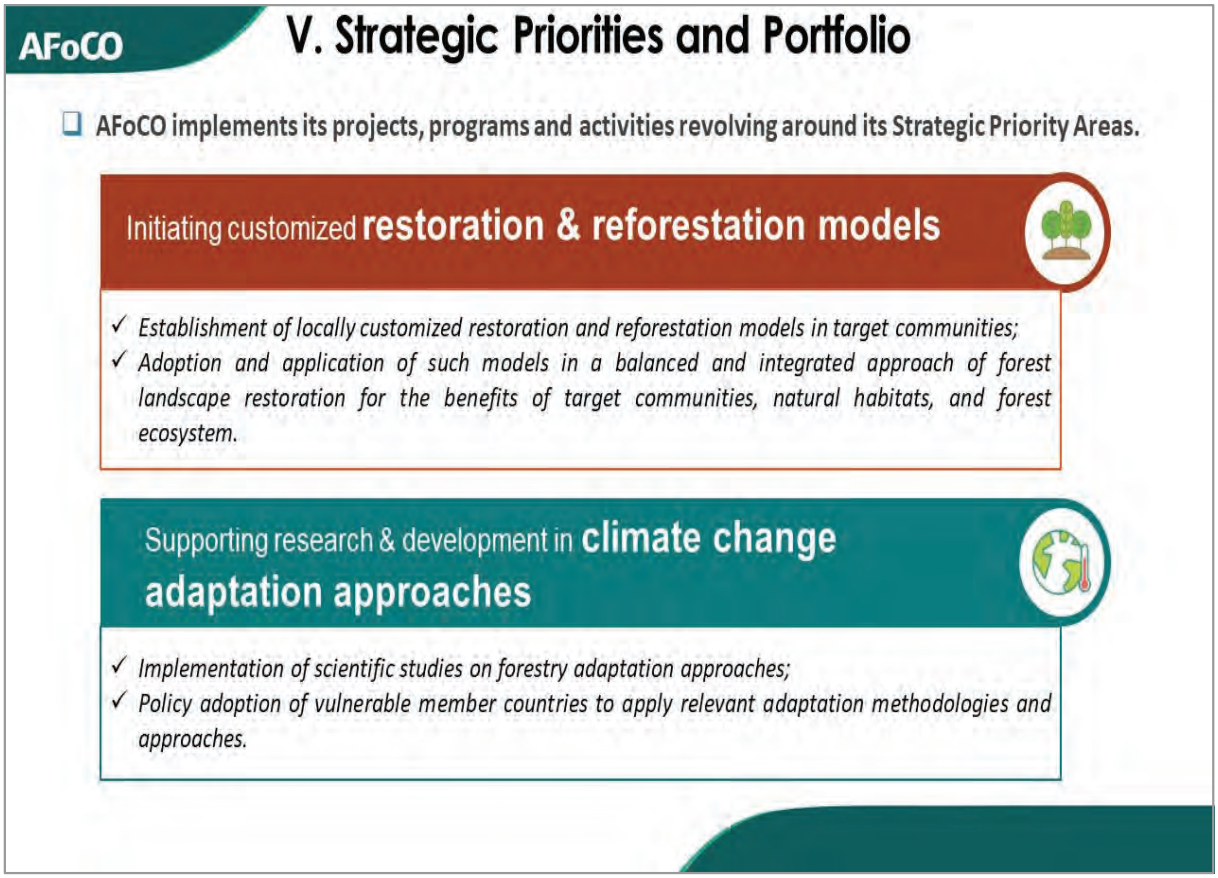
Parties (13)

Bhutan
Brunei Darussalam
Cambodia
Indonesia
Kazakhstan
Lao PDR
Mongolia
Myanmar
Philippines
Republic of Korea
Thailand
Timor-Leste
Viet Nam

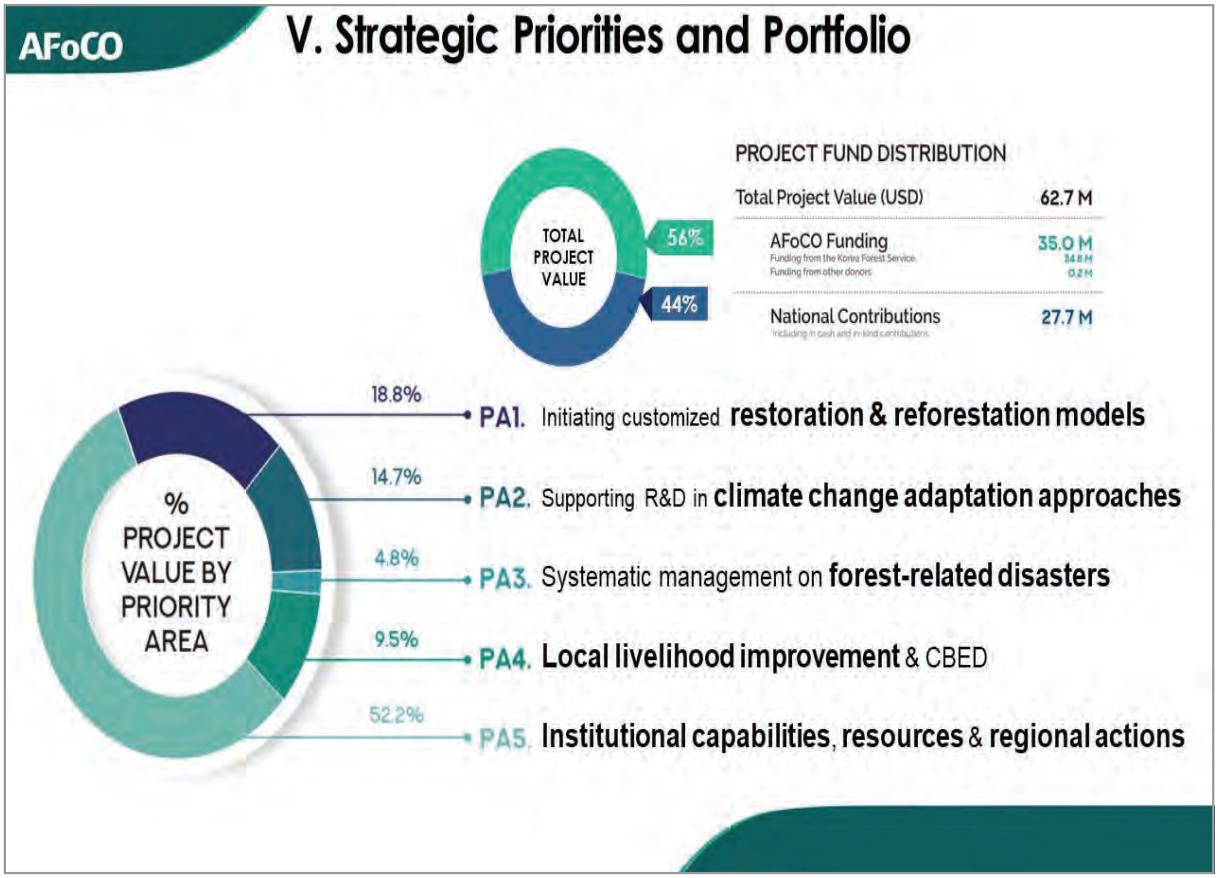
Observers (2)

Malaysia
Singapore


IV. Vision & Mission
A greener Asia with resilient forests, landscapes, and communities
with mission to
strengthen cooperation in the forest sector and promote action-oriented practices of sustainable forest management through policy support, capacity development, and inclusive partnerships to address the adverse impacts of climate change.


AFoCO
V. Strategic Priorities and Portfolio
AFoCO implements its projects, programs and activities revolving around its Strategic Priority Areas.
Initiating customized restoration & reforestation models
✓ Establishment of locally customized restoration and reforestation models in target communities;
✓ Adoption and application of such models in a balanced and integrated approach of forest landscape restoration for the benefits of target communities, natural habitats, and forest ecosystem.
Supporting research & development in climate change adaptation approaches
✓ Implementation of scientific studies on forestry adaptation approaches;
✓ Policy adoption of vulnerable member countries to apply relevant adaptation methodologies and approaches.


AFoCO
V. Strategic Priorities and Portfolio
Introducing systematic management on forest-related disasters
✓ Establishment of demonstration sites for control and management of forest-related disasters;
✓ Application of technology-based perspective and control measures where appropriate.
Local livelihood improvement & community- based small enterprise development
✓ Identification and implementation of best practices on payments for ecosystems services, ecotourism, and community-based enterprise development in target areas;
✓ Promoting relevant policy adoption in target areas.
Strengthening institutional capabilities, diversifying resources & promoting regional actions
✓ Strengthening institutional capabilities to address diverse socio-economic settings among member parties;
✓ Expanding collaboration with other organizations.


AFoCO
V. Strategic Priorities and Portfolio
TOTAL PROJECT VALUE
56%
44%
PROJECT FUND DISTRIBUTION
Total Project Value (USD) 62.7 M
AFoCO Funding 35.0 M
Funding from the Korea Forest Service 34.8 M
Funding from other donors 0.2 M
National Contributions 27.7 M
% PROJECT VALUE BY PRIORITY AREA
18.8%
PA1. Initiating customized restoration & reforestation models
14.7%
PA2. Supporting R&D in climate change adaptation approaches
4.8%
PA3. Systematic management on forest-related disasters
9.5%
PA4. Local livelihood improvement & CBED
52.2%
PA5. Institutional capabilities, resources & regional actions

AFoCO

VI. Significant Features of AFoCO Programs and Projects

A. Across different forest ecosystems and functions

The current Parties and Observers encompasses diverse climatic zones and sub-regions stretching from Northeast Asia, South Asia, Southeast Asia and Central Asia. Hence, our Programs and Projects cuts across different forest ecosystems and functions.

AFoCO

A. Across different forest ecosystems and functions

TROPICAL AND MANGROVE FOREST

Rehabilitation and Development of Mangrove Forest Ecosystem in Thai Binh Province, Viet Nam

Duration: 2015-2024

Budget: USD 1,500,000

Participating country: Viet Nam

Site description:

Thai Thuy & Tien Hai District, Thai Binh Province, Viet Nam

AFoCO

A. Across different forest ecosystems and functions

DRYLAND AND DROUGHT-PRONE AREAS (SAXAUL)

Investigation of the resistance of black saxaul (Haloxylon aphyllum) forms to gall-forming insects in Kazakhstan

Duration: 2020-2022

Budget: USD 32,864

Participating country: Kazakhstan

AFoCO

A. Across different forest ecosystems and functions

PRODUCTION & PROTECTION FOREST

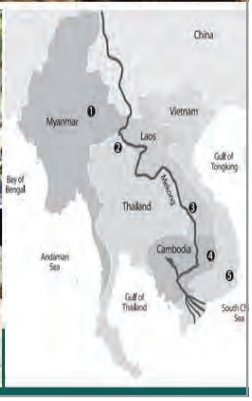
Rehabilitation and Restoration of Degraded Forest Ecosystems (RRR-DFE) in Mekong Basin Countries

Duration : May 2013 – 2015

Budget : USD 500,000

Participating countries : Thailand (lead), Cambodia, Lao PDR, Myanmar, & Viet Nam

Site description :
Mondulkiri Protection Forest (Cambodia), Xebangnouane Sub-Forest Management Area (SFMA) in Dongsithouane Production Forest Area, Savannakhet Province (Lao PDR), Pwe Hla Lake Watershed, Pindaya Township (Myanmar), Mae Yao Sub-watershed, Mae Kok Watershed (Thailand), Bidoup Nui Ba National Park, Lam Dong Province (Viet Nam)



AFoCO

A. Across different forest ecosystems and functions

NATURAL & ARTIFICIAL FOREST

Pinus caribaea Morelet for Plantation on Degraded Land in Viet Nam's Northern Mountainous Region

Duration: 2020-2023

Budget: USD 486,000

Participating countries: Viet Nam

Site description: Forest Science Centre of North-Eastern Viet Nam, Vinh Phuc Province

AFoCO

A. Across different forest ecosystems and functions

DISTURBED TERRESTRIAL ECOSYSTEMS

Performance of the Cluster Method in Rehabilitating Degraded Lands in Cambodia

Duration : 2021-2023

Budget : USD 35,000

Participating countries :Cambodia

AFoCO

A. Across different forest ecosystems and functions

DISTURBED TERRESTRIAL ECOSYSTEMS

Promotion of Forest Rehabilitation through Demonstration Models and Improvement of Seed Supply System

Duration : Dec. 2014 – Dec. 2019

Budget: USD 1,000,000

Participating countries : Cambodia (lead) & Viet Nam

Site description :

Phnom Penh and Siem Reap, Cambodia

Hanoi and Hoa Binh, Viet Nam

AFoCO

VI. Significant Features of AFoCO Programs and Projects

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

- ❑ Forest genetic research on tree improvement
- ❑ GIS and remote-sensing technology application
- ❑ Integrated pest and disease management
- ❑ Forest fire monitoring system
- ❑ Community-based approach
- ❑ Agro-forestry development
- ❑ Vertically integrated approach for plantation development and non-timber products
- ❑ Prioritize conservation of natural forest and biodiversity

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

GENETIC RESEARCH ON TREE IMPROVEMENT

Re-greening the bare lands in Timor-Leste through promotion of locally customized restoration models

Duration : 2021-2023

Budget: USD 1,000,000

Participating countries : Timor-Leste

Establishment of Forest Genetics Research Center for Restoration of Major Timber Species in Cambodia

Duration: 2016 - 2025

Budget: USD 1,500,000

Participating country: Cambodia

Site description: Chan Sor & Khun Ream, Siem Reap Province, Cambodia

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

GIS AND REMOTE SENSING

Capacity Building on Improving Forest Resources Assessment and Enhancing the Involvement of the Local Communities to Address the Impact of Climate Change

Duration : 2013-2016

Budget : USD 1,847,528

Participating countries : Indonesia (Lead), Brunei Darussalam, Cambodia, Lao PDR, Myanmar, Philippines, Thailand, & Viet Nam

National Workshop on Forest Resource Assessment

Literature Study on Alternative Livelihood

Training for Local Community on Developing Alternative Livelihood

Procurement of RS/GIS Equipment

Regional Workshop

8	1344	241	52	12	10
Countries	Participants	Remote Sensing Equipment	Local Partners	Universities	Local Communities

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

GIS AND REMOTE SENSING

Facilitating the Participatory Planning of Community-based Forest Management Using GIS and RS Technologies in Forest Resources Management

Duration: Dec. 2015 – Dec. 2019

Budget: USD 1,500,000

Participating country: Philippines, Indonesia, Thailand

Site description:

[Philippines] Pangasinan (R1)/ Albay (R5) /Davao City (R11)

[Indonesia] Lampung Province / East Nusa Tenggara / West Sumatra

[Thailand] Chiang Mai (North) / Kanjanaburi (Central-west)/ Suratthani (South)

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

PEST & DISEASE MANAGEMENT

Integrated Pest and Disease Management in Teak Plantations in Bago Regions, Myanmar

Duration: 2020-2025

Budget: USD 955,360

Participating country: Myanmar

Site description: Bago Regions, Myanmar

Assessment of Adelgid diversity and distribution in conifer forest of Bhutan to mitigate future outbreaks in Bhutan

Duration: 2020-2022

Budget: USD 32,862

Participating country: Bhutan

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

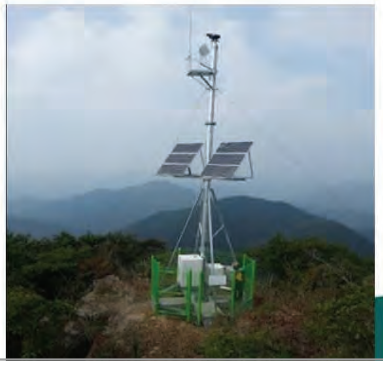
FOREST FIRE MONITORING SYSTEM

Capacity Building on Enhancing Resilience to Forest Fire and Local Livelihood in CLMV

Duration: 5 years

Budget: USD 8,500,000

Participating country: All AFoCO Parties



AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

COMMUNITY-BASED APPROACH

Village-based Forest Rehabilitation in Lao PDR

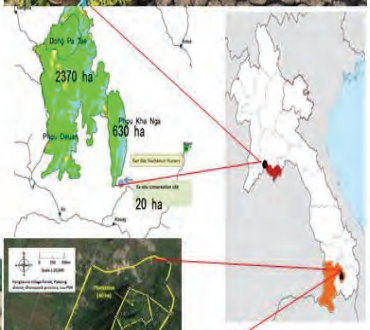
Duration: 2016-2025

Budget: USD 1,500,000

Participating country: Lao PDR

Site description:

Paksong District, Champasak Province & Sangthong District, Vientiane Capital



AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

COMMUNITY-BASED APPROACH

Developing High Valuable Species as the Mechanism for Sustainable Forest Management and Livelihood Improvement for Local Communities

Duration: Dec. 2015 – Dec. 2018

Budget: USD 720,000

Participating countries: Viet Nam (lead), Thailand

Site description:

Cao Bang and Bac Kan provinces, Viet Nam;

Nan and Loei provinces, Thailand

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

COMMUNITY-BASED APPROACH

Integrated village-driven forest rehabilitation and livelihood improvement in Viengthong district, Bolikhamxay province, Lao PDR

Duration: 2021-2025

Budget: USD 1,088,000

Participating country: Lao PDR

Site description:

Viengthong district, Bolikhamxay province, Lao PDR

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

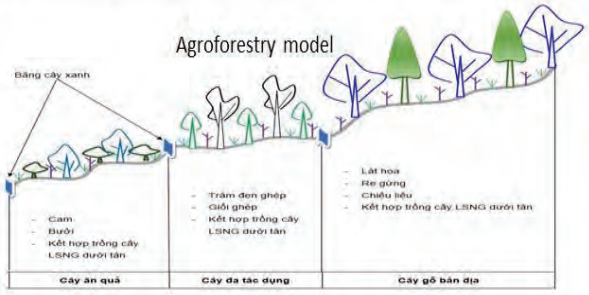
AGROFORESTRY DEVELOPMENT

Development of Agroforestry Models for Promotion of Reforestation in the Different Zones in Timor-Leste

Duration: 2021-2024

Budget: USD 516,700

Participating country: Timor-Leste



AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

VERTICALLY INGRATED APPROACH AND NON-TIMBER PRODUCTS

Model Forest for Livelihood Improvement of Forest Dependent Communities through Development of Community-based Enterprise and Forest Conservation

Duration: 2020-2023

Budget: USD 952,000

Participating country: Myanmar

Sustainable Community-based Enterprise development for Improved Rural Livelihood in Bhutan

Duration: 2020-2025

Budget: USD 1,000,000

Participating country: Bhutan

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

VERTICALLY INGRATED APPROACH AND NON-TIMBER PRODUCTS

Promotion of Vertical Integration in Wood Processing through People's Organizations in Community Based Forest Management Areas in the Philippines

Duration: 2021-2026

Budget: USD 928,821

Participating country: Philippines

Site description:

Agusan del Sur & Negros Oriental

Planting / Managing → Harvesting / Transporting → Processing → Packaging → Marketing

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

BIODIVERSITY & CONSERVATION

Domestication of Endangered, Endemic and ThreatenedPlant Species in Disturbed Terrestrial Ecosystem

Duration: May 2016 - May 2022

Budget: USD 1,200,000

Participating countries: Malaysia (lead) & Thailand

Site description: Bidor, Perak (Malaysia)
Lampang / Takuapa (Thailand)

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

BIODIVERSITY & CONSERVATION

Conservation and development of forest ecosystems biodiversity resources at Cat Tien National Park

Duration : 2021-2025

Budget : USD 1,132,000

Participating countries : Viet Nam

Research on Forest Enrichment using High Valuable Native Species in Hoa Binh Province, Viet Nam

Duration : 2021-2023

Budget : USD 35,000

Participating countries : Viet Nam

Innovative solution for climate change and biodiversity landscape strategy to support SDGs in Indonesia

Duration : 2021-2024

Budget : USD 700,000

Participating countries : Indonesia

AFoCO

B. Use of different technology and approaches of restoration, rehabilitation, and reclamation of degraded forest ecosystem

BIODIVERSITY & CONSERVATION

Capacity Building for Landscape Approach to Support the Sustainable Natural Resources Management

Duration : Mar. 2016 – Mar. 2019

Budget : USD 513,982

Participating countries : Philippines (lead), Brunei Darussalam, Indonesia, & Singapore

Site description : Berakas Forest Reserve (Brunei Darussalam); Tumbang Nusa Forest (Indonesia); Candelaria, Zambales (Philippines)

AFoCO

VI. Significant Features of AFoCO Programs and Projects

C. Common approaches of all programs and projects

1) Community participation in order to ensure project ownership, community buy-in and sustainability;
2) Multi-stakeholders participation in project management and decision-making thru the project steering committee for every project in accordance to the AFoCO project manual composed of the national focal point, representative of the Secretariat, ESS expert, relevant ministry representative and project stakeholders;
3) Integration of livelihood and community-based enterprise focused on forest dependent communities in order to address socio-economic needs and environmental concerns;
4) Provide a platform of exchange of technical expertise and sharing of experiences thru our annual technical meetings and thematic dialogue;
5) Attainment of co-benefits in terms of forest carbon enhancement and biodiversity conservation.

AFoCO

VI. Significant Features of AFoCO Programs and Projects

6) Integration of capacity building of stakeholders, frontline forestry practitioners, forest researchers , policy makers thru the regional education and training center;
   - National roll-out training programs
   - Among 9 regular training courses planned in 2021, 4 courses conducted with 950 participant-days.
   - Capacity Development Roadmap 2030

7) Guided by AFoCO's environmental and social safeguard policy adopted in the third session of the assembly to ensure that:
   a. *Program, projects and activities do not result in unnecessary environmental and social impairment;*
   b. *Program, Projects and Activities promote transparency, predictability and accountability in the decision-making process of environmental and social screenings and impact assessments;*
   c. *Program, Projects and Activities encourage project proponents and implementing agencies of AFoCO to have appropriate consideration for environmental and social impacts.*

VII. Summary of Programs and Projects

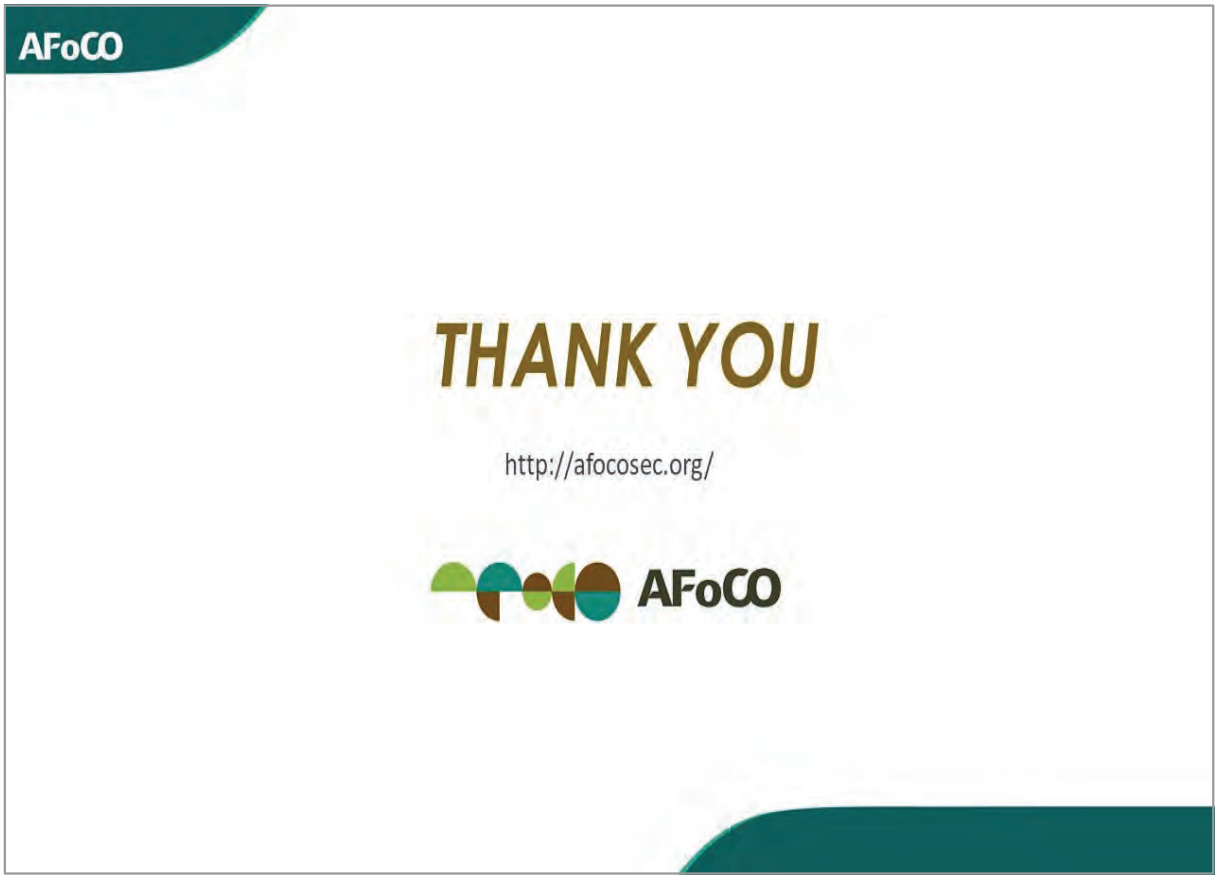
- **6 completed projects** valued at US$ 5.98 M
- **17 ongoing projects** valued at US$ 22.06 M
  ** Only 1 project is a multi-country project: Malaysia-Thailand project on domestication of endangered species*
- **6 projects** under project **inception arrangements** valued at US$ 13.35 M
  - CLMV project on ***Forest Fire Resilience and Community Livelihood Development*** funded under AFoCO and AKCF as a multi-country project but awaiting AKCF funding approval in 2021.
- **Projects in the pipeline**
  - **6 projects** are for approval on the 5th Session of the Assembly in October 2021 and **due inception by 2022** valued at US$ 7.78 M
  - **3 projects** in the pipeline are under further development

  ** Only 1 project is a multi-country project: Non-Timber Forest Products-Modelling Scalable Community-based enterprise in Asia.*

VIII. Conclusion

Currently there is no formal United Nations systems-wide mechanism to enhance cooperation, coordination and coherence on forest related issues, however there are several formal and informal initiatives aimed at improving forest related based action.

The Asian Forest Cooperation Organization (AFoCO) as a formal intergovernmental body is committed to provide the bridge in order to enhance cross-sectoral cooperation and broaden coordination and coherence among member parties, partner countries and organizations on the sustainable management of forest for the continuous production of goods and ecosystems services, biodiversity conservation and climate change mitigation and adaptation.


AFoCO
THANK YOU
http://afocosec.org/
AFoCO

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on Ecosystem Restoration for Green and Peace Asia

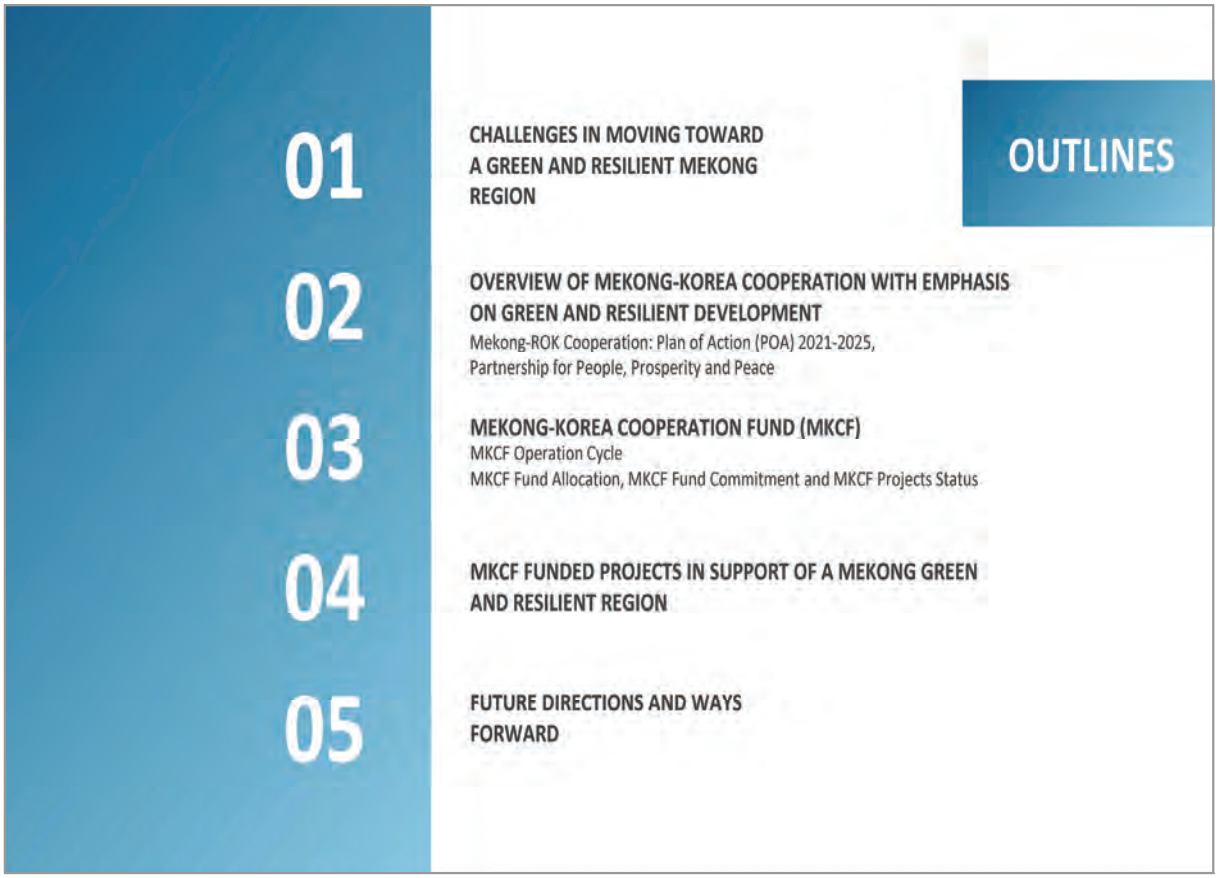
18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

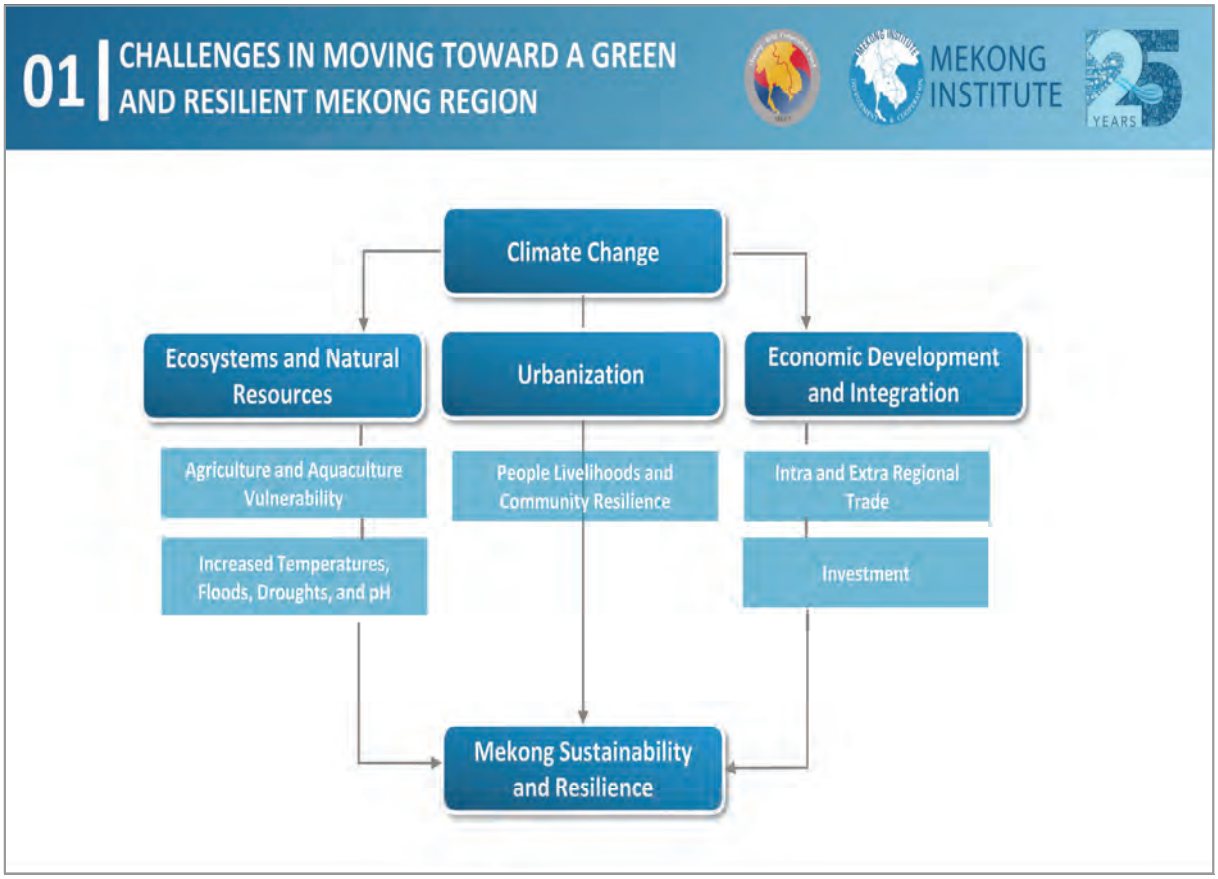
Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

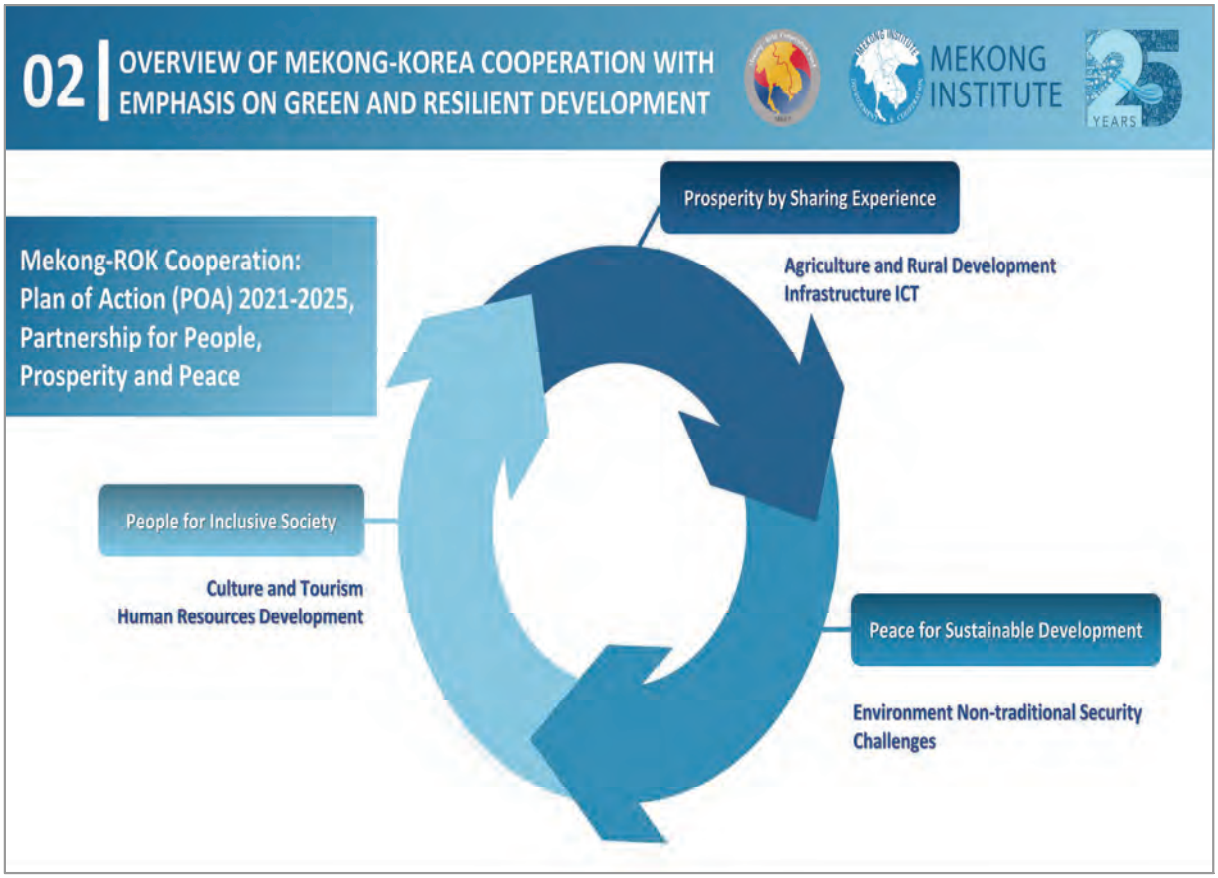
Promoting a Green and Resilient Mekong Region through Mekong-ROK Cooperation

Dr. Suriyan Vichitlekarn
Executive Director, Mekong Institute (MI)


MEKONG INSTITUTE
Promoting a Green and Resilient Mekong Region through Mekong-Korea Cooperation
Mr. Suriyan Vichitlekarn
Executive Director
Mekong Institute
August 18, 2021
MEKONG INSTITUTE
25
YEARS
Strengthening Synergies


OUTLINES
01
CHALLENGES IN MOVING TOWARD A GREEN AND RESILIENT MEKONG REGION
02
OVERVIEW OF MEKONG-KOREA COOPERATION WITH EMPHASIS ON GREEN AND RESILIENT DEVELOPMENT
Mekong-ROK Cooperation: Plan of Action (POA) 2021-2025, Partnership for People, Prosperity and Peace
03
MEKONG-KOREA COOPERATION FUND (MKCF)
MKCF Operation Cycle
MKCF Fund Allocation, MKCF Fund Commitment and MKCF Projects Status
04
MKCF FUNDED PROJECTS IN SUPPORT OF A MEKONG GREEN AND RESILIENT REGION
05
FUTURE DIRECTIONS AND WAYS FORWARD


01 CHALLENGES IN MOVING TOWARD A GREEN AND RESILIENT MEKONG REGION
MEKONG INSTITUTE
25 YEARS
Climate Change
Ecosystems and Natural Resources
Urbanization
Economic Development and Integration
Agriculture and Aquaculture Vulnerability
People Livelihoods and Community Resilience
Intra and Extra Regional Trade
Increased Temperatures, Floods, Droughts, and pH
Investment
Mekong Sustainability and Resilience


02 OVERVIEW OF MEKONG-KOREA COOPERATION WITH EMPHASIS ON GREEN AND RESILIENT DEVELOPMENT
MEKONG INSTITUTE
25 YEARS
Mekong-ROK Cooperation: Plan of Action (POA) 2021-2025, Partnership for People, Prosperity and Peace
Prosperity by Sharing Experience
Agriculture and Rural Development
Infrastructure ICT
People for Inclusive Society
Culture and Tourism
Human Resources Development
Peace for Sustainable Development
Environment Non-traditional Security Challenges

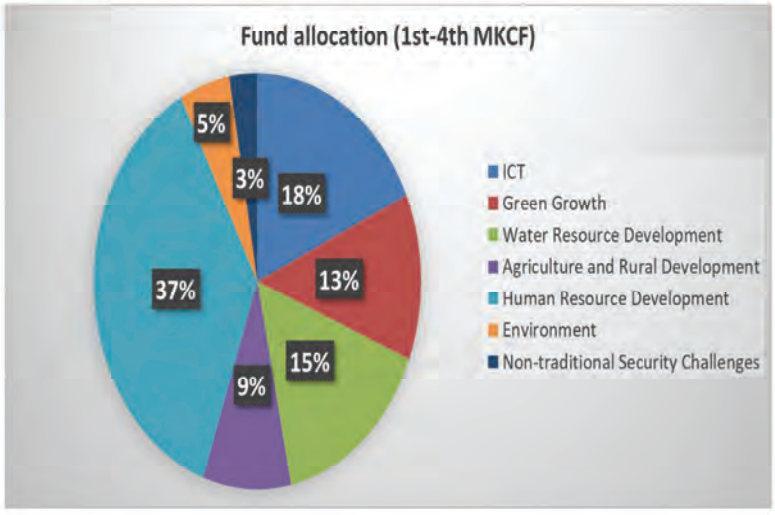
03 | MEKONG-KOREA COOPERATION FUND (MKCF)

MEKONG INSTITUTE 25 YEARS

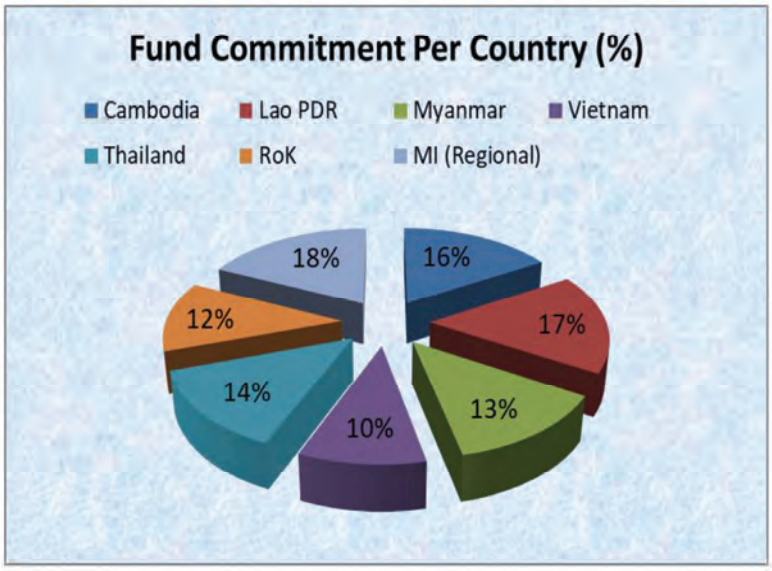
MKCF OPERATION PROGRESS

MKCF Fund Allocation by Area and Priority Sector

MEKONG INSTITUTE 25 YEARS



MKCF Fund Commitment



MKCF projects Status

Country	Completed	Ongoing	Approved*	Total
Cambodia	1	2	1	4
Lao PDR	1	3	0	4
Myanmar	0	3	1	4
Vietnam	2	1	1	4
Thailand	2	2	0	4
RoK	1	1	1	3
Regional (MI)	2	1	0	3
Total	**9**	**13**	**4**	**26**

**Approved by ROK for implementation*

04 | MKCF FUNDED PROJECTS IN SUPPORT OF A MEKONG GREEN AND RESILIENT REGION

MEKONG INSTITUTE 25 YEARS

The MKCF was established in 2013 to encourage and support cooperation in seven priority areas

MEKONG INSTITUTE

For more information

Sustainable Smart Tourism Development in the Mekong Region

Objectives: To introduce smart tourism and sharing economy concept based on more innovative and efficient use of endogenous cultural and natural resources and existing human capital

04 | MKCF FUNDED PROJECTS IN SUPPORT OF A MEKONG GREEN AND RESILIENT REGION

MEKONG INSTITUTE 25 YEARS

Guidelines and Certification for Green Buildings in Cambodia

Objectives: To reduce energy consumption, water consumption, increase more efficient use of natural resources, and make improved living environment.

Master Plan Establishment and Capacity Building for the Modernization and Advancement of Hydro-meteorological Infrastructure at Mekong River Basin in Lao PDR

Objectives: To contribute to the modernization and advancement of national hydro-meteorological services of Lao PDR.

Capacity Enhancement of Wind Energy for Sustainable Rural Development in Myanmar

Objectives: To provide electricity and lighting and alternative energy technology to the rural population of Myanmar.

04 | MKCF FUNDED PROJECTS IN SUPPORT OF A MEKONG GREEN AND RESILIENT REGION

MEKONG INSTITUTE 25 YEARS

Capacity Building on Circular Economy, Resource and Energy Efficiency for Productivity and Sustainability of Cassava Chain to High Value Products

Objectives: To strengthen and sustain the development of the CLMVT region's cassava industry by knowledge and technology transfer as well as promote cooperation between research and industrial work at several levels.

Developing of climate change-related disaster hazard zoning map and enhancing the salinity intrusion monitoring network in Can Tho city

Objectives: Integrating climate change-disaster hazard zoning map and disaster warning map into the city's socio-economic development plans to enhance the effectiveness of climate change responses in the future, contributing to develop disaster hazard zoning map for the Mekong Delta region.

Water Data Utilization and Capacity Building in the Mekong Region

Objectives: To develop and provide a satellite-based disaster analysis capability that produces and utilizes hydrological data to mitigate the water-related disasters such as floods and drought, and build capacity on water data utilization in the Mekong region.

05 | FUTURE DIRECTIONS AND WAYS FORWARD

MEKONG INSTITUTE 25 YEARS

- Greater emphasis on capacity development in advancing policy and initiatives on green and resilient development
- Strengthening implementation and experience sharing on a green and resilient development
- Greater synergies between green and resilient development and broader Mekong-Korea cooperation as well as other Mekong related cooperation frameworks
- Enhance synergies with other RoK supported initiatives i.e. AFoCO, GGGI, etc.

MEKONG INSTITUTE

25 YEARS

mekonginstitute.org mekonginstitute.org MekongInstitute

https://www.mekonginstitute.org/what-we-do/development-fund/mekong-republic-of-korea-cooperation-fund/

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on Ecosystem Restoration for Green and Peace Asia

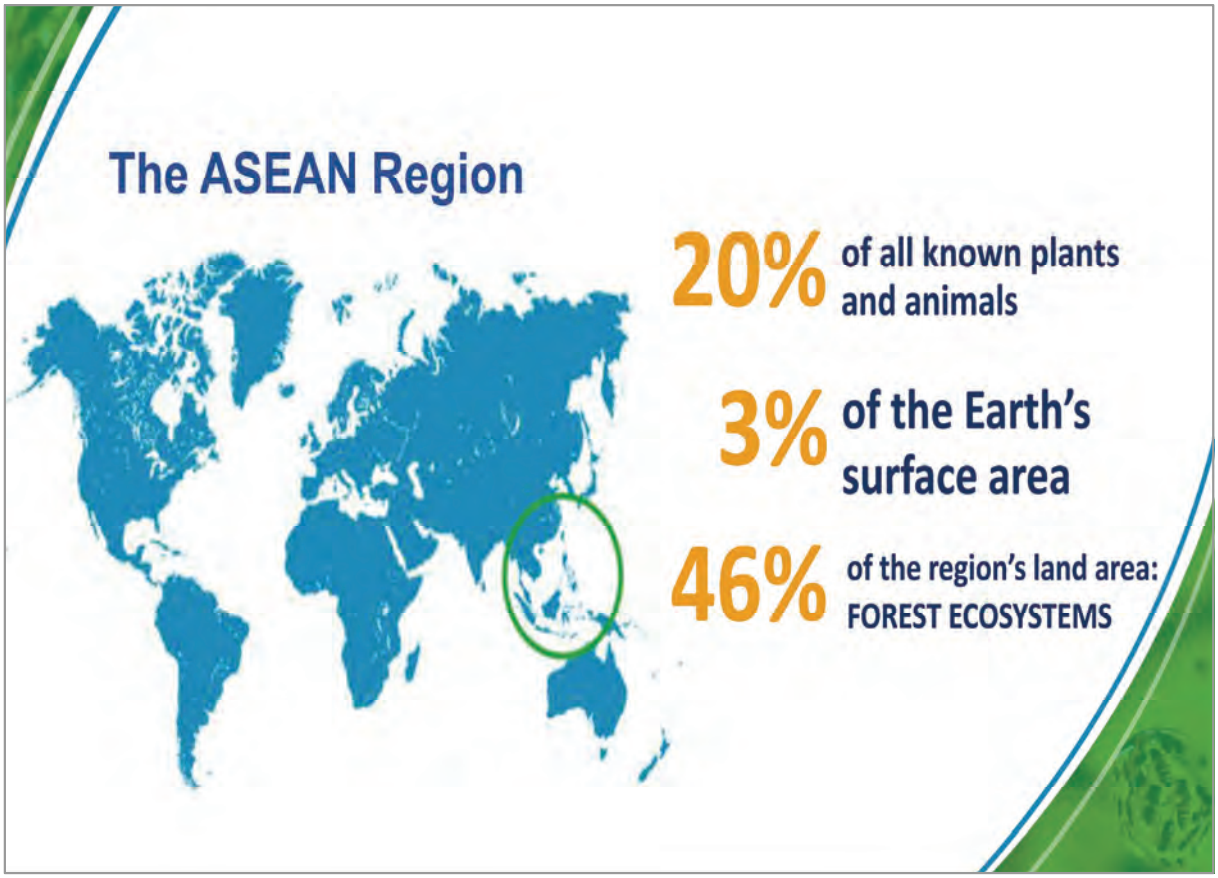
18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

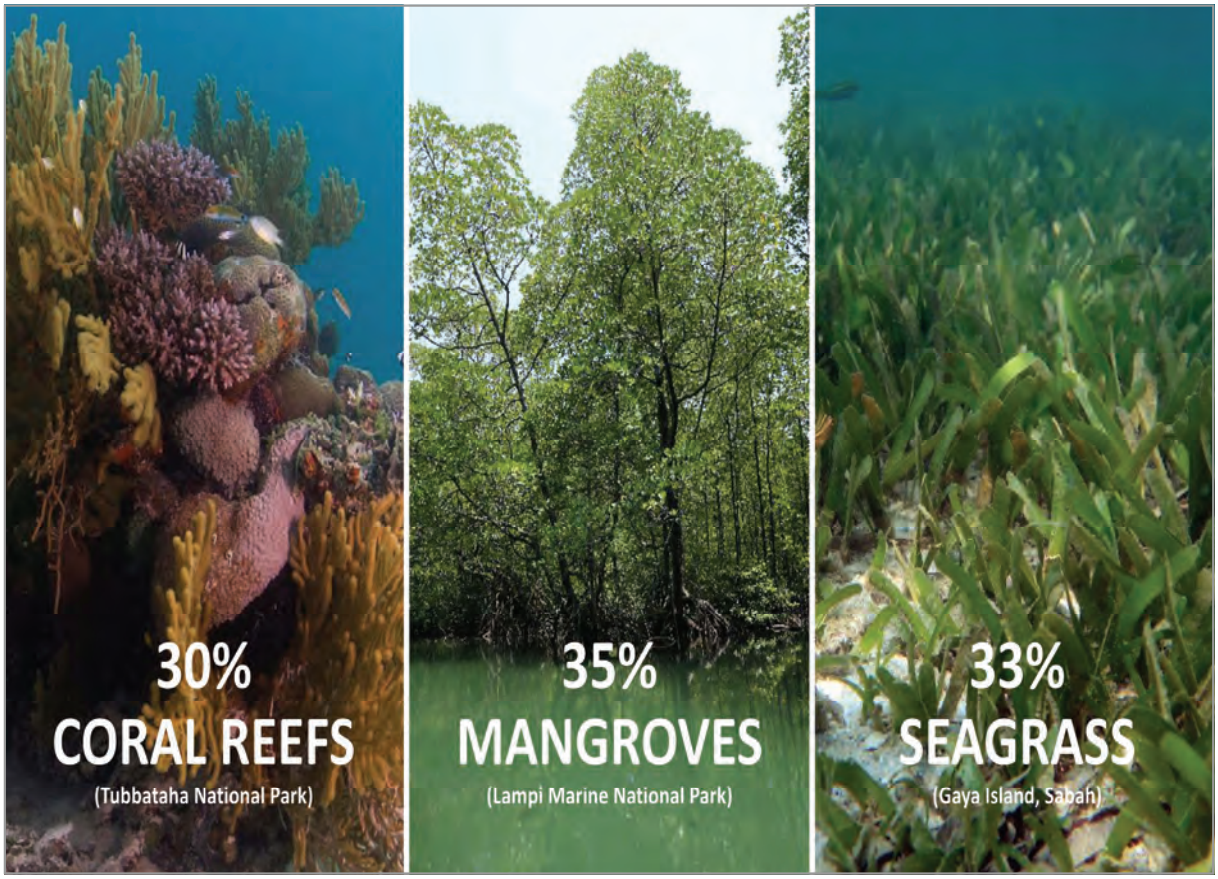
Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Conservation and Sustainable Management of Biodiversity and Ecosystem in ASEAN Region

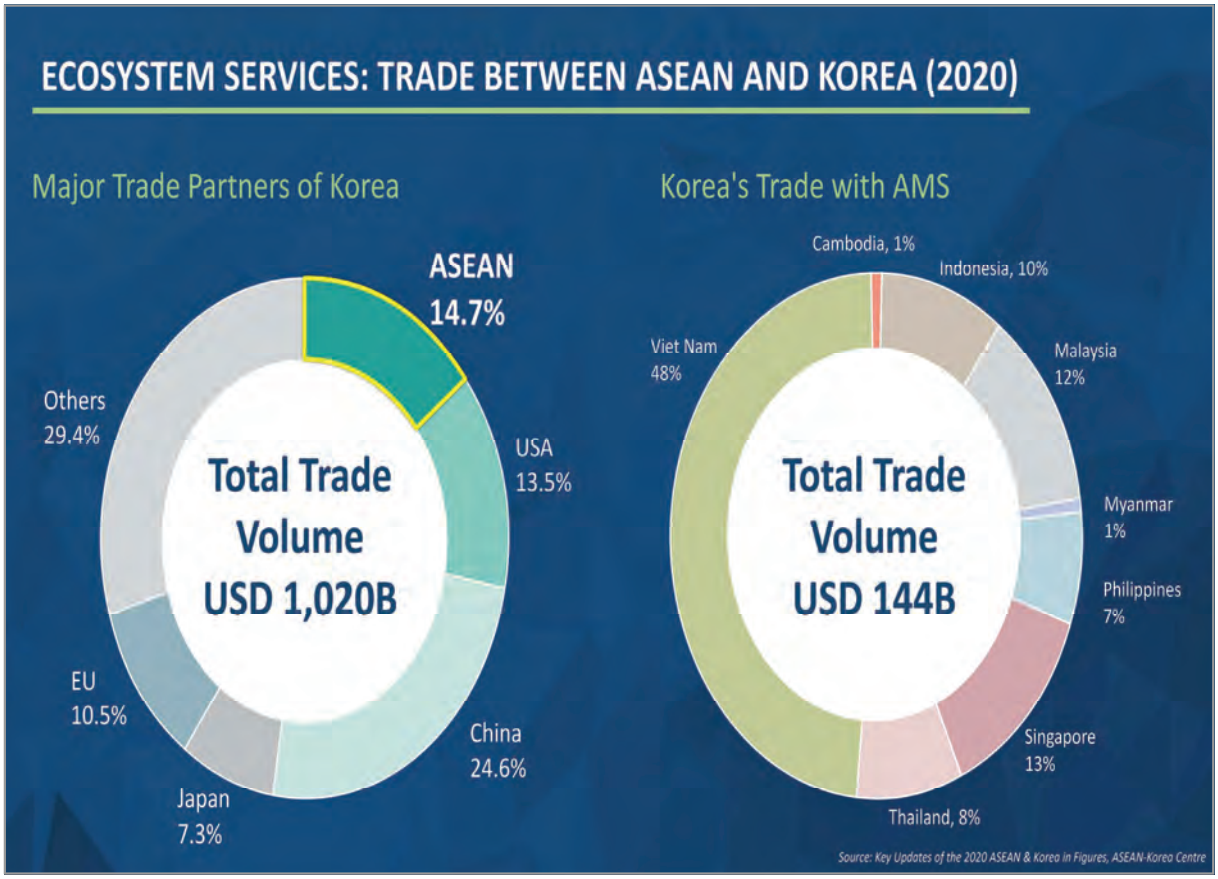
Dr. Theresa Mundita S. Lim
Executive Director, ASEAN Center for Biodiversity (ACB)

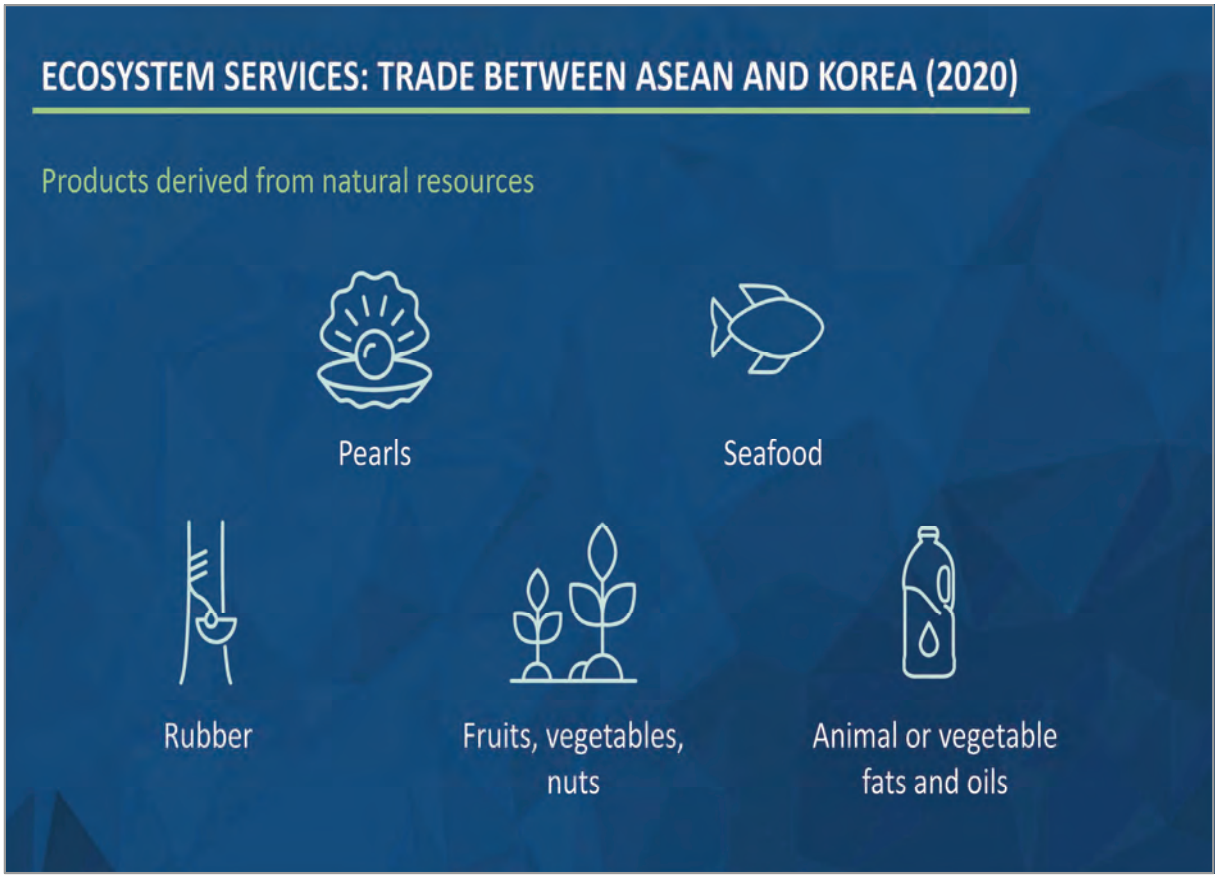

ASEAN CENTRE FOR BIODIVERSITY
asean
Conservation and Sustainable Management of Biodiversity and Ecosystem in the ASEAN Region
Dr. Theresa Mundita S. Lim
Executive Director
ASEAN Centre for Biodiversity
Photo: Ali Nazri Bin Ali Osman

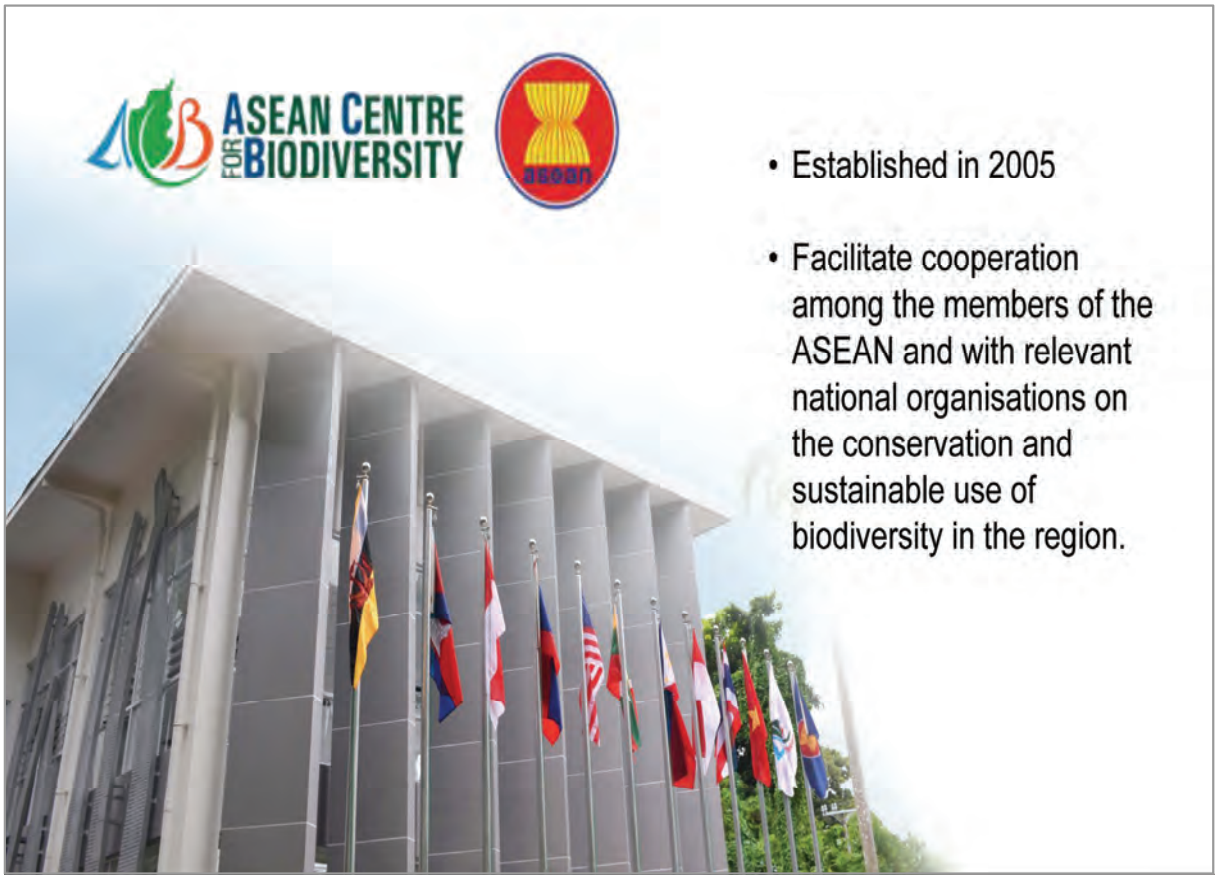

The ASEAN Region
20% of all known plants and animals
3% of the Earth's surface area
46% of the region's land area: FOREST ECOSYSTEMS


30%
CORAL REEFS
(Tubbataha National Park)
35%
MANGROVES
(Lampi Marine National Park)
33%
SEAGRASS
(Gaya Island, Sabah)


ECOSYSTEM SERVICES
≈52%
Population living in rural areas
Community near Lampi Marine National Park, Myanmar
Farmer from Terengganu, Malaysia
Villager from Sa Pa district, Viet Nam


ECOSYSTEM SERVICES: TRADE BETWEEN ASEAN AND KOREA (2020)
Major Trade Partners of Korea
ASEAN 14.7%
USA 13.5%
China 24.6%
Japan 7.3%
EU 10.5%
Others 29.4%
Total Trade Volume USD 1,020B
Korea's Trade with AMS
Cambodia, 1%
Indonesia, 10%
Malaysia 12%
Myanmar 1%
Philippines 7%
Singapore 13%
Thailand, 8%
Viet Nam 48%
Total Trade Volume USD 144B
Source: Key Updates of the 2020 ASEAN & Korea in Figures, ASEAN-Korea Centre


ECOSYSTEM SERVICES: TRADE BETWEEN ASEAN AND KOREA (2020)
Products derived from natural resources
Pearls
Seafood
Rubber
Fruits, vegetables, nuts
Animal or vegetable fats and oils

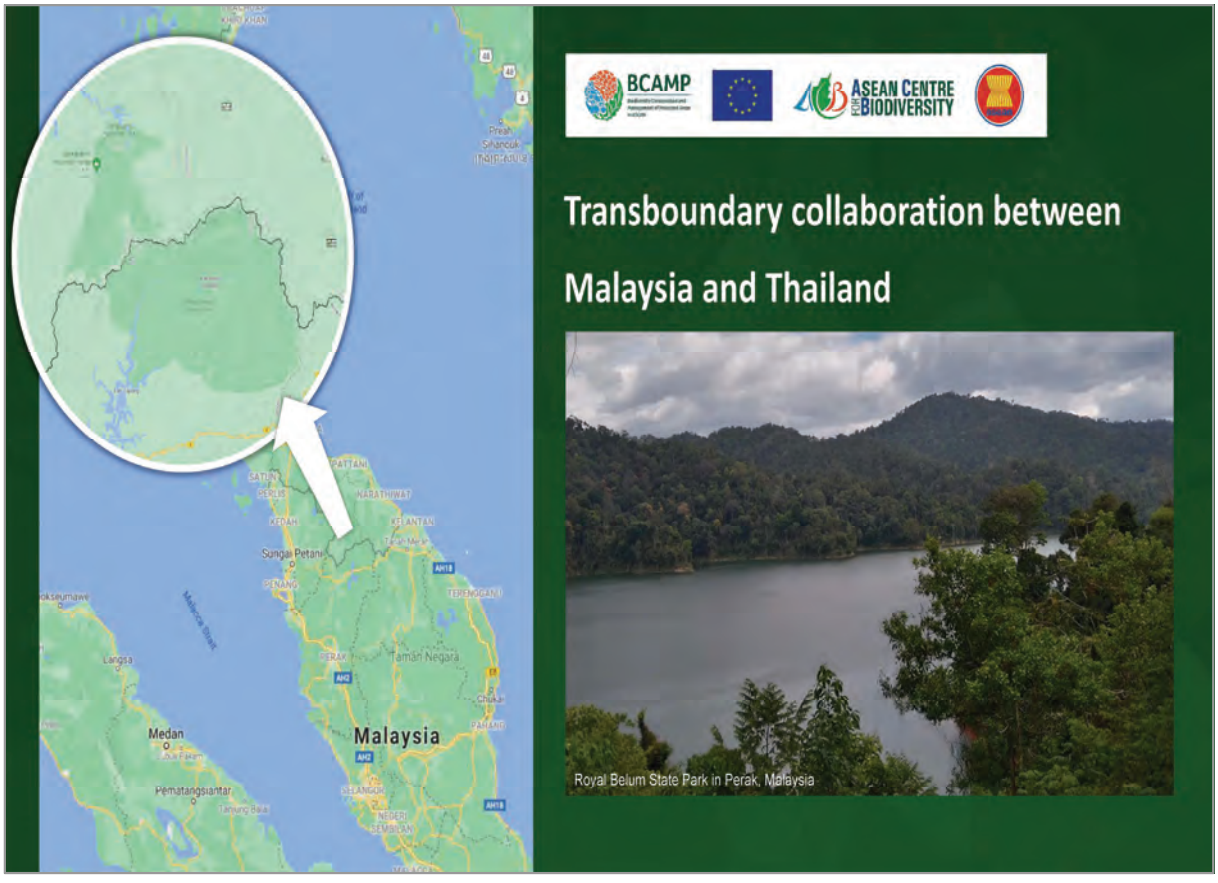

ASEAN CENTRE FOR BIODIVERSITY
asean
• Established in 2005
• Facilitate cooperation among the members of the ASEAN and with relevant national organisations on the conservation and sustainable use of biodiversity in the region.


Tasek Merimbun National Park, Brunei Darussalam
Virachey National Park, Cambodia
ASEAN HERITAGE PARKS
Gunung Leuser National Park, Indonesia
Nam Ha National Protected Area, Lao PDR


ASEAN
HERITAGE
PARKS
Hkakaborazi National Park, Myanmar
Tubbataha Reefs Natural Park, Philippines
Toomy Schultz

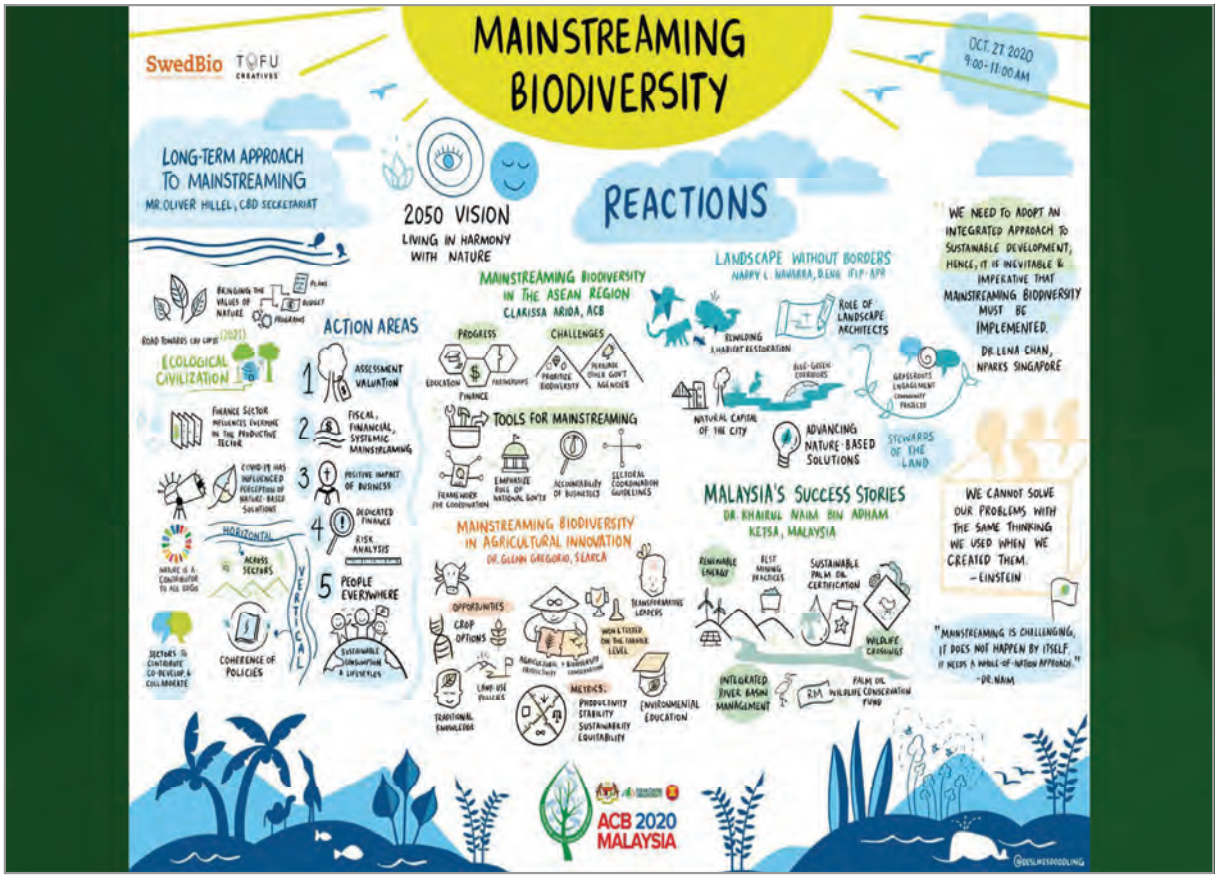

ASEAN
HERITAGE
PARKS
Sungei Buloh Wetland Reserve, Singapore
Khao Sok National Park, Thailand
DNP Thailand


Bamboo furniture production, Lao PDR
Experiential Learning Programme for Park Managers
ASEAN HERITAGE PARKS
Training Needs Assessment, Viet Nam
Seminar on black ginger production, Cambodia


BCAMP
ASEAN CENTRE FOR BIODIVERSITY
Transboundary collaboration between
Malaysia and Thailand
Malaysia
Medan
Pematangsiantar
Royal Belum State Park in Perak, Malaysia

Virtual Session on Business and Biodiversity

Policy brief on Biodiversity & Ecosystem Service Assessment



GREEN GROWTH

Webinar Series on the Economics of Biodiversity:
Dasgupta Review
First Session - 27 April 2021

GREEN GROWTH

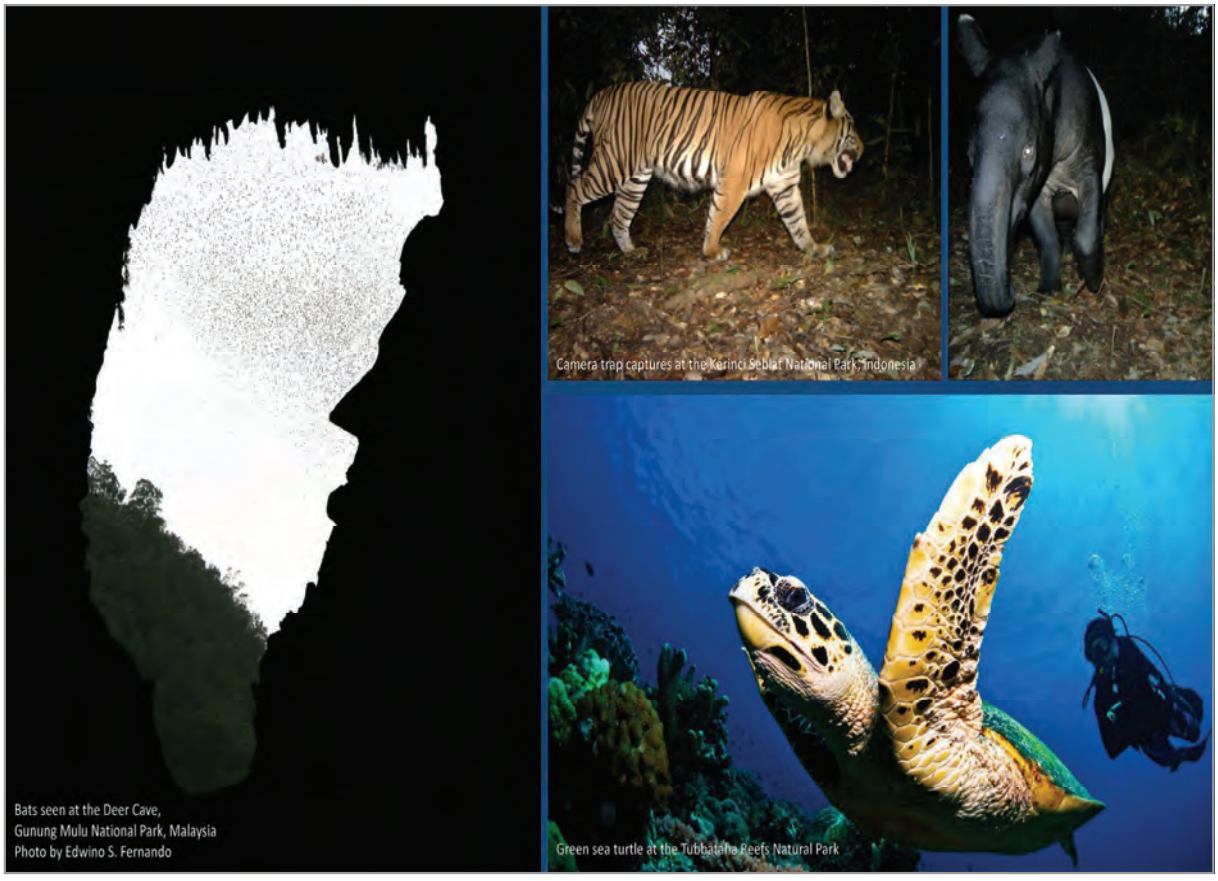
TOP
ASEAN-India Workshop on Urban Biodiversity and Application of the City Biodiversity Index
September 2019

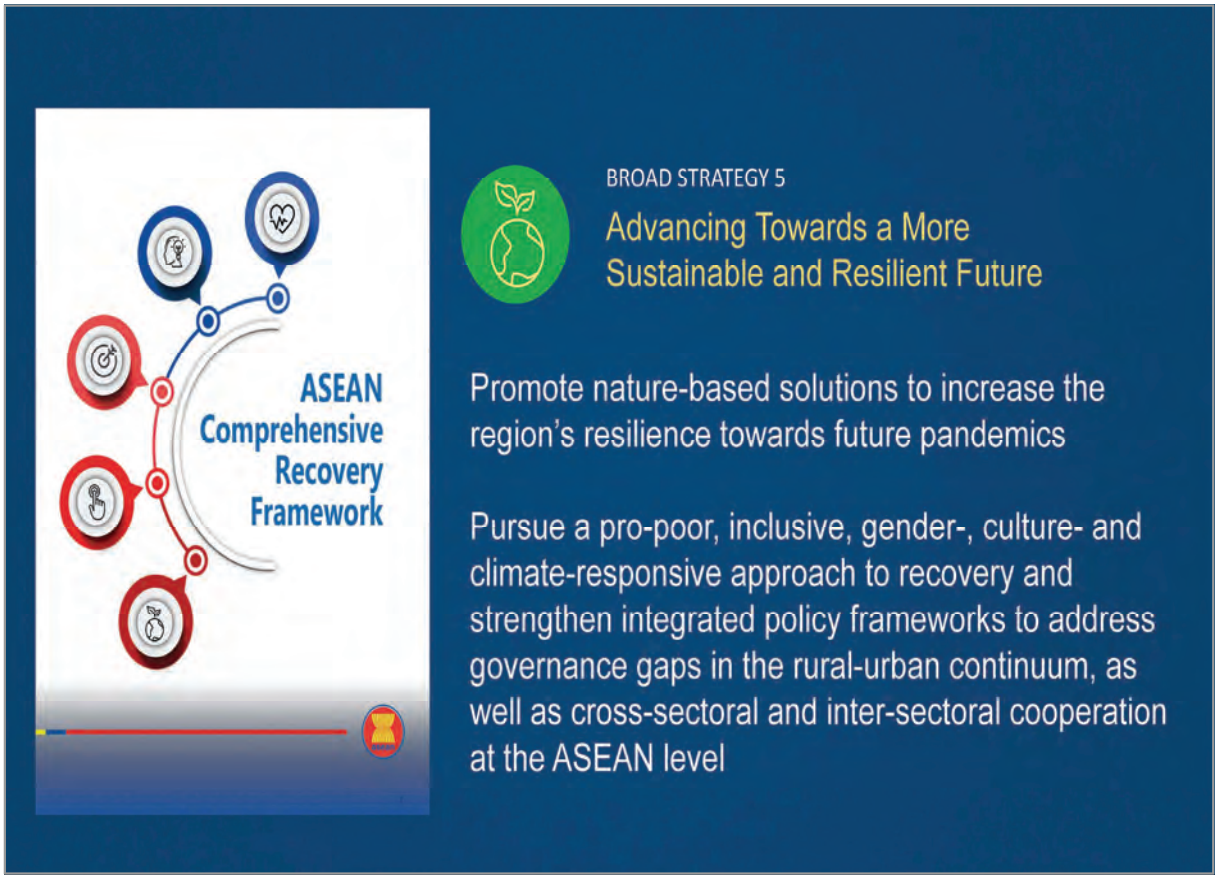
BOTTOM
Workshop on the Review of the Singapore Index on Cities' Biodiversity
October 2019

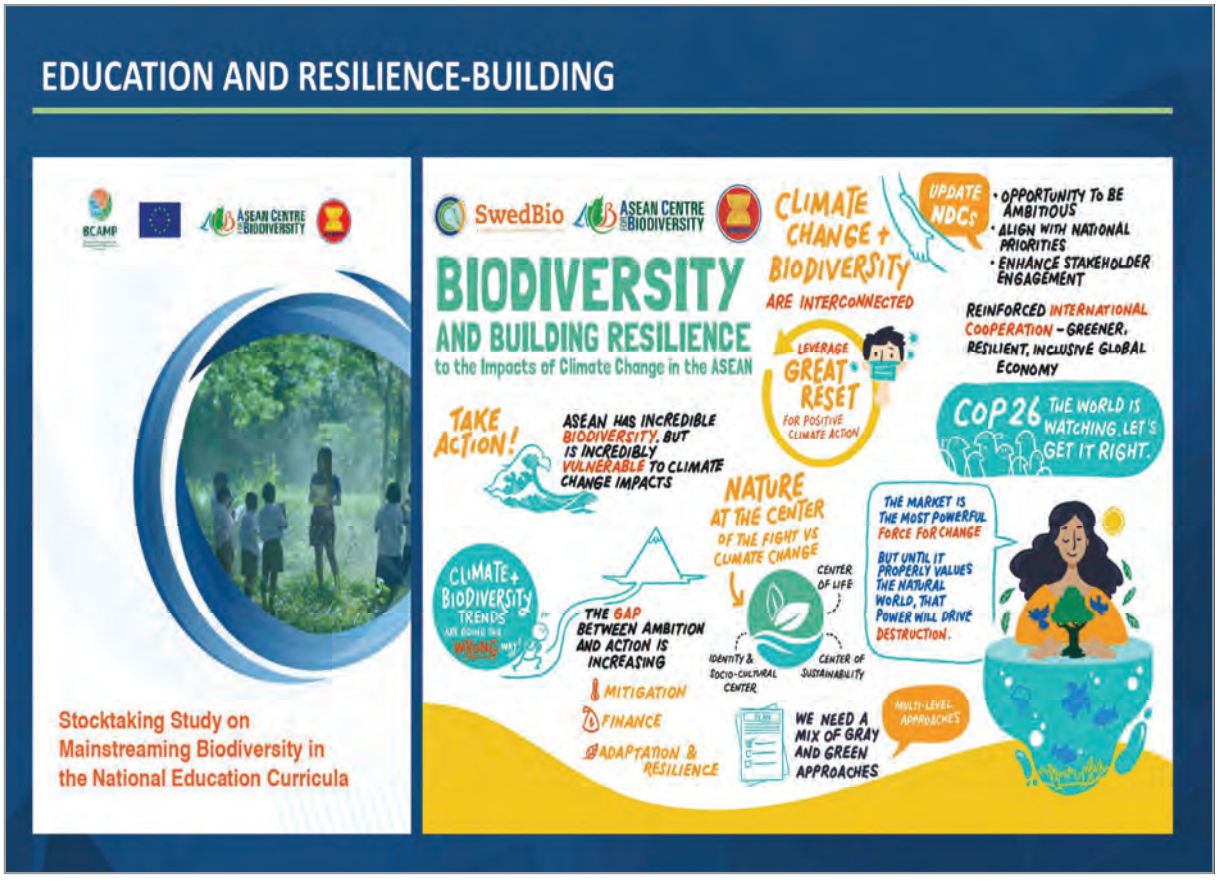

GREEN GROWTH
IFLA-APR Congress 2019
Commons Sense: Linking the Commons and Engaging Communities in Sustainable Development
November 2019


ECOTOURISM AND ENVIRONMENTAL PROTECTION
AHPs that are also UNESCO World Heritage Sites
Lorentz National Park, Indonesia
Gunung Mulu National Park, Malaysia
Kinabalu National Park, Malaysia
Tubbataha Reefs Natural Park, Philippines
Mt. Hamiguitan Range Wildlife Sanctuary, Philippines
Kaeng Krachan Forest Complex, Thailand


Anthropogenic drivers of zoonotic diseases
United Nations Environment Programme and International Livestock Research Institute, 2020
Increasing demand for animal protein
Increased use and exploitation of wildlife
Unsustainable utilisation of natural resources
Changes in food supply chains
Unsustainable agricultural intensification
Travel and transportation
Climate change


Bats seen at the Deer Cave,
Gunung Mulu National Park, Malaysia
Photo by Edwino S. Fernando
Camera trap captures at the Kerinci Seblat National Park, Indonesia
Green sea turtle at the Tubbataha Reefs Natural Park


ASEAN Comprehensive Recovery Framework
BROAD STRATEGY 5
Advancing Towards a More Sustainable and Resilient Future
Promote nature-based solutions to increase the region's resilience towards future pandemics
Pursue a pro-poor, inclusive, gender-, culture- and climate-responsive approach to recovery and strengthen integrated policy frameworks to address governance gaps in the rural-urban continuum, as well as cross-sectoral and inter-sectoral cooperation at the ASEAN level


EDUCATION AND RESILIENCE-BUILDING
Stocktaking Study on Mainstreaming Biodiversity in the National Education Curricula
SwedBio
ASEAN CENTRE FOR BIODIVERSITY
BIODIVERSITY AND BUILDING RESILIENCE to the Impacts of Climate Change in the ASEAN
CLIMATE CHANGE + BIODIVERSITY ARE INTERCONNECTED
UPDATE NDCs
• OPPORTUNITY TO BE AMBITIOUS
• ALIGN WITH NATIONAL PRIORITIES
• ENHANCE STAKEHOLDER ENGAGEMENT
REINFORCED INTERNATIONAL COOPERATION – GREENER, RESILIENT, INCLUSIVE GLOBAL ECONOMY
LEVERAGE GREAT RESET FOR POSITIVE CLIMATE ACTION
COP26 THE WORLD IS WATCHING. LET'S GET IT RIGHT.
TAKE ACTION!
ASEAN HAS INCREDIBLE BIODIVERSITY. BUT IS INCREDIBLY VULNERABLE TO CLIMATE CHANGE IMPACTS
NATURE AT THE CENTER OF THE FIGHT VS CLIMATE CHANGE
CENTER OF LIFE
IDENTITY & SOCIO-CULTURAL CENTER
CENTER OF SUSTAINABILITY
THE MARKET IS THE MOST POWERFUL FORCE FOR CHANGE
BUT UNTIL IT PROPERLY VALUES THE NATURAL WORLD, THAT POWER WILL DRIVE DESTRUCTION.
CLIMATE + BIODIVERSITY TRENDS ARE GOING THE WRONG WAY
THE GAP BETWEEN AMBITION AND ACTION IS INCREASING
MITIGATION
FINANCE
ADAPTATION & RESILIENCE
WE NEED A MIX OF GRAY AND GREEN APPROACHES
MULTI-LEVEL APPROACHES

EDUCATION AND RESILIENCE-BUILDING

Mangrove forest
Meinmhala Kyun Wildlife Sanctuary, Myanmar

Dipterocarp forest
Mt. Hamiguitan Range Wildlife Sanctuary
Philippines

Dipterocarp forest
Lo Go-Xa Mat National Park, Viet Nam

ASEAN GREEN INITIATIVE

- Region-wide recognition programme
- Supports national greening initiatives
- Shares the common aim of increasing tree cover and restoring ecosystems
- Encourages the active participation of various sectors.


ASEAN
GREEN
INITIATIVE
LAUNCH
6 August 2021 * 14:00 (GMT+8)
ECOSYSTEM
RESTORATION
giz
ASEAN CENTRE
BIODIVERSITY
MOHD RIDZUW...


ASEAN
GREEN
INITIATIVE
At least 10 million native trees
across 10 ASEAN Member States
in a span of 10 years


2nd ASEAN Flyway
Collaboration
and cooperation
for biodiversity
Welcome
LA MESA NATURE RESERVE
Norwegian Wood


AKECOP
ASEAN CENTRE FOR BIODIVERSITY
Exploratory
Meeting on
Cooperation
between the
ACB and
AKECOP
2012


AKECOP
ASEAN CENTRE FOR BIODIVERSITY
Short-term Training Course on Tropical Ecosystem Resilience and Services
2014


#WeAreASEANBiodiversity
OUR HOME • OUR LIVES • OUR STORIES
#BiodiversityDay #ForNature

https://www.youtube.com/watch?v=nqQECk86zz0

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on
Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

International Cooperation on Forest Initiated by Korea

Dr. Eun Sik Park
Director General, Korea Forest Service, Republic of Korea


2021 International Symposium on Ecosystem Restoration for Green and Peace Asia
Aug.8, 2021
International Cooperation on Forest Initiated by Korea
Dr. Eun Sik Park
WFC 2021
산림청
Korea Forest Service


Contents
1 International Forest Trend
2 Cooperation with International organizations
3 Bilateral Cooperation
4 Peace Forest Initiative(PFI)
5 World Forestry Congress(WFC)
2


1. International Trend in Forest
3


World Forest & Climate Change
THE WORLD'S FORESTS
31% OF TOTAL LAND AREA
4.06 BILLION HECTARES
FORESTS, BIODIVERSITY AND PEOPLE
SOFO 2020
FORESTS: KEY TO A SUCCESSFUL PARIS AGREEMENT
INCLUDE FORESTS
INCREASE FINANCE
STRENGTHEN COMMITMENTS
FOREST AND CLIMATE PROGRAMME
4


'One trillion trees'
Davos launched plan to help nature and the climate
THE TRILLION TREES PROGRAMME
THERE WERE ONCE
6 TRILLION
TREES ON OUR PLANET
TODAY THERE ARE ONLY
3 TRILLION
IN FACT, WE ARE LOSING
10 BILLION
TREES PER YEAR
THE TRILLION TREES VISION IS FOR GLOBAL SOCIETY TO REVERSE THIS TREND BY 2050 BY RESTORING AND BETTER PROTECTING ONE TRILLION TREES
360 BILLION
NEW TREES THROUGH FOREST RESTORATION
170 BILLION
TREES SAVED THROUGH AVOIDED DEFORESTATION
470 BILLION
TREES BETTER PROTECTED IN FOREST LANDSCAPES
5


International Cooperation of Korea Forest Service
Convention on Biological Diversity
United Nations
IUCN
P4G
CIFOR
AFoCO
United Nations FORUM ON FORESTS
ITTO
IUFRO
CENTRAL AFRICAN FOREST INITIATIVE
GGGI
THE WORLD BANK
International Organization Partnership
Multilateral Cooperation
Bilateral Cooperation
ODA Project
REDD+ Project
6

2. Cooperation with International organizations

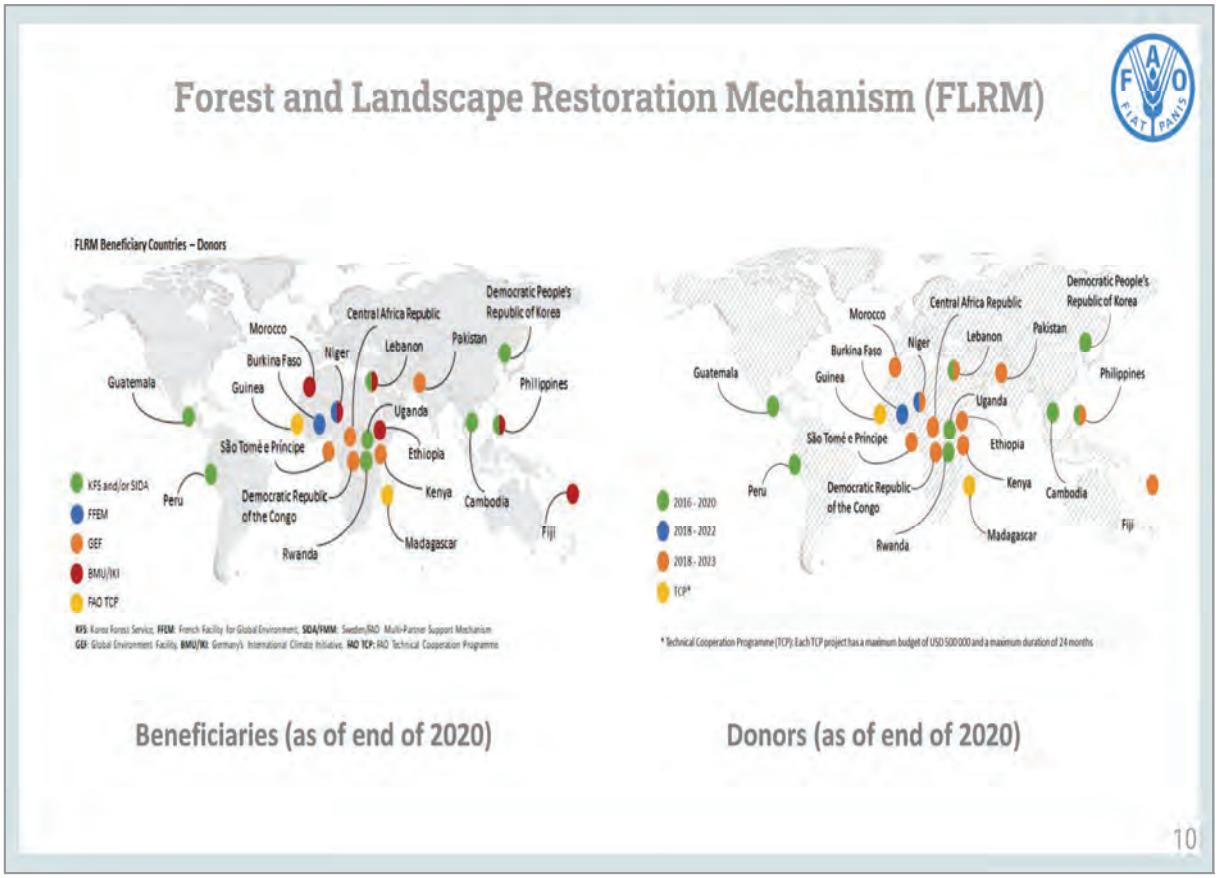
7

Forest and Landscape Restoration Mechanism (FLRM)

- **Period: 1st phase: 2014–2020, 2nd : 2021–2025**
  - 650 million KRW for 2020 and 7.5 billion KRW in total
- **Objective**
  - Achieving the global forest goals such as UN Decade on Ecosystem Restoration, Bonn Challenge, and SDGs through sharing Korea's successful experiences in erosion control and greening, and supporting forest and landscape restoration
- **Activities**
  - Contributing to development of international restoration goals through global partners
  - Monitoring, Reporting and Verification (MRV) of national forest and landscape restoration
  - Holding annual meeting of FLRM Advisory Group to take opinions from each country

8


Forest and Landscape Restoration Mechanism (FLRM)
Country Participation: 8 countries in 2017 and total 25 countries in 2021
The Philippines, Cambodia, Lebanon, Rwanda, Uganda, Peru, Burkina Faso, Morocco, etc.
Based on Korea's seed funding in 2014, funds of SIDA (Sweden), FFEM (France), IKI (Germany), and GEF were added.
Budget: 6.6 million USD in 2017 and accumulated to 64.6 million USD in 2020
Contribution to global forest restoration with additional funding for developing countries
Most successful forest projects as its importance were acknowledged by the international community
9


Forest and Landscape Restoration Mechanism (FLRM)
FLRM Beneficiary Countries – Donors
Morocco
Central Africa Republic
Democratic People's Republic of Korea
Burkina Faso
Niger
Lebanon
Pakistan
Guatemala
Guinea
Philippines
Uganda
São Tomé e Príncipe
Ethiopia
KFS and/or SIDA
Peru
Democratic Republic of the Congo
Kenya
Cambodia
FFEM
GEF
Madagascar
Fiji
BMU/IKI
Rwanda
FAO TCP
2016 - 2020
2018 - 2022
2018 - 2023
TCP*
Beneficiaries (as of end of 2020)
Donors (as of end of 2020)
10

Activities in FLRM

1 Annual meeting of FLRM Advisory Group

3 Agroforestry project site (Peru)

2 Rock terrace restoration (Lebanon)

4 Publication of Guatemala's national FLR strategy

11

Forest Ecosystem Restoration Initiative (FERI)

- **Period for 1st phase: 2015 – 2020 and 2nd phase: 2021 – 2025**
  - KFS contributed 460 million KRW in 2021, and 5.3 billion KRW in total.
- **Objective**
  - Achieving the global forest goals such as UN Decade on Ecosystem Restoration and Post-2020 Global Biodiversity Framework by promoting forest ecosystem restoration through capacity-building and technological cooperation with developing countries
- **Activities**
  - Holding global and regional workshops for strengthening the restoration capacity
  - Direct supporting for restoration in 11 developing countries and establishing support platform
  - Expanding networks, e.g., side events of major international conferences (CBD COP, etc.)

12

Forest Ecosystem Restoration Initiative (FERI)

- FERI was included as the only global initiative on forest sector in the CBD Decision.
- FERI has supported for seven capacity-building workshops by continents and 11 developing countries' activities for ecosystem restoration.
- The CBD Executive Secretary officially announced outcomes of FERI on the CBD website and wanted the KFS for continuous cooperation (Apr. 2021).

13

Activities in FERI

CBD COP14 Decision (Nov 2018)
(FERI, a technical and scientific cooperation program for developing countries)

CBD

Convention on Biological Diversity

Executive Secretary attended in FERI event at CBD SBSTTA (Nov 2019)

CBD's official announcement of FERI's outcomes and plans (Apr 2021)

NOTIFICATION

14

FERI Activties

① <Regional capacity-building workshops>
(from left) The Pacific, Southeast Asia, South America, and Africa regions

② <Direct support projects for ecosystem restoration >
(from left) Oak forest restoration (Bhutan), Rainforests of the Atsinanana restoration (Madagascar), restoration technology transfer (Peru), restoration project (Sahel)

15

Changwon Initiative

- **Objective**
  - Supporting the effective implementation of the decisions of UN Convention to Combat Desertification (UNCCD) and Desertification, Land Degradation, and Drought (DLDD)
- **Period: 2012~Present (USD 1.3M has been contributed for 2021)**
- **Activities:**
  - Enhancing the scientific process of the UNCCD through improving science-policy interactions (Science Policy Inter-linkage), research and advocacy for land degradation neutrality (LDN), supporting LDN implementation, developing a global policy on sand and dust storms (SDS)
  - Building Greening Drylands Partnership (GDP)
  - Promoting good sustainable land management practices through the Global Land Outlook (GLO) and other communication materials

16

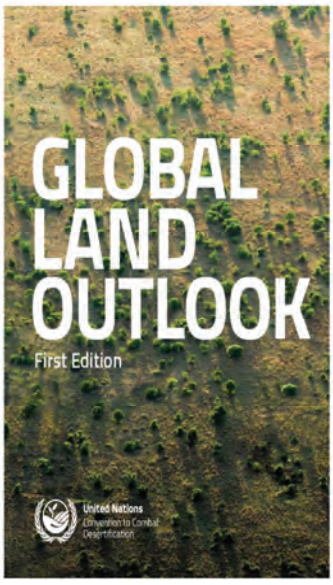
Changwon Initiative

- **Supported the development and testing of the LDN concept and contributed greatly to the adoption of SDG Target 15.3**
  - Performed a vital role in the adoption of the SDG target 15.3 on LDN.
- **Developed global partnerships for combating DLDD by supporting Greening Drylands Partnership (GDP)**
  - The initiative has supported 12 countries in restoring degraded lands and forests as well as improving people's livelihoods through GDP.
- **Helped develop a global sand and dust storms (SDS) policy framework**
  - Decision on SDS policy advocacy framework adopted by the UNCCD in Sept. 2017, SDS was adopted on the UN agenda, etc.

17

Activities in FLRM

1 GLO Report



2 GDP Project: peatland restoration in Belarus

GDP Project: agroforestry in Benin

3

18


3. Bilateral Cooperation
19


Korea has Bilateral Cooperation Partnership with 33 countries.
Canada
Russia
Kazakhstan
Mongolia
Turkmenistan
Kyrgyzstan
Austria
Uzbekistan
Tajikistan
China
Japan
Tunisia
Moroco
Algeria
Iran
Myanmar
Viet Nam
Lao PDR
Philippines
Cambodia
Dominican Republic
Benin
Ethiopia
Ecuador
Indonesia
Brazil
Paraguay
Chile
Uruguay
Argentina
Australia
New Zealand
20

Korea-Mongolia Greenbelt Plantation Project

- **Project Period: 2007 ~ 2026**
  - 1st phase: 2007~2016 2nd phase: 2017~2021, 3rd phase : 2022~2026
  - Budget for 1st phase: USD 12M, and for 2nd phase: USD 8.8M
- **Activities**
  - 1st phase: Planting trees in 3,046 ha of forests, establishing tree nurseries and joint research
  - 2nd phase : Creating an urban forest, transferring the forest plantations to the Mongolian government, capacity building for post-project management
  - 3rd Phase : Forest fire management, forest restoration, agroforestry
- **The project increased public awareness of the value of planting trees in Mongolia**

21

Activities of Greenbelt Project in Mongolia

Forest plantation

Tree nursery

Forest plantation technology center

22

Forest Plantation Project in Kubuqi, China

- **Project Period: 2007~Present**
  - Budget: USD 4.4M
- **Activities:**
  - Planting around 4 million trees to combat desertification
  - Installing facilities for fixing sand dunes, monitoring, etc.
- **Outcomes:**
  - Prevented the expansion of desertification
  - Improved the livelihood of local communities
  - Mitigated the effects of sand and dust storms in Northeast Asia

23

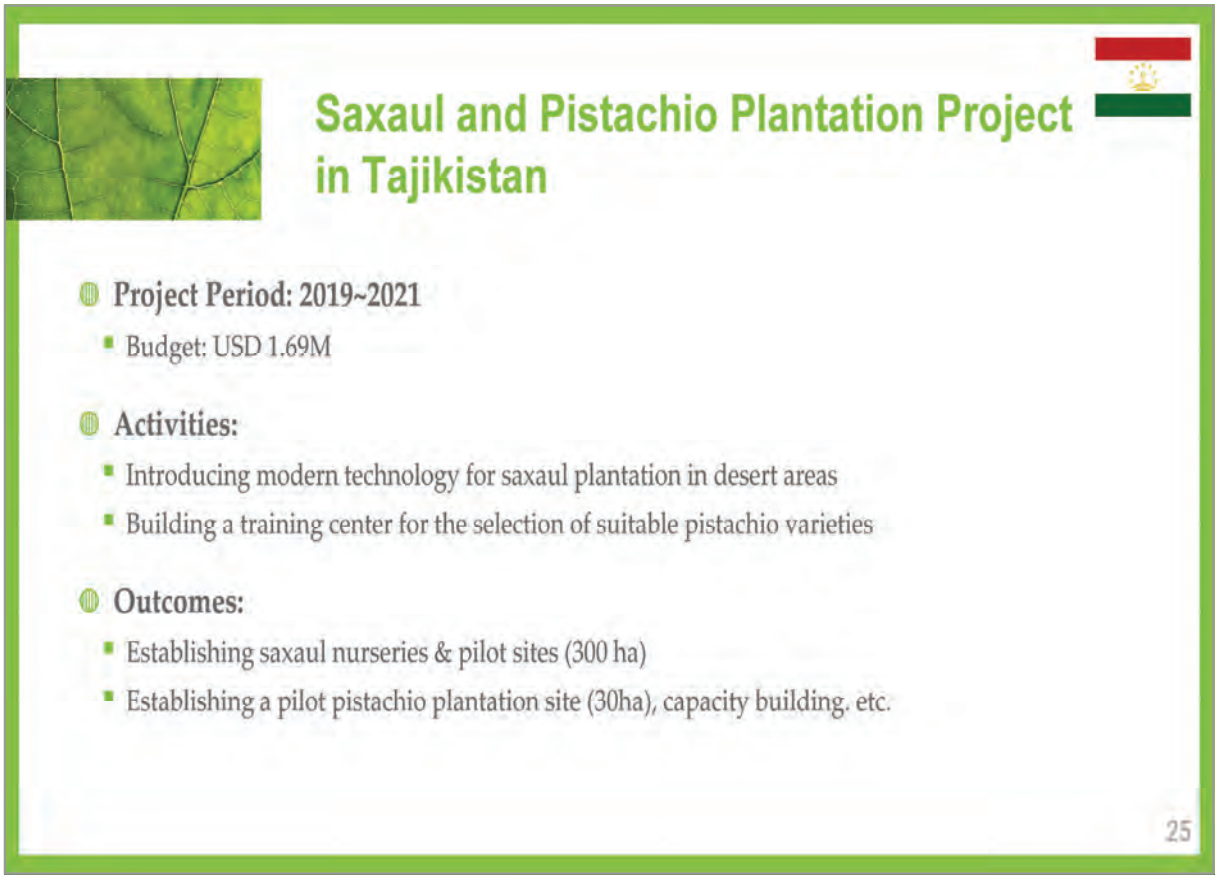
Changes of Kubuqi Forest Plantation Project Site in China

Right after planting trees

4 years after planting trees

10 years after planting trees

24


Saxaul and Pistachio Plantation Project in Tajikistan
Project Period: 2019~2021
Budget: USD 1.69M
Activities:
Introducing modern technology for saxaul plantation in desert areas
Building a training center for the selection of suitable pistachio varieties
Outcomes:
Establishing saxaul nurseries & pilot sites (300 ha)
Establishing a pilot pistachio plantation site (30ha), capacity building. etc.
25


Saxaul and Pistachio Plantation Project in Tajikistan
Pistachio plantation site
Pilot Saxaul plantation
Preparation for the project
26


Rehabilitation of Mangrove Forests in Vietnam
Project Period: 2020~2024
Project Location: Nam Dinh and Ninh Binh provinces
Budget: USD 37.92M
Activities:
Mangrove forest rehabilitation and management, and livelihood development
The first convergence project between forestry and fishery
Mangrove forest rehabilitation (Korea Forest Service)
Aquaculture of shrimp and clamp (Ministry of Oceans and Fisheries of ROK)
27


Rehabilitation of Mangrove Forests in Vietnam
Mangrove forests degraded by aquaculture
Mangrove forest restoration
Technical support for aquaculture
28


Forest Cooperation in Mekong Region
Project Period: 2016~Present
The project covers the Mekong countries (Cambodia, Myanmar, Laos and Viet Nam)
Budget: USD 3.76M (2021-2024) for creating forests for recreation and ecotourism purposes in Cambodia
Projects are controlled by Korea-Mekong Forest Cooperation Center (KMFCC)
Activities:
Developing and implementing forest cooperation projects in the Mekong countries
Supporting cooperation between Korean companies and the Mekong countries
Supporting sustainable forest management and livelihood development in the Mekong countries through forest restoration, ecotourism, and etc.
29


Forest Cooperation in Mekong Region
Korea-Mekong Forest Cooperation Center
Project on Establishment of Recreational Forest In Cambodia
30

Forest cooperation project in Turkmenistan

- **Project Period: 2023 ~2027**
  - Budget: 3.6M USD (2-year pilot project + scale-up)
- **The purpose of the project is to restore the deforested areas and generate the income for local people.**
  - The project was developed as a follow-up to the MOU signed during the Korea-Turkmenistan Summit in 2019
- **Activities:**
  - Planting 300 ha of trees to combat desertification
  - Planting 50 ha of pistachio trees
  - Establishing tree nurseries and a training center

31

Forest cooperation project in Turkmenistan

Pilot Saxaul plantation

Pistachio plantation site

32

4. Peace Forest Initiative

33

PEACE

LDN
Land Degradation Neutrality
Target Setting Programme

15 LIFE ON LAND

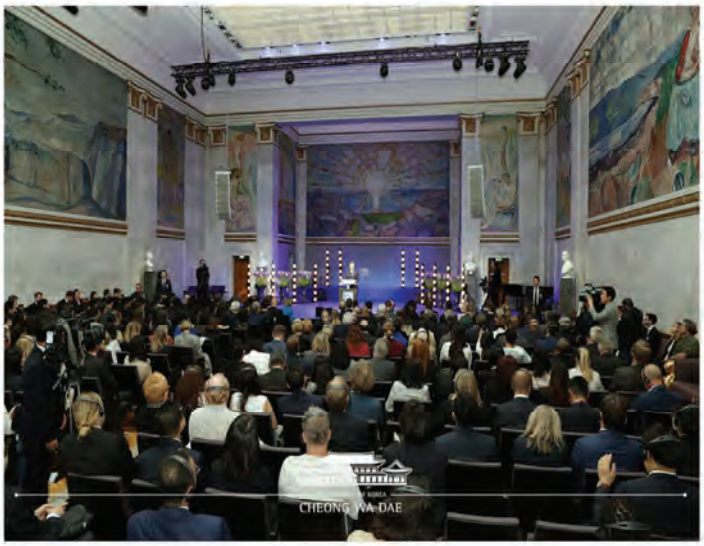
The Peace Forest Initiative (PFI)

is a global initiative serving as a partnership framework with a focus on land degradation neutrality (LDN) in fragile and conflict-affected regions.

The overall objective is to promote peace and build trust between neighboring countries through trans-boundary cooperation in sustainable land management, including forest.

34

'Peace for the People,' address by President MOON, Jae-in of ROK



President Moon proposed *'Peace for the People'* which emphasizes "a positive peace that changes everyday life" and *"a peace that contributes to resolving disputes and conflicts between neighboring countries."*

The president also mentioned the 'Permanent Legations' case laid out in the German Basic Treaty of 1972, which made swift and joint responses to fires(wildfires), floods, landslides, infectious diseases(forest pest), insect damage and water contamination occurring in border areas.

35

Examples of the Cooperation similar to PFI

GrünesBand Deutschland

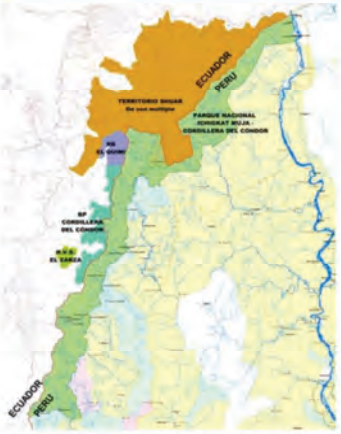
36

Examples of the Cooperation similar to PFI

Joint LDN target setting between Georgia-Armenia-Azerbaijan

Pantanal between Brazil-Paraguay-Bolivia

Cordillera del Cóndor Peace Park between Ecuador-Peru



37

PFI Contributes to the SDGs

SUSTAINABLE DEVELOPMENT GOALS

17. Partnership
Neighboring countries

16. Peace
Goal of the PFI

15. Life of Land
Land Degradation Neutrality and more

13. Climate Action
Carbon sink, REDD+ & Biodiversity

2. Zero Hunger
Agro-forestry

3. Well-Being
Forest recreation etc.

6. Clean Water
Watershed
forest management

7. Clean Energy
Woody biomass

38

Launching the Peace Forest Initiative

- **The PFI was reflected in the UNCCD COP 14 Decision (Sep 2-13, 2019, India).**
  - After being announced at the COP 14 High-level Session with officials from over 60 countries, it was included in the 'New Delhi Declaration' and the 'COP14 decision' as a key outcome.
  - The PFI secured the Co-Chairs' Statement of the ASEAN-ROK Commemorative Summit along with supports from home and abroad (Oct 26, 2019).
  - The PFI was mentioned in address of the ROK's President Moon at the P4G Summit (Sep 23, 2019).

39

Development of the Peace Forest Initiative

- **The PFI and relevant projects were introduced to member states of AFoCO and CAFI, and international organizations (July 20 and Sep 4, 2020).**
  - The PFI Round Table was held, inviting embassies to Korea of potential donor countries (Dec 12, 2020).
    - ✓UK, Denmark, Germany, France, Sweden, Canada, Australia, and Dominican Republic
  - The PFI work plans were approved at the Executive Board Meeting attended by the KFS' Minister and the UNCCD Executive Secretary (Apr 23, 2021).

40

Plan for the Peace Forest Initiative

- **The PFI will become a flagship global policy program for implementing the UN Decade on Ecosystem Restoration (2021-2030)**
- **The implementation will be enhanced by conducting pilot project in earnest, including the following:**
  - attracting more countries to take parts in the initiative while utilizing international events such as UNFCCC COP 26, CBD COP 15, and World Forestry Congress (15th WFC);
  - launching pilot projects on the occasion of the UNCCD COP 15 (May 2022)
    - ✓ (Project sites) Haiti-Dominican Republic and Bosnia-Herzegovina

41

Pilot PFI Project in Ethiopia

- **"Agroforestry for People, Peace and Prosperity in Southern Ethiopia's Coffee Growing Region" with concept of the PFI will be implemented through cooperation of the P4G partnership.**
  - The project aims to contribute to promoting peace and forest ecosystem restoration through education and training for local communities, sustainable coffee farming and restoration of degraded forest in fragile and conflict-affected areas of Southern Ethiopia.
  - It was chosen as the only start-up project in food and agriculture sector (SDG 2) by the P4G Hub in March 2020.

42

Agroforestry for People, Peace, and Prosperity in Ethiopia

For me, nurturing peace is like planting and growing trees.

By Prime Minister Abiy Ahmed

Nobel Peace Prize Address in Oslo, Norway(10 Dec. 2019)

Forest cooperation will be a driving force behind the promotion of peace

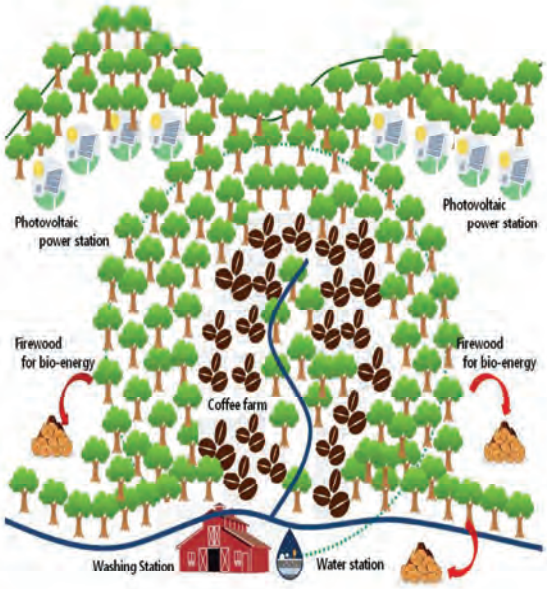
by President Moon, Jae-in

P4G reception in New York(23 Sep. 2019)

Korea-Ethiopia Summit in Seoul (26 Aug. 2019)

43

Agroforestry for People, Peace, and Prosperity in Ethiopia



Six Partners for the Project

- KFS
- SK Forest
- Tree Planet
- EFCCC(Ethiopian Government)
- ECFF(Ethiopian Coffee NGO)
- GGGI

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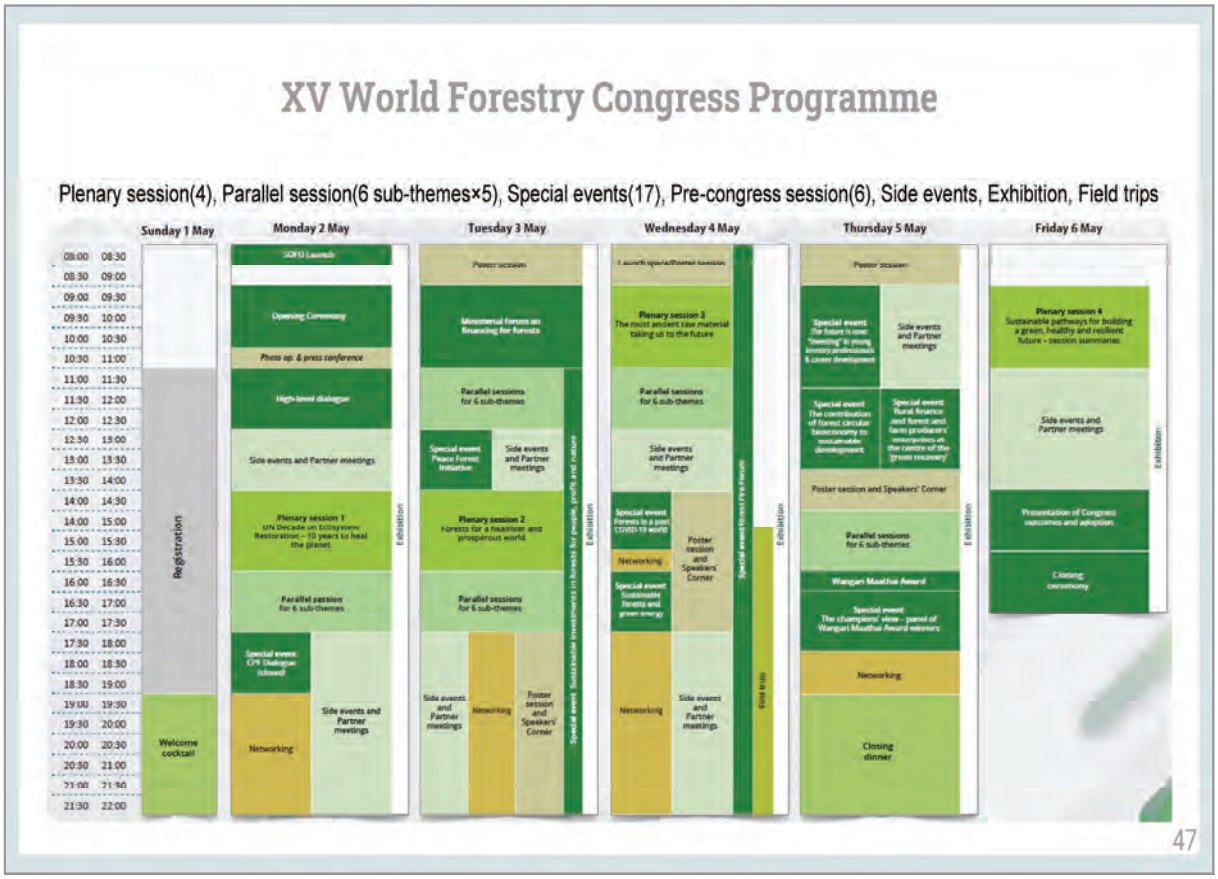
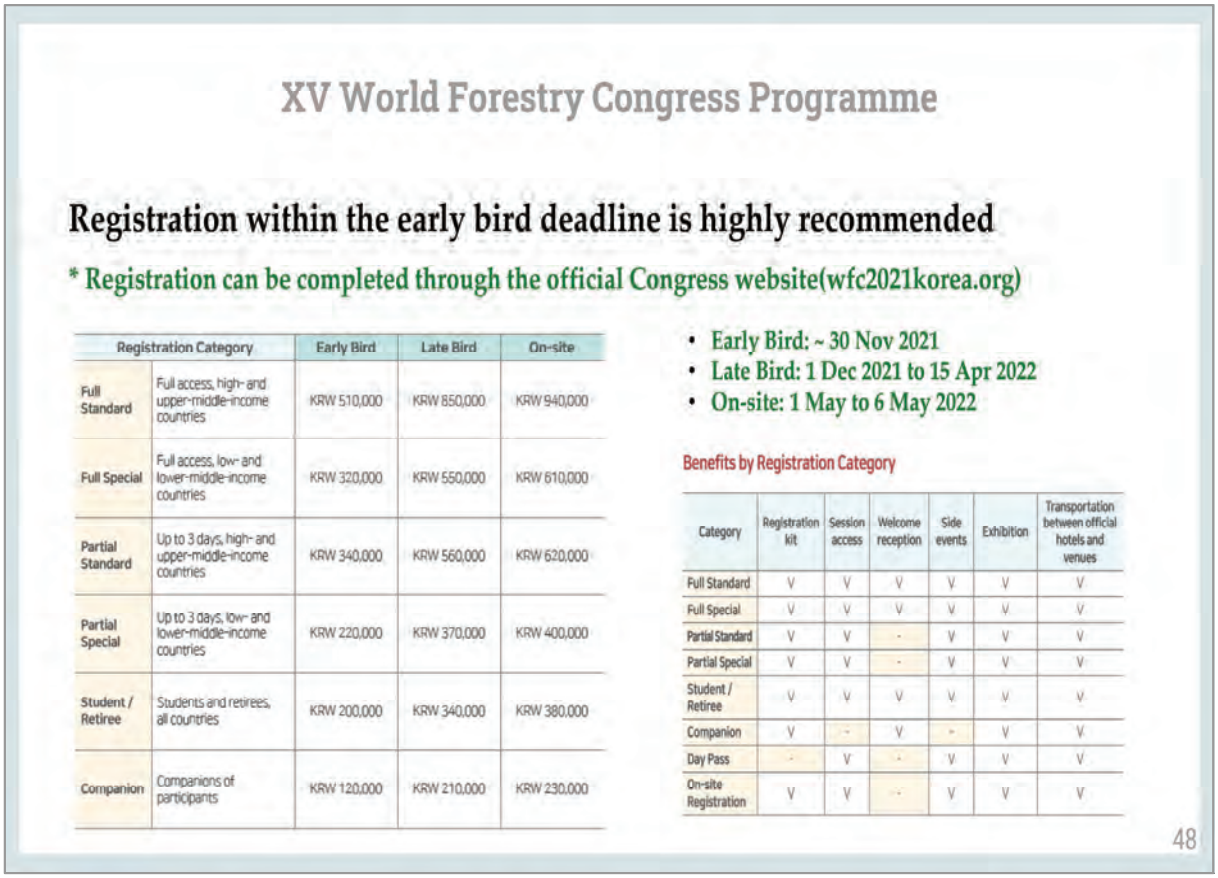
World Forestry Congress


WFC 2021
XV WORLD FORESTRY CONGRESS
XV WORLD
FORESTRY CONGRESS
New dates: 2–6 May 2022
Coex, Seoul, Republic of Korea
Korea Forest Service
Food and Agriculture
Organization of the
United Nations


XV World Forestry Congress Programme
Plenary session(4), Parallel session(6 sub-themes×5), Special events(17), Pre-congress session(6), Side events, Exhibition, Field trips
Sunday 1 May
Monday 2 May
Tuesday 3 May
Wednesday 4 May
Thursday 5 May
Friday 6 May
Registration
Welcome cocktail
Opening Ceremony
Photo op. & press conference
High-level dialogue
Side events and Partner meetings
Plenary session 1
Parallel session for 6 sub-themes
Networking
Side events and Partner meetings
Ministerial forum on financing for forests
Parallel sessions for 6 sub-themes
Special event Peace Forest Initiative
Side events and Partner meetings
Plenary session 2
Forests for a healthier and prosperous world
Parallel sessions for 6 sub-themes
Side events and Partner meetings
Networking
Poster session and Speakers' Corner
Plenary session 3
The most ancient raw material taking us to the future
Parallel sessions for 6 sub-themes
Side events and Partner meetings
Networking
Poster session and Speakers' Corner
Networking
Side events and Partner meetings
Special event: Sustainable investments in forests for people, profits and nature
Special event: Forests Pre-Future
Field trips
Exhibition
Special event
Side events and Partner meetings
Special event
Special event
Poster session and Speakers' Corner
Parallel sessions for 6 sub-themes
Wangari Maathai Award
Special event
Networking
Closing dinner
Plenary session 4
Sustainable pathways for building a green, healthy and resilient future - session summaries
Side events and Partner meetings
Presentation of Congress outcomes and adoption
Closing ceremony
Exhibition
47


XV World Forestry Congress Programme
Registration within the early bird deadline is highly recommended
* Registration can be completed through the official Congress website(wfc2021korea.org)
Registration Category
Early Bird
Late Bird
On-site
Full Standard
Full access, high- and upper-middle-income countries
KRW 510,000
KRW 850,000
KRW 940,000
Full Special
Full access, low- and lower-middle-income countries
KRW 320,000
KRW 550,000
KRW 610,000
Partial Standard
Up to 3 days, high- and upper-middle-income countries
KRW 340,000
KRW 560,000
KRW 620,000
Partial Special
Up to 3 days, low- and lower-middle-income countries
KRW 220,000
KRW 370,000
KRW 400,000
Student / Retiree
Students and retirees, all countries
KRW 200,000
KRW 340,000
KRW 380,000
Companion
Companions of participants
KRW 120,000
KRW 210,000
KRW 230,000
• Early Bird: ~ 30 Nov 2021
• Late Bird: 1 Dec 2021 to 15 Apr 2022
• On-site: 1 May to 6 May 2022
Benefits by Registration Category
Category
Registration kit
Session access
Welcome reception
Side events
Exhibition
Transportation between official hotels and venues
Full Standard
Full Special
Partial Standard
Partial Special
Student / Retiree
Companion
Day Pass
On-site Registration
48


When we plant trees, we plant the seeds of peace and seeds of hope.
Wangari Maathai
(The Nobel Peace Prize, 2004)
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Thank you !
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International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Challenges and National Strategy for Ecosystem Restoration in the Philippines

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Good afternoon to everybody in this symposium!

I am excited to be part of this symposium on Ecosystem Restoration for Green and Peace Asia as it puts emphasis on the usually under-appreciated fact that taking care of the ecosystem is also the bedrock of peace in this world. That the quest for peace in nature's very bosom would be elusive if it is not green. Finally! a serious discussion of green and peace is commencing, thank you to the organizers of this symposium for this.

At the outset, let me clarify that I wrote my paper and will be speaking right now from the perspective of someone previously directly involved in the Philippine government's ecosystem restoration and now, as simply an "onlooker" in what is happening in this field of environmental work in the country. I am now several months retired from government service.

My paper on the "Challenges and National Strategy for Ecosystem Restoration in the Philippines" was based on personal and secondary data and knowledge on the matter. Let me qualify too that my discussion of ecosystem restoration follows the definition that it is "*the process of helping degraded ecosystems recover and conserving those that are still intact whenever possible"* (Weeden 2021*)*. As such I will be presenting both the Philippines' programs on ecosystem rehabilitation and conservation. I will also use the following in defining the goal of restoration: "*Restoration aims to re-establish self-sustaining and resilient ecosystems*" (Mickelfield 2017). Further, I am also going to give emphasis in the significant role people play for ecosystem restoration to happen and succeed and propose to refine the above definition of ecosystem restoration as "*the process people and partners do of helping degraded ecosystems recover and conserving those that are still intact whenever possible".* I got struck and thought about this seriously when UN Environment Programme Regional Development Coordinator, Mr. Jonathan Gilman during the Philippines' celebration of World Environment Day this June 2021 said that "restoring ecosystems also means working with partners in the region and globally". I looked at his statement as another level of defining ecosystem restoration.

In this paper presentation, I will focus on forest ecosystem rehabilitation and conservation as explained in the ensuing discussion.

I. Current State of Ecosystems in the Philippines

The Philippines is an archipelagic country of various ecosystems that host a large number of endemic flora and fauna. The Philippines maintains five percent of the world's total flora. Through the years of use and dependency of a very rapidly growing human population now numbering over 109 million, these ecosystems and the biodiversity therein are at different levels of condition and shape now. In a recent presentation during the World Environment Day celebration this June 2021, Secretary Roy

Cimatu of the Philippine Department of Environment and Natural Resources (DENR) and Dr. Selva Ramachandran, UNDP Philippines, summed up the current state of a number of these ecosystems. Quoting part of their presentation, they reported:

> "Over the years, the country has lost 10.9 million hectares of forest cover. That's 194,000 hectares of average loss each year. Fish stocks are drastically overfished in almost all areas except Eastern Luzon, Palawan, and the Southern Sulu Sea. Reef conditions, an indicator of fish productivity, have similarly declined. In 1997, just four percent were in excellent condition, down to less than one percent in 2012.
>
> The country's rivers, coastal and marine areas have suffered from marine litter, especially uncollected plastic waste. The Philippines ranks as the third-largest contributor of marine plastics globally, which compromises fish productivity, tourism and human health.
>
> Mangrove forests, which — together with seagrasses and coral reefs — provide protection against storm surges and rising seas, unfortunately, they have suffered the same fate. Mangrove cover is down from around 500,000 hectares to almost half this amount.
>
> Land degradation in the form of soil erosion and fertility decline has affected agricultural activities in the Philippines. The Global Assessment of Land Degradation and Improvement showed that there are an estimated 132,275km2 of degraded lands, affecting about 33 million Filipinos."

The order of their reporting of the ecosystems somehow indicates the chronological order of awareness of the need for these ecosystems' restoration and the chronological order as well of concomitant concrete actions taken on this by the Philippine government. The forest ecosystem's degradation was the first environmental issue that was addressed by the country and effort on ecosystem restoration was focused on forest restoration for a long time. The expansion of rehabilitation of forest in the uplands to include mangrove forests came much later.

As the adverse impact of ecosystem degradation in the other ecosystems (rivers, coastal and marine) became pronounced in the later years, their rehabilitation and the conservation of still intact areas were embarked on initially by the government and later on by other entities and organizations.

II. Why forest ecosystem restoration was the first restoration effort in the Philippines

The focus on the uplands in earlier ecosystem restoration effort is probably because the life-threatening effects of its degradation e.g. landslides, reduction of the water supply, unabated flooding it caused etc. were the first ones physically felt and experienced by the populace. These impelled people then to act to mitigate if not totally prevent these adverse effects from happening. It is also probably because the Philippines was almost forest in precolonial times (it was reported as 90% forest then), in 1900, 70% forest (as reported by the Forest Management Bureau) that forest loss did not escape notice and concern. It was very clearly seen and felt then.

We can say that this focus on forest ecosystem restoration was also, though unknowingly at that early time, the first effort at biodiversity conservation by the Philippines. The Philippines being one of the world's 17 most biologically rich countries lost biodiversity with the loss of its forest and the

degradation of its other ecosystems. The gravity of biodiversity loss is compounded and amplified by the very high endemism of Philippine's terrestrial and marine habitats– nearly half of all its flora and fauna are unique to its 7,641 islands (Sixth National Report to Convention on Biological Diversity. CHM. 2019). Thus, the Philippines is considered also one of the hotspots for biodiversity loss. It ranks among the top ten countries with the largest number of species threatened with extinction (CI, 2013; DENR, 2015). These facts place the Philippines in the center of global concern for ecosystem restoration. As UN Environment Programme Regional Development Coordinator, Mr. Jonathan Gilman said during the Philippines' celebration of World Environment Day this 2021, "you're one of the top global ecosystem and biodiversity restoration areas. Restoring ecosystems in the Philippines means protecting your biodiversity and using ecosystems on land and sea in ways that strengthen the natural resources and processes while delivering benefits to people and nature".

In all the degradation of ecosystems reported by Cimatu and Ramachandran (2021) and the reports of the literatures reviewed for this paper, what is evident is that the major cause of ecosystem degradation in the past is exploitation for personal and economic gain of the the area by the populace. The impact of natural disasters became alarming only in a proportion not observed before with the onset of climate change. The current uncontrolled risk and threat to the Philippines ecosystems is now climate change. The risk and threat of degradation as a result of economic use are somehow minimized and addressed now by regulatory and mitigating systems in place.

The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation Inc. (OML Center) reported that most of the based on the review they conducted. The Center further related "The Burning Embers (Philippine version) diagram explicitly illustrates the increasing risks to Philippine ecosystems as global mean temperatures increase"(OML Center 2020).

III. Forest Ecosystem Restoration Through The Years

The Philippines has been in the business of restoring degraded forestlands since a century back. A brief history of forest ecosystem restoration can be gleaned from the paper of Rebugio *et al.* (2005) on "Forest Restoration and Rehabilitation in the Philippines". They traced forest restoration activities/programs in the country from its beginning in 1910 to the early 2000. They reported that "the first recorded rehabilitation initiative in the country was initiated by the Forestry School in Los Baños, Laguna (Luzon) as part of its silvi-cultural class".

The greater earlier effort at forest restoration was solely by the government. In 1960 the government created under Republic Act (RA) No. 2706 a dedicated office to take charge of forest restoration in the country, the Reforestation Administration. The participation of other stakeholders came much, much later. In the same paper of Rebugio *et al.* (2005) it was reported that "in the mid-70s, multi-sectoral rehabilitation efforts had been given impetus. By the end of the 1970s other sectors of the society such as the private sector, government agencies other than the Bureau of Forest Development, local government units and citizens were involved in various forest rehabilitation efforts".

In 1986, the National Forestation Program (NFP), that integrated all reforestation efforts undertaken by government and non-governmental sector and involving a wider sector of the citizenry, was

launched. Reforestation was already at the national level. It was in 1995 that the participation of communities in forest restoration/rehabilitation was institutionalized. Executive Order No. 263 adopted the Community Based Forest Management (CBFM) as the national strategy for sustainable management and development of forest lands.

The support and participation of international organizations in Philippine forest ecosystem restoration programs started in 1988. The Forestry Sector Project Loan I was funded by ADB, OECF and GOP. Today, several decades after, the Philippines is engaged in multilateral environmental/ecological restoration efforts many of which have funding from international and world organizations. As the country commits to multi-country global targets, it is guided in its work by what former Senator Loren Legarda stated that “Restoration action is always local. We succeed and fail depending on how well we do at the level of communities, which are at the frontlines.” (Forest News. “Destruction stops here. Shaping landscape restoration in the Philippines” Robert Finlayson.20 May 2021).

The Philippines in recent years to this day is engaged in a nationwide planting of billion trees in its public domain involving the whole of the Philippine government and hopefully the whole of the country. This is the National Greening Program of CY 2011 – CY 2016 which was expanded to “rehabilitate all the remaining unproductive, denuded and degraded forestlands estimated at 7.1 million hectares from 2016 to 2028” through Executive Order No. 193 of 2015, EXPANDING THE COVERAGE OF THE NGP.

a. Protection/Conservation of Remaining Forests, a Restoration Strategy Too

The continuing degradation of the forest that diminished if not overturned the gains achieved from forest rehabilitation work led to led to realization that protection of remaining forests and its conservation are essential components of restoration too. An additional dimension to restoration work involves the protection of the remaining forests and its conservation. Alongside the NGP, the ban on logging in natural and residual forests of the entire country, and the intensified protection of the remaining forest cover areas of the country was declared by President Benigno S. Aquino III through EO No. 23 series of 2011 DECLARING A MORATORIUM ON THE CUTTING AND HARVESTING OF TIMBER IN THE NATURAL AND RESIDUAL FORESTS AND CREATING THE ANTI-ILLEGAL LOGGING TASK FORCE. This EO No. 23 was in support of “the obligation of the State to protect the remaining forest cover areas of the country not only to prevent flash floods and hazardous flooding but also to preserve biodiversity, protect threatened habitats and sanctuaries of endangered and rare species, and allow natural regeneration of residual forests and development of plantation forests”.

These two dimensions of forest restoration (rehabilitation and protection/conservation) are being vigorously pursued by the Philippine government. In the Sixteenth Session of the United Nations Forum on Forests held in New York, USA on 26 April 2021 Mr. Marcial C. Amaro, Assistant Secretary of the Department of Environment and Natural Resources representing the Republic of the Philippines said: “The Philippines reaffirms its commitment to continuously promote sustainable forest management and exert vigorous efforts to achieve the 6 shared global goals on forests by rehabilitating unproductive, denuded, and degraded forestlands through the country’s enhanced national greening program, national forest protection program, and other initiatives”. He further reported “We have updated the national

forest protection program for 2021 to 2025, to emphasize the significance of improving forest cover in mitigating the impacts of climate change".

The Philippine Development Plan 2017-2022 that contains the country's targets and plans for specific sector of the government for the years 2017-2022 shows that for the Strategic Framework "Ensuring ecological integrity and a clean and healthy environment", the twinning of rehabilitation and protection of forestlands is to be prioritized. The PDP 2017-2022 specifically indicated this "Reverse the loss of forest cover through sustained rehabilitation of degraded forestlands including critical watersheds and strengthened protection of remaining natural forests. Rehabilitation of the remaining unproductive, denuded, and degraded areas (7.1 million ha) will be accelerated and prioritized. In addition, the protection of remaining natural forests as well as the forest established from previous reforestation activities will be ensured".

Among the current efforts at protection and conservation of forest ecosystem and its biodiversity by the DENR is the adoption of the Lawin Forest and Biodiversity Protection System as a national strategy for forest and biodiversity protection in the Philippines. This is embodied in a DENR Administrative Order signed by Secretary Roy Cimatu in October 2018. Other legal instruments for the protection and conservation of Philippine ecosystems and biodiversity are Republic Act (RA) No. 11038 or the "Expanded National Integrated Protected Areas System Act of 2018 (ENIPAS)" and RA No. 9147 or the "Wildlife Resources Conservation and Protection Act" of 2001 (DENR B+WISER 2018).

b. Lessons from the Past

From a century of forest restoration work, the country have realized and learned many lessons (environmental/technical, social, cultural, political). Ellison *et al.* 2020 citing the works of Field, 1998 and Mazon *et al.* 2019 shared similar lessons experienced in restoration programs by other countries. They reported "most failures result from the lack of community involvement, appropriate governance structures, and alignment of objectives and goals of external agents (including scientists) and local stakeholders". The same observations were reported by Chazdon *et al.* 2020 in their Conference Report on "Manila Declaration on Forest and Landscape Restoration: Making it Happen". The participants of the conference from 22 countries shared the observations that "typically, failed efforts do not adopt a landscape approach, do not effectively engage actors in local landscapes, do not build local capacity, and do not provide means for sustained financing for continuation of restoration activities [20]. FLR (forest landscape restoration) also suffers from a widely recognized research-practice gap in restoration. Many scientists do not communicate the results or applications of their work.".

Given all technical and environmental requisites for successful planting are okay, successful forest restoration will still not come about unless there is the active participation of all stakeholders in the area. The participation of local people in the restoration site is crucial. There have been instances that local people intentionally uproot seedlings or burn restoration sites because they felt their personal interests were compromised by this development in *their* area. It is a lesson that local people, local community should be made part of the restoration effort to endow in them the sense of ownership of the activities, the sense that the activities are part of their personal interests.

This critical role of people in the success of ecosystem restoration is the basis of my earlier

proposed refinement of the definition of ecosystem restoration to“ *the process people and partners do of helping degraded ecosystems recover and conserving those that are still intact whenever possible”*. This will highlight and not just assume that people are part of the restoration effort, that they spell the success of restoration.

The capacities of people to constructively and effectively participate in the restoration work are also vital. The realization of the need for capacity building of all participants, stakeholders for this purpose is a lesson that requires resources and logistics.

The sustainability of people's and other stakeholders' participation also requires resources and logistics. This is without saying that the success of the whole ecosystem restoration is also dependent upon the sustainability of resources and logistics poured into it.

One environmental/technical lesson learned centers on the planting material and the biophysical condition of the restoration site. These include: genetic diversity and quality of the planting materials should be ascertained to be appropriate for the restoration site; a period of nurturing till newly planted seedlings are established is required for them to survive in the field; monitoring of their performance after planting for at least 3 years should be done; protection forest or production forest in restoration site should be delineated for their appropriate restoration intervention to be identified.

Governance issues were also recognized as impeding the smooth implementation and success of the restoration program. The role of each stakeholder/participant in the program should be clearly discussed and agreed upon in the very beginning of the program. The participatory approach should be the guiding principle in both the planning and implementation of restoration programs.

Addressing the above concerns requires a multidisciplinal science and team. This is aptly echoed during a workshop in Quezon City in 2015 by Dr. Felix Gaschick of the B+WISER Program of U.S. Agency for International Assistance (USAID) and DENR. The workshop developed an action plan that identified restoration activities for specific ecosystems. He said “There is a need to apply the best science and identify certain aspects towards restoration such as its scope, desired ecosystem conditions, and the appropriate restoration interventions,”(DOST PCAARD Portal 2015).

IV. The National Greening Program

The Republic of the Philippines President Benigno S. Aquino III through Executive Order No. 26 (EO 26) in February 2011 ordered and declared “the implementation of a National Greening Program (NGP) as a government priority” in line with “the policy of the State to pursue sustainable development for poverty reduction, food security, biodiversity conservation, and climate change mitigation and adaptation”. The NGP is a convergence initiative of the DA-DAR-DENR (Philippine Department of Agriculture-Philippine Department of Agrarian Reform-Philippine Department of Environment and Natural Resources) led by DENR and “shall be implemented in Partnership with the following agencies/stakeholders”: “Philippine Department of Education (DepEd)/ Philippine Commission on Higher Education (CHED), Philippine Department of Social Welfare and Development (DSWD) Philippine Department of Budget and Management (DBM) Philippine Department of Interior

and Local Government (DILG) Local Government Units (LGUs) Philippine Department of Health (DOH), Philippine Department of Public Works and Highways (DPWH), Philippine Department of (DOTC), Philippine Department of National Defense (DND), Philippine Department of Science and Technology (DOST), Philippine Department of Justice (DOJ), National Commission on Indigenous Peoples (NCIP), Technical Education and Skills Development Authority (TESDA), and the Philippine Amusement and Gaming Corporation (PAGCOR). All other government agencies, instrumentalities, including government-owned and controlled corporations (GOCCs), state universities and colleges (SUCs), shall provide full support and assistance to the NGP".

The whole force of the government was tasked to prioritize the implementation of NGP, it being "a government priority" as E.O. 26 stipulates.

a. NGP as the National Strategy for Forest Restoration

The NGP is the Philippines' banner program for forest rehabilitation crafted from the lessons of the past discussed earlier and the demands of the future (environment and community resilient to disasters and climate change etc.). The NGP embodies the government's strategy to fully rehabilitate the country's denuded lands. It mandated the planting of 1.5 billion trees in 1.5 million hectares of lands of the public domain for a period of six (6) years from CY 2011 to CY 2016.

It is a nationwide forest ecosystem restoration program by the government and the public that considers the possible consequences of its implementation activities on vital issues of concern related to people and the environment. It is not simply an environmental program to make the Philippines greener and make the environment cleaner. It is a program launched with the pursuit of sustainable development of people and the environment in mind, thus the specific objectives of the program were poverty reduction, food security, biodiversity conservation, and climate change mitigation and adaptation. Note that these objectives of NGP are fundamentally the same as those of the UN Decade on Ecosystem Restoration 2021 to 2030. The UN Decade on Ecosystem Restoration document laid down, the global program "could help end poverty, combat climate change, and prevent mass extinction" (www.decadeonrestoration.org).

This restoration strategy of the Philippines is open to adjustments and refinements of methodologies and activities as dictated by the conditions and situation on the ground, very much like the adaptive management that Holling 1978 described. NGP allows for "a structured, iterative process of "learning-by-doing" and decision-making in the face either of continuous change (environmental, social, cultural, or political) or uncertainty (Holling 1978 in Ellison *et al.* 2020). Thus, a very critical activity of the implementation of NGP is regular monitoring and assessment of accomplishments, problems and constraints before the planning of the succeeding cycle of implementation is undertaken.

The NGP is hinged in science. Science is at the core of its implementation. The research bureau of DENR, the Ecosystems Research and Development Bureau (ERDB), is directly involved in the implementation of NGP (unlike in earlier rehabilitation programs). Other than the ERDB providing the natural and social science bases/foundation of NGP activities, it is the DENR unit in charge of 1) the production of quality planting materials (NGP-PQPM component) for planting in NGP sites all over the country; 2) the benchmarking of NGP sites to provide concrete benchmark data for comparison in later

assessment of impacts of NGP and for developing protocols for benchmarking and impact assessment (manual); 3) production of mycorrhizal fertilizer for NGP planting materials and 4) provision of technical support/advise as needed and requested.

The NGP-Production of Quality Planting Materials (NGP-PQPM) implemented by ERDB produced quality planting materials from clonal nurseries established for this purpose in regional offices and partner State Universities and Colleges (SUCs) across the country and from certified quality seeds sourced from DENR Tree Seed Centers, Seed Production Areas (SPAs) and Individual Plus Trees (IPTs). The reported pitfall of a number of restoration work which is the widely recognized research-practice gap was minimal in the implementation of NGP. Robin Chazdon *et al.* 2020 in their Conference Report on "Manila Declaration on Forest and Landscape Restoration: Making it Happen" shared that FLR (forest landscape restoration) also suffers from a widely recognized research-practice gap in restoration.

b. The Gains of NGP

1. Intangible gains

Other than the accomplishments relative to the targets and objectives of the program, NGP has also changed and remodeled the Philippine government's way of doing ecosystem restoration. The convergence modality among its three national agencies, the Philippine Department of Agriculture (DA), the Philippine Department of Agrarian Reform (DAR) and the Philippine Department of Environment and Natural Resources (DENR), and the "whole government" approach vest in not just one agency or unit the sense of ownership and accountability over the program. This innovative approach to doing forest ecosystem rehabilitation has improved the gains realized from NGP.

Of course the contribution of other groups and other sectors in the actual rehabilitation of forestlands for the period cannot be discounted. In a Convention on Biological Diversity (CBD) Philippine document, the following was reported "Independent reforestation activities organized by local communities, civil society organizations, private groups, and the academe supplement the reforestation activities of the National Greening Program. The intensified enforcement of national and local forest laws, deputation of Bantay Gubat, and regular conduct of biodiversity assessments through the LAWIN Forest and Biodiversity Protection System and the Biodiversity Monitoring System has also improved the management and protection of forests" (Sixth National Report to Convention on Biological Diversity. CHM. 2019).

Another intangible benefit from the implementation of NGP was the strong, lasting partnership that formed among government organizations, local communities, civil society organizations, private groups, and the academe for a common cause, the National Greening Program.

The table below summarizes the accomplishments of NGP from the start of its implementation in 2011 to this year 2021 relative to its objectives and targets (FMB-DENR website).

Table 1. National Greening Program accomplishment, 2011-2021.

NATIONAL GREENING PROGRAM ACCOMPLISHMENT REPORT
as of July 16, 2021

YEAR	TARGET AREA	AREA PLANTED	% Accomp	SEEDLINGS PLANTED	JOBS GENERATED	PERSONS EMPLOYED
2011	100,000	128,558	129%	89,624,121	335,078	47,868
2012	200,000	221,763	111%	125,596,730	380,696	55,146
2013	300,000	333,160	111%	182,548,862	466,990	65,198
2014	300,000	334,302	111%	205,414,639	1,079,792	152,008
2015	350,000	360,357	103%	351,014,239	915,729	123,519
2016	247,683	284,089	115%	415,564,211	842,792	114,584
2017	193,803	206,136	106%	182,185,530	582,070	84,315
2018	136,466	141,310	104%	138,020,616	393,903	62,375
2019	19,617	21,925	110%	25,851,359	268,171	46,313
2020	46,907	47,299	101%	37,206,581	367,195	55,141
2021	94,667	10,078	10.65%	8,495,411		
TOTAL	1,989,143	2,088,977	105%	1,761,522,299	5,632,416	806,467

2. Gains in forest area/forest cover

The data in the preceding table show the accomplishment for Area Planted exceeded the set target. More than 100%, average of 105% was planted. NGP was able to plant a total area of 2.09 million hectares with 1.8 billion seedlings for the period 2011-2021. The larger area planted was in the first five years of the program, from 2011 to 2016. The last five years' target was significantly lower. DENR Asst. Secretary Marcial Amaro said the DENR-FMB's focus in the past five years is protecting existing forest more than expanding the current forest (Mayuga 2021).

This significant accomplishment of NGP has been noticed by a number of organizations looking at the progress of environmental rehabilitation in particular and what is happening in the world´s forests and their management and uses in general. The UN Food and Agriculture Organization (UN FAO) reported that "in more recent years, Philippines has made significant advances towards resolving historical trends causing net forest cover loss. This commitment is exemplified by embarking on a massive tree planting and reforestation program called the National Greening Program. In addition, the Integrated Natural Resources and Environmental Management Project(INREMP) and the Forestland Management Program (FMP) are also involved in this initiative. From a position as one of the top ten deforestation countries contributing to 17-20 percent of global GHG emissions from global forest loss in 2000 (FAO, 2006), the country has since recovered with a modest forest cover increase of 55 000 hectares per year (FAO, 2010); the 2010 Global Forest Assessment Country Report for Philippines reported an increase in forest cover from 6.57 million ha in 1990 to 7.66 million ha in 2010 (FAO The Forest and Landscape Restoration Mechanism – Philippines 2020).

In 2015, FAO published Global Forest Resources Assessment 2015 which showed among other data the annual change rate in forest areas of its 234 member countries and territories. Shown in the table below (Table 2.) are ten of the countries reporting the greatest annual forest area gain from 2010 to 2015. Note that the Philippines registered the highest percentage of forest area gain, 3.5% of its 2010 forest area. The period covered is the period of NGP.

FAO Global Forest Resources Assessment 2015

Table 2. Countries reporting the greatest annual forest area gain (2010-2015)*.

NUMBER	COUNTRY	ANNUAL FOREST AREA ('000 has)	ANNUAL CHANGE RATE (% of 2010 forest area)
1	China	1,542	0.8
2	Australia	308	0.2
3	Chile	301	1.8
4	USA	275	0.1
5	Philippines	240	3.3
6	Gabon	200	0.9
7	Lao PDR	189	1.0
8	India	178	0.3
9	Vietnam	129	0.9
10	France	113	0.7

* - Lifted from FRA 2015, Table 2. Extent of forest 1990-2015.

A CBD document on the Philippines reported "data from the National Mapping Resource and Information Authority (NAMRIA) indicate that the total forest cover decreased by 4.59% in 2010 and increased by 2.53% in 2015". "The overall increase in forest cover within forestlands may be attributed to the ongoing implementation of the National Greening Program (NGP)" (Sixth National Report to Convention on Biological Diversity. CHM. 2019).

3. Social gains of NGP

Table 1 also shows the jobs generated and the persons employed by NGP in its activities. More than 5.6 million jobs were generated and a total of 806,467 persons were employed in the various phases of the implementation of NGP. In the light of the pandemic, the implementation of NGP has been modified to benefit upland and rural communities. According to Asst. Secretary M. Amaro, 'due to the limitations brought by the covid-19 pandemic, the Philippines implemented policy improvements on the enhanced NGP (ENGP). In 2020, our country shifted to family implementation approach to support our government's objective of providing additional income to upland and rural families affected by the pandemic (Amaro 2021).

This program has also provided *all* involved in the implementation of the program opportunities that improved their skills in and knowledge on its different activities from planning to implementation to monitoring and assessment to management and maintenance. Even their social skills and social capital have been improved.

4. Other physical gains

During the year end assessment and strategic planning of enhanced NGP (ENGP/e-NGP) held in 2018, the following accomplishments were reported: "through the NGP- PQPM, a total of 22 DENR clonal nurseries were established nationwide, 16 of these were turned-over to the DENR Regional Offices, which they use in the production of quality planting materials for the implementation of the e-NGP. 75 seed sources were established, one per province, through the field offices and Hi-QVAM 1, a biofertilizer, was developed by ERDB to support the production of quality planting materials (Gillado 2018). An additional 27 clonal nurseries were also established in partner SUCs.

V. The Mangrove and Beach Forest Development Project (MBFDP)

Another restoration program pursued by the government in line with NGP was the Mangrove and Beach Forest Development Project. While NGP has mangrove component sites, the MBFDP's focus was in different areas, those devastated, wrecked by natural and man-made disaster and calamity-affected areas. The MBFDP was part of the Philippine Reconstruction and Rehabilitation Program (RPP) of 2014. It was a response to the devastation caused by Super Typhoon Haiyan (locally named Super Typhoon Yolanda) in November 2013 particularly in the Visayas region of the country. The project is at the same time a reconstructive project of coastal areas damaged by other disasters and calamities. The NGP restoration strategies were modified for this project to address the urgency and magnitude of restoration/rehabilitation work to be undertaken. Unlike the biophysical and sociocultural condition of "regular" NGP sites, the MBFDP sites were those where the damage to both the people and the environment was unthinkable. This project was crafted and its implementation was led by ERDB.

The following are its significant features: execution of mapping and baseline data collection on biophysical and sociocultural characteristics of target sites at the very start of the project as basis for refining implementation activities and for future impact assessments; implementation of cash-for-work scheme in the different stages of plantation development including nursery establishment; has robust capacity-building and sustainability mechanism strategies; has strong, regular participatory monitoring and evaluation system.

The Philippines' Sixth National Report to Convention on Biological Diversity reported that "stakeholders from local government units (LGU), civil society organizations (CSOs), and the private sector participated in the implementation of the MBFDP in disaster-affected areas" "in target sites (Region 4A, 4B, 5, 6, 7, 8, 9, 10, 11 and 13)". A total of 50,000 hectares of mangroves and beach forests are targeted for development, planting, and enrichment".

Accomplishments

Then Secretary of the DENR, Dr. Ramon J.P. Paje, shared to the public in an article at The Standard, the accomplishments of MBFDP. He reported some 50,417 hectares of coastal areas in 43 Yolanda-hit provinces were planted with 150 million seedlings/propagules by the Mangrove and Beach Forests Development Project, which was carried out by the Ecosystems Research and Development Bureau of the Department of Environment and Natural Resources. He further shared

"MBFDP mirrors the commitment of the Aquino administration to build back better the communities ravaged by the disaster, and the ERDB has done well in amplifying that commitment."

Of the more than 50,417 hectares, around 90 percent or 44,800 hectares of the rehabilitated areas were planted with native mangrove, while the remaining 5,617 hectares of beach forest belts were planted with indigenous beach tree species. The use of native/indigenous species for this rehabilitation project was purposely done for biodiversity conservation.

The cash for work target of MBFDP was realized within its 1-year implementation. Eighty seven thousand, five hundred (87,500) jobs were generated and the project benefited 12,500 individuals who were hired for site preparation and seedling production.

The MBFDP has to a large extent given relief and support to the people of the project site who were gravely affected by the storm surge and other severe and grim disasters that hit them.

Other Ecosystem Restoration Programs of the Philippines

The other ecosystems restoration initiatives started in the more recent past focusing on other ecosystem include Filipinovation on Coral Reef Restoration, Restoration of seagrasses, Pasig River rehabilitation, Rehabilitation of inactive/abandoned mines, and the Rehabilitation of Laguna Lake (Government keen on ecosystems restoration (PCAARD DOST article 2015).

Another program on coral reef is the Bolinao Coral Reef Targeted Research Program, a community based reef restoration programme carried out between 2004 and 2009 (Mickelfield, 2017).

Challenges and the Future of Ecosystem Restoration

Challenges continue to reshape and redefine our responses, our behavior. They are opportunities for rethinking and reflecting on what have been done and what else can be done. They drive people to act.

A number of challenges still confront forest ecosystem restoration in the Philippines. The government has admitted in its Sixth National Report to Convention on Biological Diversity that “insufficient amount of resources for the routine monitoring and management of forested and reforested areas remains a challenge. Slash and burn practices and timber poaching also continue despite regulations. (Sixth National Report to Convention on Biological Diversity. CHM. 2019).

In the same report to CBD, another challenge that was mentioned is the problem of control and management of ecosystems e.g. mangrove in alienable and disposable (A&D) lands. Data from the National Mapping Resource and Information Authority (NAMRIA) showed that within forestlands, there was an increase in mangrove cover from 23,591 hectares in 2010 to 215,969 hectares in 2015. Within alienable and disposable lands, there was a decrease in cover from 107,002 hectares in 2010 to 87,700 hectares in 2015. The action property owners took in these lands was in disregard of existing environmental regulations.

Natural disasters (typhoons, monsoon rains, etc.) that hit the Philippines “abundantly” and are worsening, are continuing concerns that we are in a quandary to address.

The exploitation of our ecosystems for natural resources of both locals and oversees/foreign nationals insisting exploitation is within their rights is something that would definitely challenge our capacities and strength to restore the system. A case in point is that of Chinese in the West Philippine Sea found doing activities that destroyed large areas of coral reefs and collecting endangered species and other ocean resources.

The continuous implementation of NGP is challenged, according to Asst. Secretary M. Amaro, by the fact that “the remaining areas are remote and difficult to access,” “There are still conflicting policies. We have problems in some places with peace and order, with fire, pests and diseases. Water shortages

are a problem, too, leading to low survival rates." "So how can we accelerate restoration and maintain it? We need to find ways to strengthen livelihoods, increase monitoring, prioritize critical watersheds for enhancement of existing forest cover, recover easements, build more partnerships with the private and non-governmental sector, add value to products, install small dams, and create better and more accessible financial and insurance products.".

The "apathy" or misappreciation by country leaders of the importance of ecosystem restoration is a stumbling block to restoration too. The Duterte government excluded reforestation efforts among its commitments to mitigate climate change under the 2016 Paris Agreement.

Lastly, the current pandemic, the COVID epidemic is also a challenge. It has drained the Philippine coffers of monetary resources for restoration. Asst. Secretary Amaro reported that the 2020 budget for ENGP/e-NGP was cut to support battling the pandemic. Human resources have been taken away from the work by the health protocols and the lockdowns of offices and communities imposed by the government. Those forestry personnel who were allowed to continue work have limited mobility significantly slowing down the delivery of services in these times.

While the pandemic has negative impacts on ecosystem restoration as cited above, the editorial "Ecosystem Restoration" of a newspaper, The Phil Star, in its June 5, 2021 issue wrote the pandemic "heightened the interest of people in keeping surroundings clean, in the use of environment-friendly transportation particularly bicycles, and in activities such as gardening. Property developers are putting greater emphasis on green spaces. More trees are being planted in urban centers including Metro Manila". The air quality index of the metropolis was also reported by DENR to have improved.

Given all these challenges and with the commitment of the Philippine government to the UN Decade on Ecosystem Restoration plus the now heightened awareness of people to the hazard of environmental degradation e.g. cropping up of pandemic-causing virus, climate change, etc., ecosystem restoration will always be alive in the consciousness of people to drive them to act to heal nature and be at peace with nature. As Secretary Roy Cimatu, Department of Environment and Natural Resources and Dr. Selva Ramachandran, UNDP Philippines said, and I quote, "we call on everyone to support the global campaign for the healing of nature through the restoration of our ecosystems. We must do our part as responsible stewards of our planet before it's too late. It is, after all, the only planet we've got".

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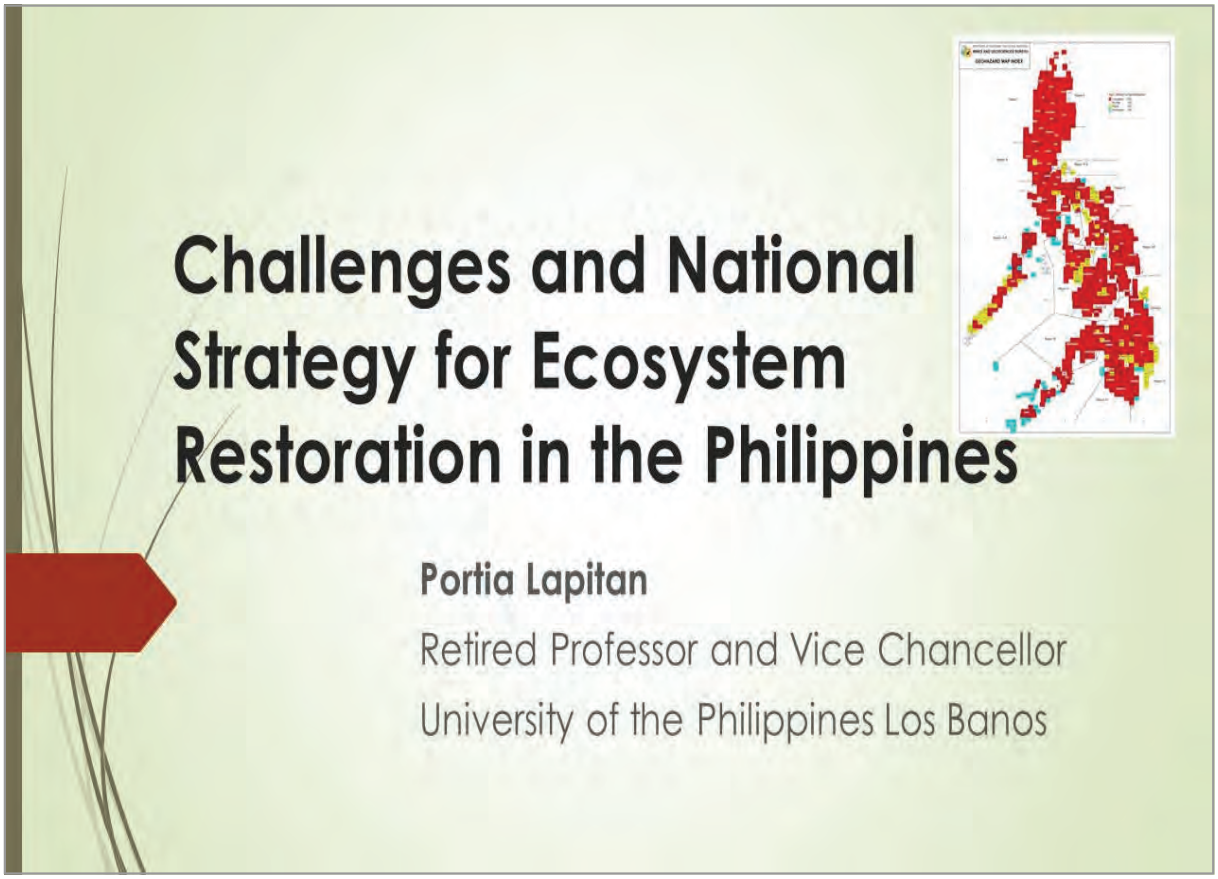
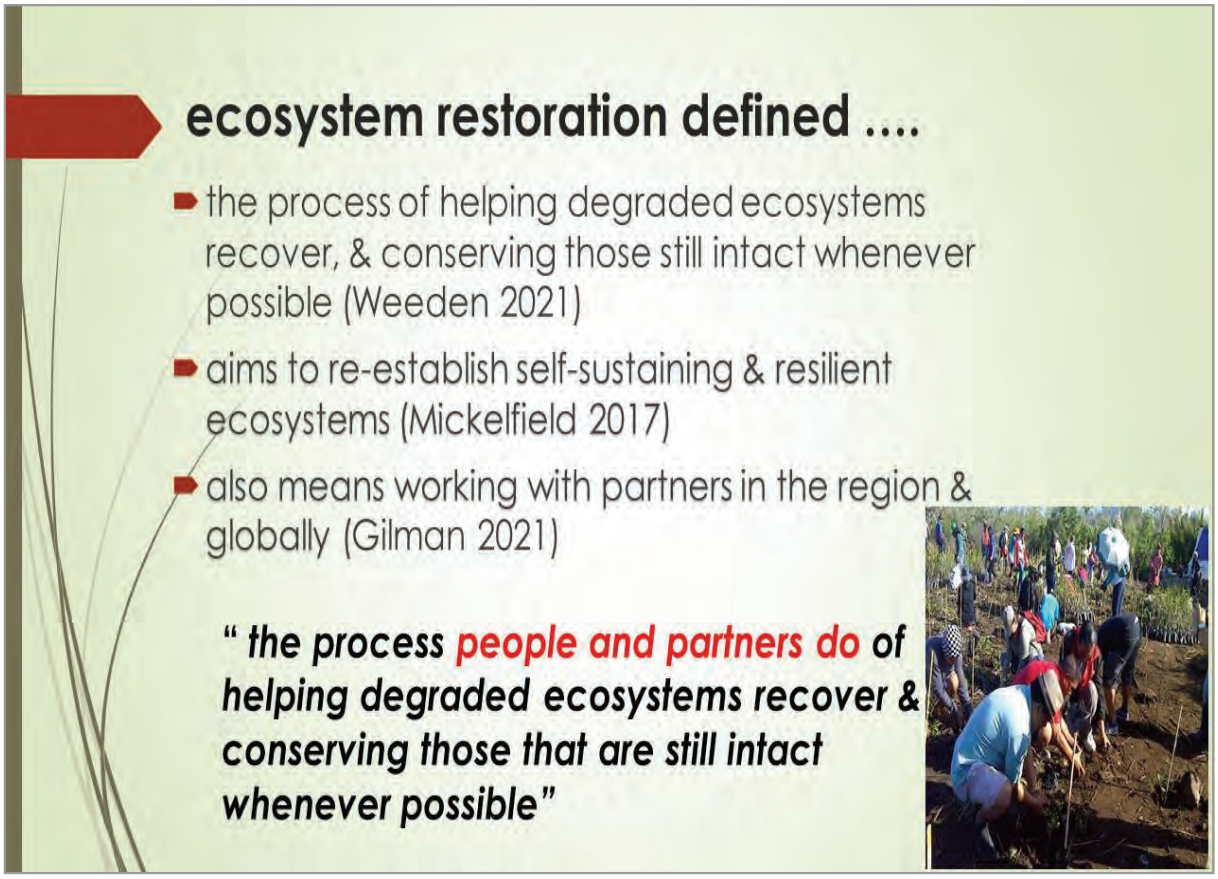
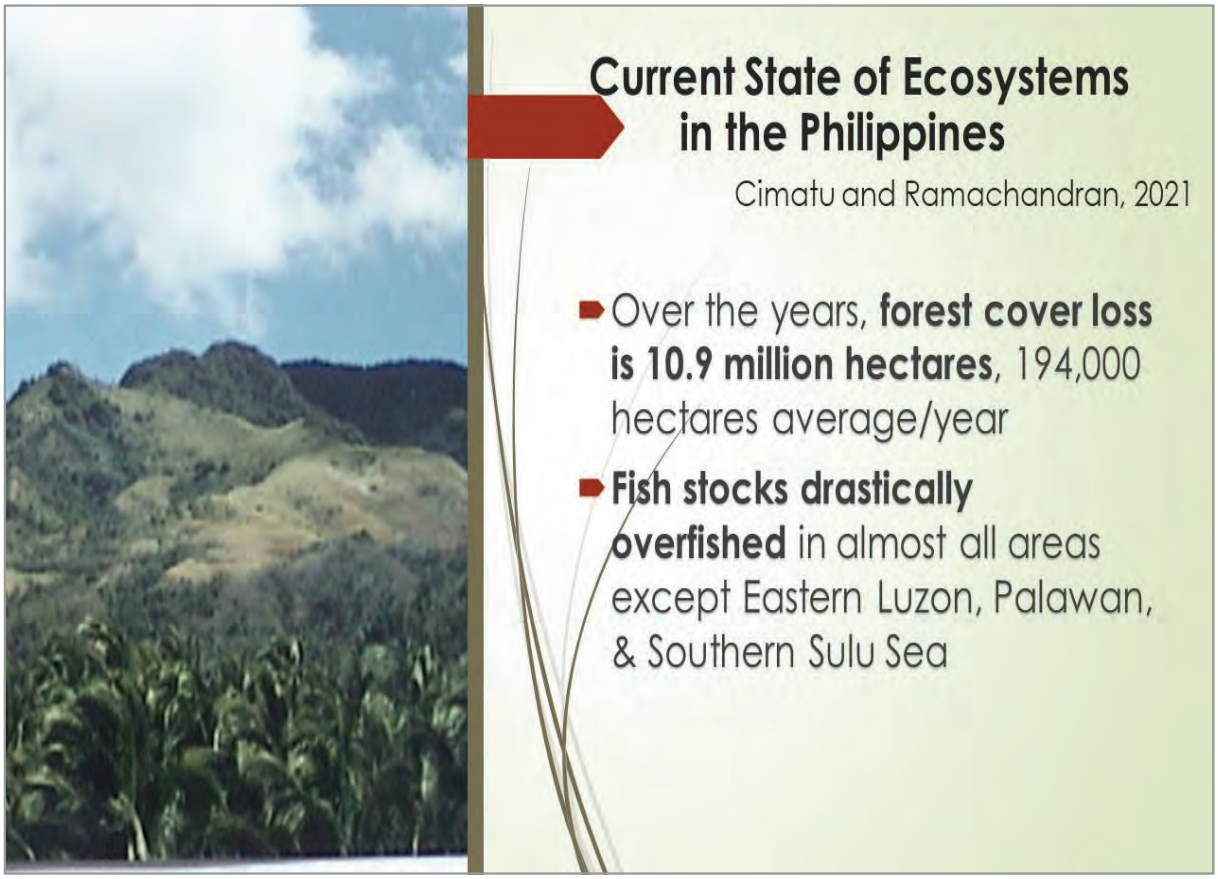

Challenges and National Strategy for Ecosystem Restoration in the Philippines
Portia Lapitan
Retired Professor and Vice Chancellor
University of the Philippines Los Banos


ecosystem restoration defined ....
the process of helping degraded ecosystems recover, & conserving those still intact whenever possible (Weeden 2021)
aims to re-establish self-sustaining & resilient ecosystems (Mickelfield 2017)
also means working with partners in the region & globally (Gilman 2021)
" the process people and partners do of helping degraded ecosystems recover & conserving those that are still intact whenever possible"

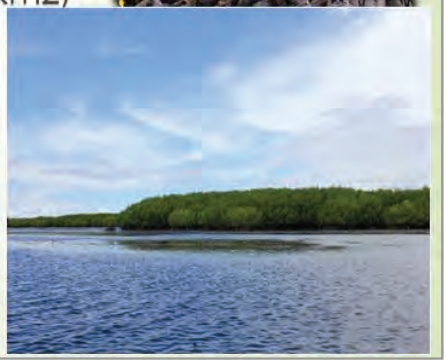

Current State of Ecosystems in the Philippines
Cimatu and Ramachandran, 2021
Over the years, forest cover loss is 10.9 million hectares, 194,000 hectares average/year
Fish stocks drastically overfished in almost all areas except Eastern Luzon, Palawan, & Southern Sulu Sea


Current State of Ecosystems in the Philippines
Cimatu and Ramachandran, 2021
Reef in excellent condition in1997 just 4%, in 2012 less than 1%
Rivers, coastal & marine areas suffered from marine litter, especially plastic waste (Philippines third-largest contributor of marine plastics globally)

Current State of Ecosystems in the Philippines

Cimatu and Ramachandran, 2021

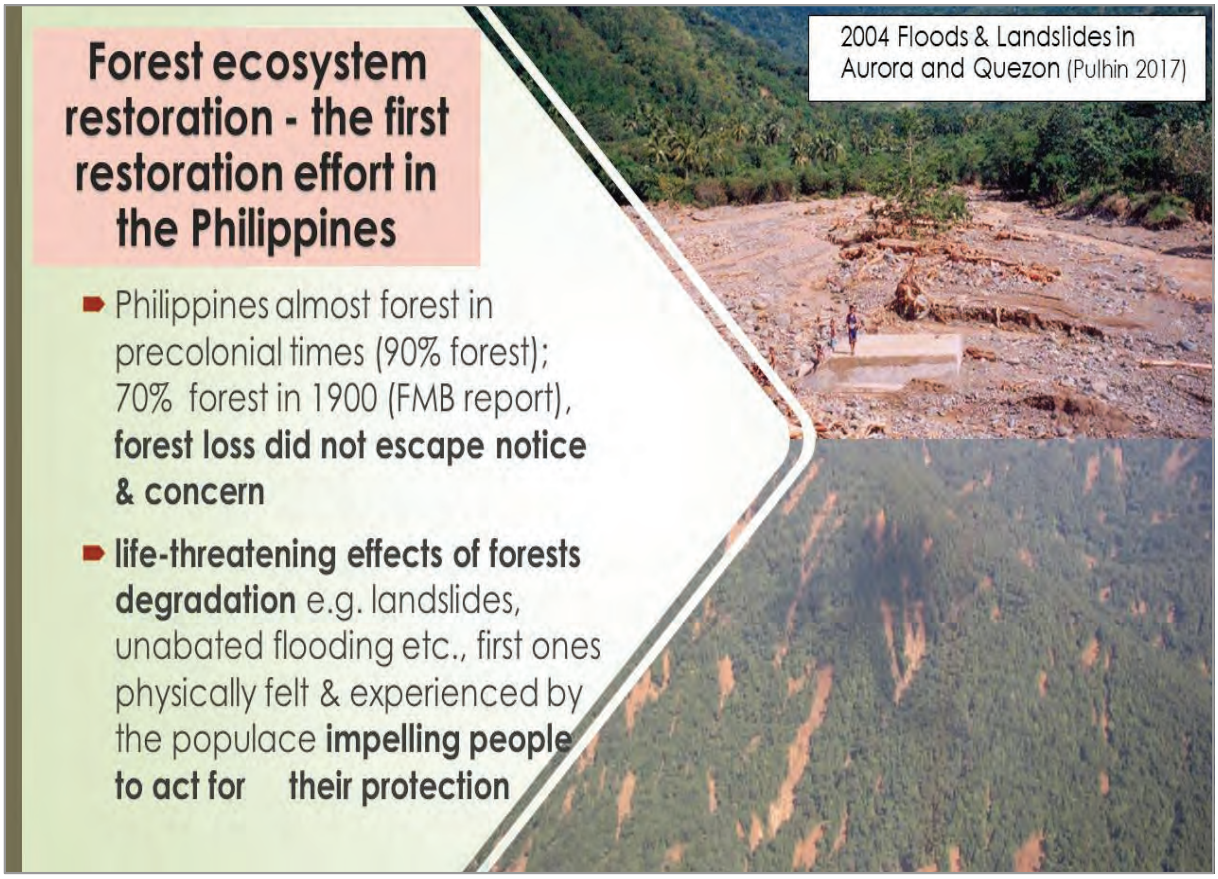
- **Mangrove cover, coral reefs and seagrasses down** from around 500,000 hectares to almost half this amount
- **Estimated degraded lands** is 132,275km2, affecting approximately 33 million Filipinos (Global Assessment of Land Degradation and Improvement)



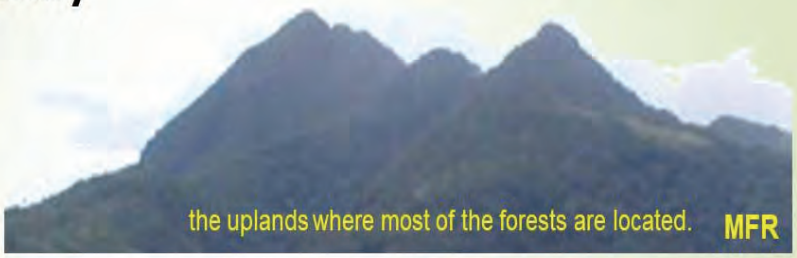
Current Ecological State of the Philippines

- **one of hotspots for biodiversity loss**, more than 20 000 endemic species (nearly half of all its flora & fauna are unique to the 7,641 islands (CBD 2019))
- among top ten countries with **largest number of species threatened with extinction**
- **one of the world's 17 most biologically rich countries**, together, hold two-thirds of earth's biological diversity


"you're one of top global ecosystem and biodiversity restoration areas"
Jonathan Gilman, UNEP Regional Development Coordinator


Forest ecosystem restoration - the first restoration effort in the Philippines
Philippines almost forest in precolonial times (90% forest); 70% forest in 1900 (FMB report), forest loss did not escape notice & concern
life-threatening effects of forests degradation e.g. landslides, unabated flooding etc., first ones physically felt & experienced by the populace impelling people to act for their protection
2004 Floods & Landslides in Aurora and Quezon (Pulhin 2017)

Forest restoration was an effective strategy for biodiversity conservation in the country



Primary forest, **the most biodiverse & carbon-dense** form of forest. Source: U.N. FAO

Forests - **habitat for > 6,000 plant species & numerous bird and animal species** a sizeable number of which are endangered

First forest ecosystem restoration, a forest rehabilitation, a reforestation involving planting of trees

Protection/Conservation of Remaining Forests, a Restoration Strategy Too

- Continuing degradation of forest that diminished if not overturned gains of forest rehabilitation led to realization that **protection of remaining forests and its conservation are essential components of restoration too.**

causes of ecosystem degradation

- in the past, **major cause - exploitation** for personal & economic gain by the populace
- **current - natural disasters** exacerbated by climate change
  - Philippine ecosystems already at risk from climate change (low to medium confidence), increasing risks as global mean temperatures increase (OML Center 2020)

Forest Ecosystem Restoration Through The Years

- **Philippines in the business of restoring degraded forestlands a century back**
  (Rebugio *et al.* (2005) traced forest restoration activities/programs from its recorded beginning in 1910 to the early 2000)
- **greater earlier effort at forest restoration solely by government** In 1960, Reforestation Administration created by Republic Act (RA) No. 2706
- **participation of other stakeholders came much, much later**
  "in mid-70s, multi-sectoral rehabilitation efforts given impetus, by end of 1970s private sector, local government units & citizens involved in various forest rehabilitation efforts" (Rebugio *et al.* (2005) .

Forest Ecosystem Restoration Through The Years .... *continued*

- In 1986, **reforestation already at national level**
  National Forestation Program (NFP) launched, undertaken by government, non-governmental sector & wider sector of the citizenry
- In 1995, **participation of communities institutionalized**
  Executive Order No. 263 adopted the Community Based Forest Management (CBFM) as national strategy for sustainable management & development of forest lands
- **support & participation of international organizations started** in 1988
  Forestry Sector Project Loan I by ADB, OECF & GOP
  Today, several decades after, Philippines engaged in multilateral environmental/ecological restoration with funding from international & world organizations.

As country commits to multi-country global targets, it is guided in its work by what former Senator Loren Legarda stated....

"Restoration action is always local. We succeed and fail depending on how well we do at the level of communities, which are at the frontlines." Former Senator Loren Legarda, 2021

INQUIRER FILE PHOTO

The National Greening Program: National Strategy for Forest Restoration

- **Nationwide planting of billion trees** in public domain **by whole of government** (Executive Order No. 26 of 2011)
- expanded to "rehabilitate remaining 7.1 million hectares from 2016 to 2028" (Executive Order No. 193 of 2015)

President Aquino & DENR Sec. Paje


The National Greening Program .... continued
a. NGP as the National Strategy for Forest Restoration
crafted from the lessons of the past & demands of the future
lessons on environmental/technical, social, cultural, political aspects
In future, environment & community resilient to disasters & climate change


The National Greening Program .... continued
a. NGP as the National Strategy for Forest Restoration
nationwide program by government & public that considers possible consequences of its implementation on vital issues of concern related to people & environment
program launched for pursuit of sustainable development of people & environment -> specific objectives: poverty reduction, food security, biodiversity conservation, & climate change mitigation & adaptation

The National Greening Program .... *continued*

a. NGP as the National Strategy for Forest Restoration

- **open to adjustments & refinements of methodologies & activities** as dictated by conditions & situation on ground -> regular monitoring & assessment prior to succeeding cycle of implementation
- **NGP hinged in science,** research-practice gap in restoration addressed -> Ecosystems Research and Development Bureau (ERDB) of DENR directly involved in its implementation

ERDB in NGP activities

DENR unit in charge of

- 1) **production of quality planting materials** (NGP-PQPM component) for planting sites all over the country;
- 2) **benchmarking of sites**
  - to provide concrete benchmark data as bases in later assessment of impacts
  - for developing protocols for benchmarking and impact assessment (manual)

Benchmarking manuals

ERDB in NGP activities ... *continued*

DENR unit in charge of

- 3) production of **mycorrhizal fertilizer for NGP** planting materials
- 4) provides **natural & social science bases/foundation** of NGP activities & technical support/advise as needed and requested


Stacks of HiQVAM of Mycorrhizal facility in Los Banos

NGP-Production of Quality Planting Materials (NGP-PQPM) implemented by ERDB

- quality planting materials produced from
  - **clonal nurseries** in regional offices & partner SUCs in the country
  - from **certified quality seeds** sourced from DENR Tree Seed Centers, Seed Production Areas (SPAs) and Individual Plus Trees (IPTs).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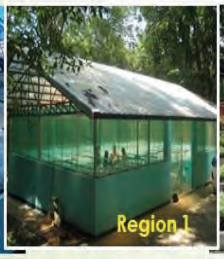

Region 1


Region 11


ERDB


SPA

The National Greening Program .... *continued*

b. The Gains of NGP

1. **Intangible gains**
   - **NGP changed & remodeled Philippine government's way** of doing ecosystem restoration
   - convergence modality among its three national agencies & "whole government" approach vest in not just one agency **sense of ownership & accountability over the program**
     - This innovative approach to doing forest ecosystem rehabilitation improved the gains realized from NGP.

The National Greening Program .... *continued*

b. The Gains of NGP

1. **Intangible gains**
   - **strong, lasting partnership** that formed among government organizations, local communities, civil society organizations, private groups, and the academe for common cause, the NGP

The National Greening Program .... *continued*

b. The Gains of NGP

2. Gains in forest area/forest cover

NATIONAL GREENING PROGRAM ACCOMPLISHMENT REPORT

as of July 16, 2021

YEAR	TARGET AREA	AREA PLANTED	% Accomp	SEEDLINGS PLANTED	JOBS GENERATED	PERSONS EMPLOYED
2011	100,000	128,558	129%	89,624,121	335,078	47,868
2012	200,000	221,763	111%	125,596,730	380,696	55,146
2013	300,000	333,160	111%	182,548,862	466,990	65,198
2014	300,000	334,302	111%	205,414,639	1,079,792	152,008
2015	350,000	360,357	103%	351,014,239	915,729	123,519
2016	247,683	284,089	115%	415,564,211	842,792	114,584
2017	193,803	206,136	106%	182,185,530	582,070	84,315
2018	136,466	141,310	104%	138,020,616	393,903	62,375
2019	19,617	21,925	110%	25,851,359	268,171	46,313
2020	46,907	47,299	101%	37,206,581	367,195	55,141
2021	94,667	10,078	10.65%	8,495,411		
TOTAL	1,989,143	2,088,977	105%	1,761,522,299	5,632,416	806,467

The National Greening Program ... *continued*

b. The Gains of NGP

2. Gains in forest area/forest cover

- Area Planted **more than 100%** (105% average from 2011-2021)
- total area planted - **2.09 million hectares**
  - larger area planted in first five years from 2011 to 2016
  - target significantly lower the last five years, focus on protecting existing forest more than expanding current forest (Amaro 2021)
  - 1.8 billion seedlings planted

The National Greening Program .... *continued*

b. The Gains of NGP

2. Gains in forest area/forest cover

Philippines registered highest percentage of forest area gain, 3.5% of its 2010 forest area. The period covered is the period of NGP (FAO Global Forest Resources Assessment 2015)

Table 2. Countries reporting the greatest annual forest area gain (2010-2015)*.

NUMBER	COUNTRY	ANNUAL FOREST AREA ('000 has)	ANNUAL CHANGE RATE (% of 2010 forest area)
1	China	1,542	0.8
2	Australia	308	0.2
3	Chile	301	1.8
4	USA	275	0.1
5	Philippines	240	3.3
6	Gabon	200	0.9
7	Lao PDR	189	1.0
8	India	178	0.3
9	Vietnam	129	0.9
10	France	113	0.7

* - Lifted from FRA 2015, Table 2. Extent of forest 1990-2015

The National Greening Program .... *continued*

b. The Gains of NGP

2. Gains in forest area/forest cover

- total forest cover increased by 2.53% in 2015 (NAMRIA)
- "The overall increase in forest cover within forestlands may be attributed to the ongoing implementation of the National Greening Program (NGP)" (Sixth National Report to Convention on Biological Diversity. CHM. 2019)

The National Greening Program .... *continued*

b. The Gains of NGP

3. Social gains of NGP

- More than **5.6 million jobs generated** & total of **806,467 persons employed**
- In 2020, NGP shifted to family implementation approach to **support upland and rural families affected by pandemic** (Amaro 2021)

The National Greening Program .... *continued*

b. The Gains of NGP

4. Other physical gains

- established 22 DENR clonal nurseries & additional 27 clonal nurseries in partner SUCs
- established 75 seed sources in every province
- established 4 mass production facilities for mycorrhizal biofertilizer Hi-QVAM 1

The Mangrove and Beach Forest Development Project (MBFDP)

- MBFDP sites **different from NGP mangrove component sites**
- part of Philippine Reconstruction & Rehabilitation Program (RPP) of 2014 in **response to devastation by Super Typhoon Haiyan (Super Typhoon Yolanda)** (also a reconstructive project of coastal areas damaged by other disasters & calamities)
- **NGP restoration strategies modified for this project** to address urgency & magnitude of needed restoration/rehabilitation work

The Mangrove and Beach Forest Development Project (MBFDP) ... *continued*

significant features

- **prior mapping & baseline data collection** on biophysical & sociocultural characteristics as bases for refining implementation activities & for future impact assessments
- **largely cash-for-work scheme project** (76 % of proposed budget)
- has robust **capacity-building & sustainability mechanism** strategies;
- has **strong, regular participatory monitoring & evaluation system**

The Mangrove and Beach Forest Development Project (MBFDP) ... *continued*

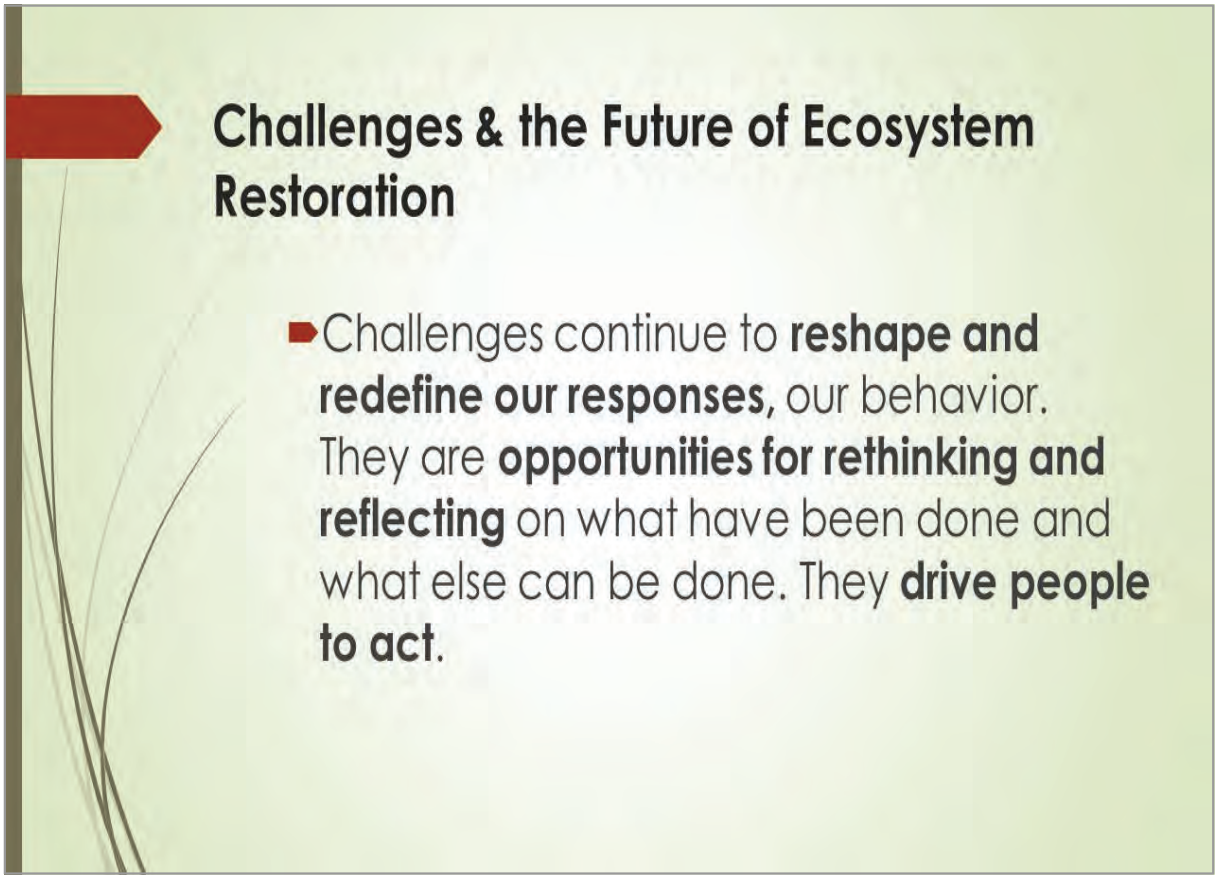
accomplishments

- **50,417 hectares** of coastal areas in **43 Yolanda-hit provinces** were planted with **150 million seedlings/propagules**
- around 90 percent or **44,800 hectares planted with native sp.**

The Mangrove and Beach Forest Development Project (MBFDP) ... *continued*

accomplishments

- **5,617 hectares beach forest belts planted** with indigenous beach tree species
  - -> use of native/indigenous species purposely done **for biodiversity conservation for greater adaptability**
- cash for work target of MBFDP realized within its 1-year implementation; **87,500 jobs generated** & project **benefited 12,500 individuals** hired for site preparation and seedling production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Challenges & the Future of Ecosystem Restoration ... continued
Given all the challenges & with the commitment of the Philippines to the UN Decade on Ecosystem Restoration plus the now heightened awareness of people to the hazard of environmental degradation e.g. cropping up of pandemic-causing virus, climate change, etc., ecosystem restoration will always be alive in the consciousness of people to drive them to act to heal nature & be at peace with nature.

"Healing Nature Through Ecosystem Restoration"

By: Secretary Roy Cimatu, DENR & Dr. Selva Ramachandran, UNDP Philippines

"we **call on everyone to support the global campaign** for the healing of nature through the restoration of our ecosystems. We **must do our part as responsible stewards of our planet before it's too late. It is, after all, the only planet we've got** "

Thank you for listening

Portia Lapitan
Retired Professor and Vice Chancellor
University of the Philippines Los Banos


rehabilitation & protection/conservation, two dimensions of forest ecosystem restoration vigorously pursued by Philippine government
"The Philippines reaffirms its commitment to continuously promote sustainable forest management & exert vigorous efforts to achieve the 6 shared global goals on forests by rehabilitating unproductive, denuded, and degraded forestlands through the country's enhanced national greening program, national forest protection program, and other initiatives"(Amaro 2021)

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

International Symposium on
Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Successful Forest Restoration in Vietnam - Challenges and Lessons Learnt

Dr. Bui The Doi

Vice President, Vietnam National University of Forestry, Vietnam

International Symposium on Ecosystem Restoration for Green and Peace Asia

Successful Forest Restoration in Vietnam: Challenges and Lessons Learnt

By: Assoc. Prof. Dr. Bui The Doi
Vietnam National University of Forestry
Email: doibt@vnuf.edu.vn

Aug. 2021

CONTENTS

I. OVERVIEW OF FORESTRY SECTOR

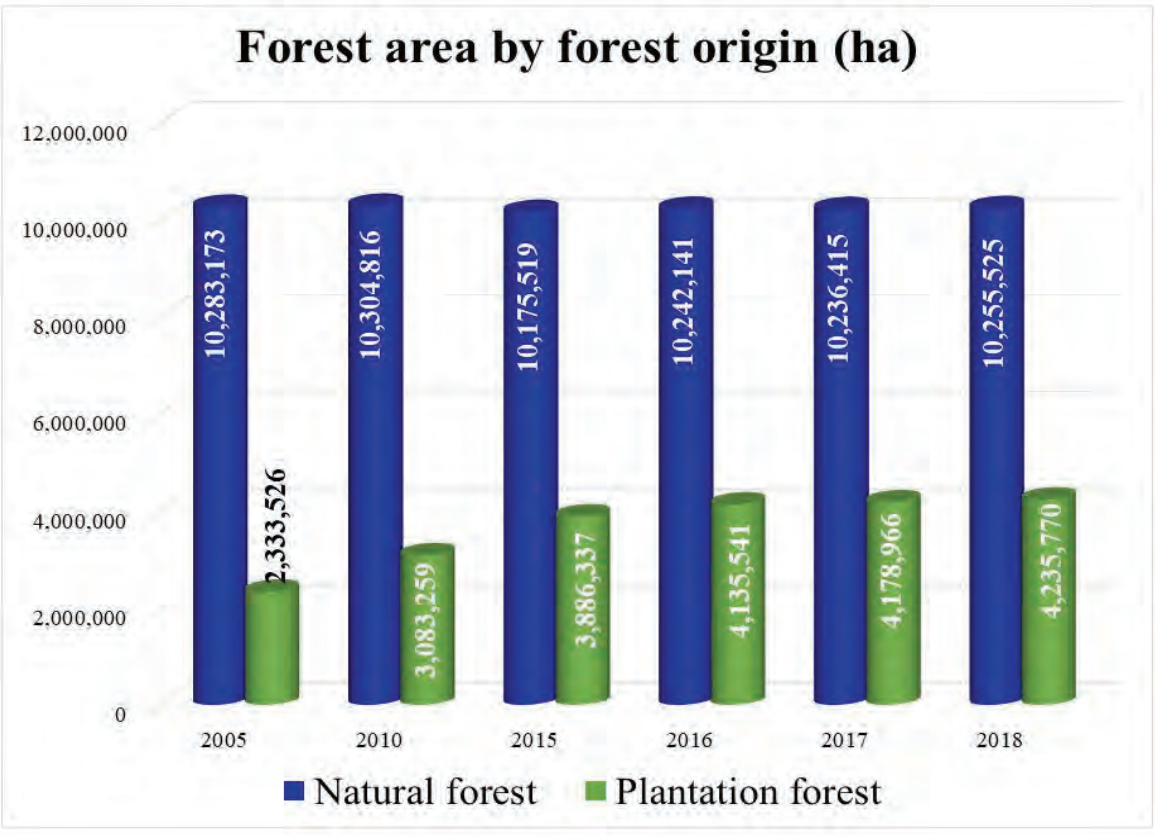
1. About Vietnam
2. Vietnam's forests and forest resources
3. Achievements of forest product processing and trade in recent years

1.1. About Vietnam

- **Located in the Southeast of Asia.**
- **Land area (only): 331,212 km²**
- **3/4 area covered by mountains** and hills ➔ larger forest land.
- 2,360 rivers and streams; 3,444 km coastal line.
- **Climate: Northern hemisphere tropical monsoon**, close-to-equatorial climate, impacted by the Northeast and Southwest monsoons.
- **Population: 97.58 million in 2020** with the density of 294 people/km²
- GDP growth: 7.08% in 2018
- GDP per capita: US$ 2,700 in 2019

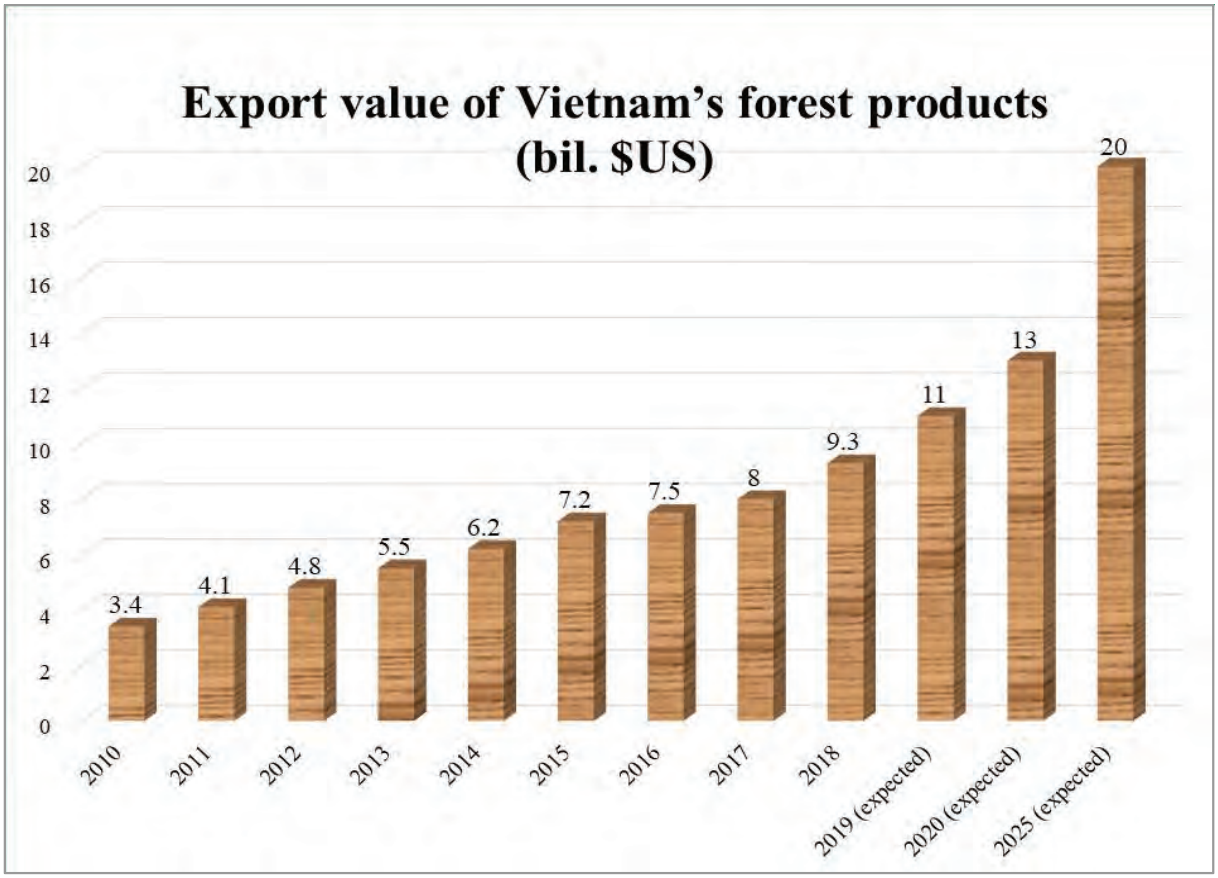
1.2. Vietnam's forests and fore resources

Total forest land area: 16.24 mil. ha, of which, forested area: 14.49 mil. ha

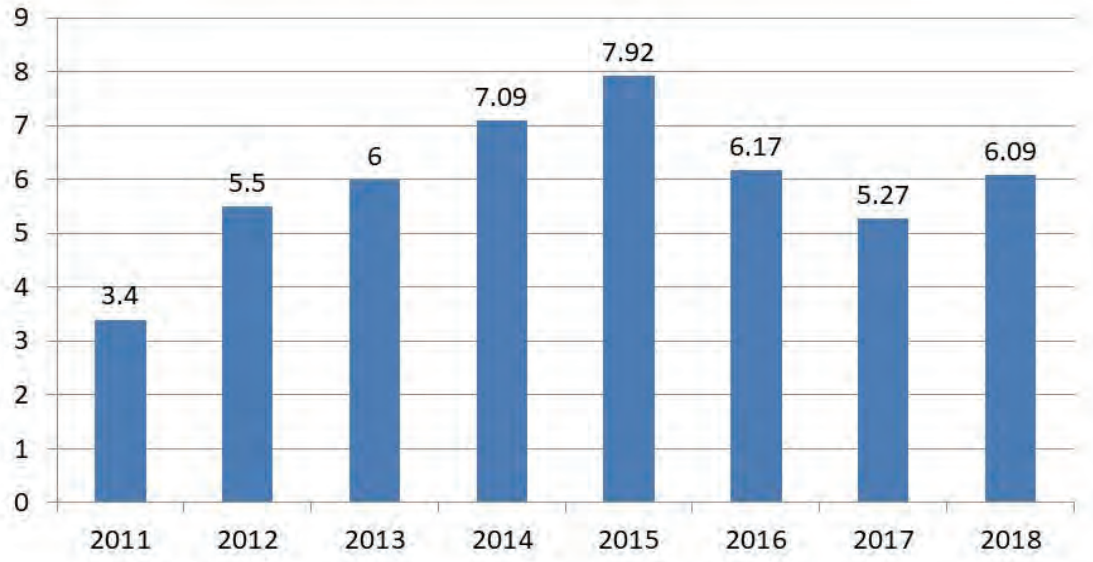


1.3. Forest product processing and trade

- There are around 4,500 forest processing enterprises, including 3,900 domestic and 600 FDI enterprises
- The export value of forest products (FP) has significantly increased over the past 10 years, from 3.4 bil. $US in 2010 to 9.3 bil. in 2018; and 13.2 bil. In 2020
- Vietnam's FP exported to ~120 countries and territories, ranking 5th in the world, 2nd in Asia and 1st in SE Asia in 2019.
- Major exports of Vietnam's forest products: the US, China, Japan, EU and Korea.



Forestry sector growth (%)



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II. FOREST RESTORATION IN VIETNAM

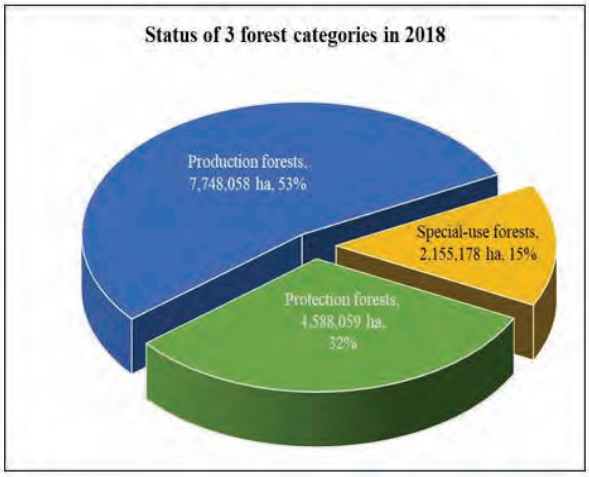
1. Forest categories
2. Challenges on forest restoration
3. Programs/projects for restoration
4. Lesson learnt from forest restoration in Vietnam
5. Forest development and restoration strategy

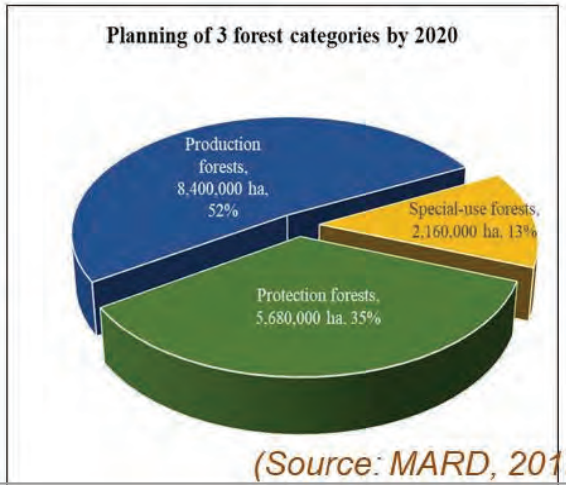
2.1. Forest Categories in Vietnam

Forest land divided into 3 categories:

- Special-Use Forest: 2.15 mil. ha (15%);
- Protection Forest: 4.59 mil. ha (32%);
- Production Forest: 7.75 mil. ha (53%)

Total: 14.49 ha

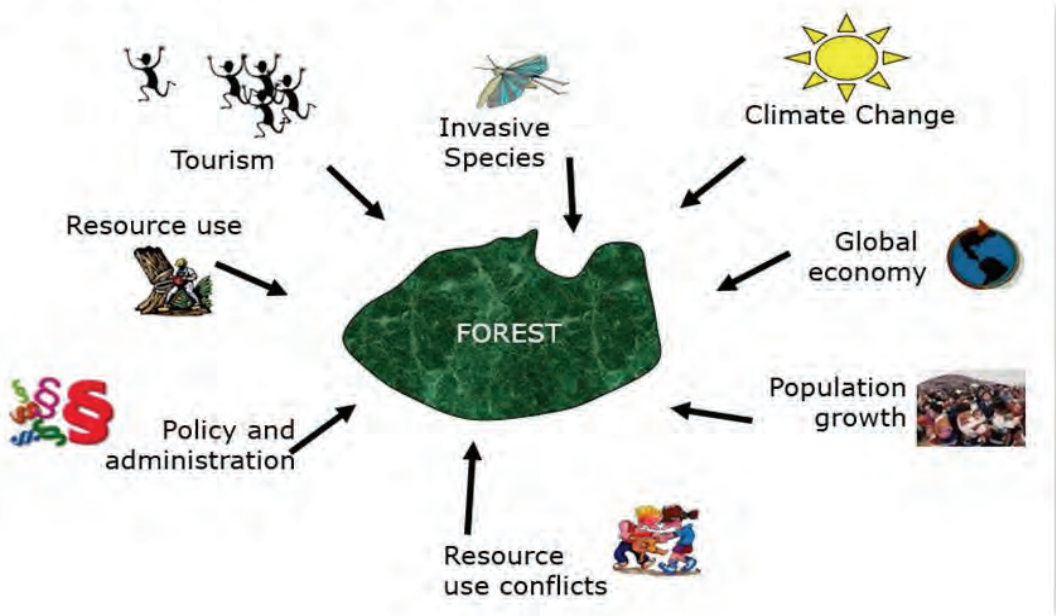




(Source: MARD, 2019)

2.2. CHALLENGES OF FOREST RESTORATION

2.2.1. Impacts on Forest



2.2.2. Challenges to forest restoration

- Production forests are degraded, poor; forest plantations with mainly mono-cultured with very low productivity.
- Most remaining old-growth forests are now protected, but demand for wood form them increasing.
- From 2010-2015, natural forest coverage fell almost 6% (over 300,000 ha), illegal logging and poverty-driven resource extraction.

Sources: VNFOREST, 2017

2.2.2. Challenges to forest restoration (cont')

- State companies control the vast majority of forest land. about 146 state forest companies manage about 2 million ha of forest compared to 3.4 million ha held by small-holders.
- Designing and certifying sustainable management plans for production forests are limited. Development of national certification very slowly.
- The quality of the growth is poor. Some native forests are still being converted into cash crops.

2.2.3. Additional challenges

- **Lack of incentives:**
  - Low income from rehabilitated forest
  - Fund to support forest protection and restoration is short
  - Very low fee coming from environmental services (PFES, PES).
- **Poor forest quality**
  - Low reserves/biomass
  - Low biodiversity
  - Declined high valuable species
- **High cost of forest restoration**
  - Remote area
  - Difficulty topography
- **Forest owners' capacity to manage forests**
  - Limited knowledge/skills
  - Short finance

2.3. PROGRAMS/PROJECTS FOR FOREST RESTORATION

The Greening the Barren Hills Program

- Decision 327/CT (15/9/1992) - On policies on the use of bare land and denuded hills, coastal alluvial areas and water surfaces

The Five Million Hectare Reforestation Project

- Decision 661/QĐ-TTg (29/7/1998) - On objectives, duties, policies and implementing organizations of the 5MHRP

The One Billion Trees Planting Project (2021-2025)

- Decision 524/QĐ-TTg (01/4/2021) - On Planting one billion trees nationwide by 2025. About 690 million trees will be planted in urban and rural areas, and 310 million in forests.

PROGRAMS/PROJECTS ON FOREST RESTORATION IN VIETNAM

1.The Greening the Barren Hills Program

- Time: 1992-1997
- Goal: Recovering bare land, barren hills and protecting the existing forests, promoting forest regeneration and restoration.
- **Key results:**
  + Zoning with additional planting of 0.3 mil ha
  + New planting of 0.4 mil ha, mainly Acacia, Eucalyptus and Pine; Less success with native trees
  + Contracting for forest protection of 1.6 mil ha to 466,000 households and individual

(Source: MARD, 1998)

PROGRAMS/PROJECTS ON FOREST RESTORATION IN VIETNAM

2.The Five Million Ha Reforestation Project (661 Project)

- Time: 1998-2010
- Goal: restoring 2 million ha of protective and special-use forests; and newly planting 3 million ha of production forests
- **Key results:**

+ Newly planted 2.45 million ha, in which: 1.55 million ha of production forest, mainly Acacia, Eucalyptus and Pine species; 0.9 million ha of protection and special-use forests with native tree species with the low success rate

+ 1.28 million ha of promoting natural regeneration and forest enrichment;

+ 0.94 million ha of industrial and fruit trees

(Source: MARD, 2011)

SOME LEGAL DOCUMENTS ON FOREST RESTORATION

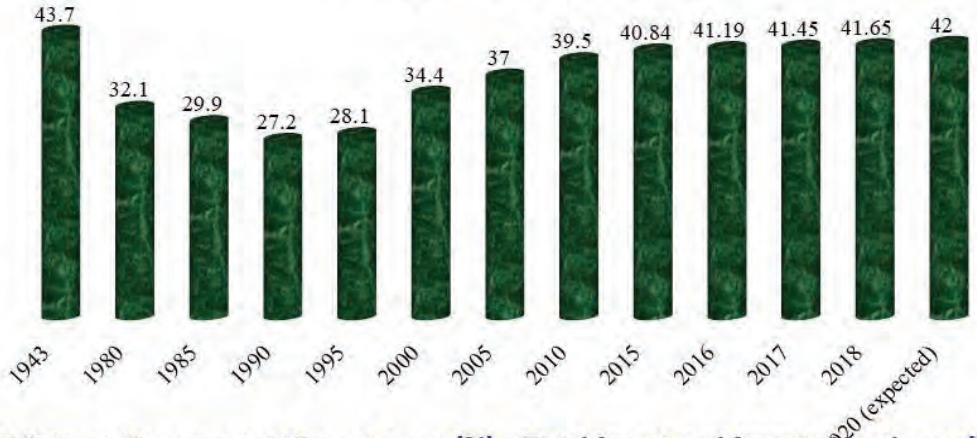
• Land and forest land allocation (LFA) has been promoted by Vietnam Government since 1983 with the policy of making each land area, each forest, and each hill has owner(s).
• Law on Land 2003; amendment 2013.
• Law on Forest Protection and Development 2004.
• Law on Forestry 2017, effective from January 1, 2019.
• Decrees and Circulars follow by Law on Forestry:
- No. 156/ND-CP dated Nov. 2018 implementation of articles of the Law on Forestry –
- No. 01/ND-CP dated Jan, 2019 regulating forest rangers and specialized forest protection forces
- No. 06/ND-CP dated Jan, 2019 on management of endangered, precious and rare forest plants and animals and implementation of CITES
- Seven Circulars were effective in 2018 to serve forest management and restoration.

Other relevant policies

- National strategy on **Green Economy** (Decision 1393/QĐ-TTg in 25 September 2012);
- Agriculture and Rural Development Sector's green economy action plan to 2020 (Decision 923/QĐ-BNN-KH on 24 March 2017);
- **Re-constructing forestry sector** through increasing forest added value, value chain development;

- **Forest services diversification** (timber, NTFPs, ecosystem services...);
- **REDD+ National Action** Plan (Decision 419/QĐ-TTg on 5 April 2017).
- **Degree 59/2017/CP on** Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising From Their Utilization to the Convention on Biological Diversity (**ABS)**

Forest cover (%)



By Vietnam Government: **Forest cover (%) = Total forest and forested land area/Total natural area.**

"Forest" definition by Law on Forestry (2017: *A "forest" is an ecosystem including forest flora and fauna, fungi, microorganisms, forestland and other environmental factors in which the main component is one or some species of trees, bamboo or arecaceae whose height is determined according to the flora of the soil or rocky mountain, submerged land, sandy land or other typical flora; with inter-regional area of at least 0.3 ha; canopy of at least 0.1.*

2.4. LESSONS LEARNT

- **Issued Policies:**

- Legal framework/forest land allocation: household and the community were defined as legal subjects for forest land allocation.
- Planning and monitoring: master planning 3 types of forests nationwide and at provincial level; annual forest monitoring system.
- Policies: clarify rights and benefits, responsibilities of related stakeholders.

Issued policies...

- The state supports: forest protection contracts, supporting the planting of forest products; implementation of PFES, PES.
- Research and development (R&D): varieties, silvicultural techniques, technological transfer, forestry extension, capacity improvement...
- Strengthening the forest education: state universities, colleges, institutes and research centers... on forestry nationwide.

- **Effective Measures:**

- Zoning to promote natural regeneration:

+ Determine the target tree species for planting
+ Take care of regenerated trees by appropriate silvicultural measures
+ Additional planting in the forest gaps if any...

- **Measures...:**

- Forest Enrichment: applied in very poor (degraded) forests and/or young forest with the low target tree rate.

+ Inventory to assess target tree rate
+ determining the forest enrichment method
+ deciding the tree species to plants
+ determination of proper silvicultural measures

- **Measures:**

  - Forest planting on bare land:

  + Site classification
  + Choose the PROPER planting tree species
  + Planting the supporting plants (supporting the target trees)

a) Forestry Sector Restructuring (2016-2020)

- Overall objectives: To develop a forestry sector that is economically, socially and environmentally sustainable; gradually shifting the growth modality towards improved quality, efficiency and competitiveness
- Specific objectives:
  - ➢ To improve the added values of forest environmental products and services;
  - ➢ To gradually meet the demand for timber and timber products for domestic and export markets;
  - ➢ To contribute to job creation, poverty alleviation, livelihood improvement, ecological and environmental protection to aim for sustainable development

Forestry Sector Restructuring

- Orientations:
  - ➢ Strengthening the system of protection forests, special-use forests and production forests;
  - ➢ Increasing the added values of the sector, including adoption of a value-chain based production approach throughout stages of supply chain from harvesting to processing and marketing; development and promotion of forest quality; and development of timber processing industry;
  - ➢ Reforming economic entities in the forestry sector

b) Target program for Sustainable Forest Development for the 2016-2020 period

OVERALL OBJECTIVES

1. Improve forest productivity, quality and production value
2. Mitigate natural disasters, protect ecosystem environment, and respond effectively climate change
3. Create jobs, improve income, reduce poverty, improve livelihoods to address social problems

SPECIFIC OBJECTIVES

ECONOMY

- Increase production value up to 5.5-6.0%;
- Improve plantation productivity to 20 m^3/ha/year;
- Increase forestry product export turnover to 8.0-8.5 bil. USD.

ENVIRONMENT

- Increase forest cover up to 42%;
- Increase the area of forests to14.4 mil. ha.

SOCIETY

- Maintain stably 25 mil. jobs
- Increase income and improve livelihoods for forest owners

MAIN TASKS TO 2020

Protection & nature conservation	Development & improvement of forest productivity and quality	Increase of forest products' added value
• Protect existing forests • **Restore 15% of degraded forests and increase 100,000 ha of SUFs** • Strengthen law enforcement, reduce the area of deforestation and the number of violations to and 30-35%	• Afforestation and post-harvesting reforestation: 1,025,000 ha • Natural forest regeneration: 360,000 ha/year • Scattered tree plantation: 250 mil. trees • Transformation from small-diameter timber plantation forests to large-diameter timber plantation forests: 90,000 ha • Proportion of planted forests under the control of seed quality: 75-80%	• Develop timber processing industry • Organize commodity chain – based production; • Support for certification of sustainable forest management: 100,000 ha /year

International Cooperation

- Vietnam joined and member international organizations and treaties (CITES, UNFCCC, UNCCD, UNFF, APFC, COFO, ITTO, AFoCO, ASOF, APFNet...). Over the years, Vietnam has made efforts to fully and seriously implement its commitments and actively participate in activities within the framework of international organizations and treaties.
- VNFOREST signed a MOU on forestry cooperation with 7 countries: Korea, China, Cambodia, Laos, Indonesia, South Africa, Mozambique and a Letter of Intent (LOI) with the United States. These bilateral agreements aim to promote policy dialogues and information exchange in forest management, protection and development, and so on...

Voluntary Partnership Agreement on Forest Law Enforcement, Governance and Trade (VPA/FLEGT) between Vietnam and the European Union

- Vietnam and the EU have been negotiating VPA/FLEGT since Nov. 2010. The purpose of the Agreement is to ensure that all timber and wood products exported from Vietnam to the EU are of legal origin.
- The negotiation process ended in May 2017 and officially signed the VPA/FLEGT on Oct. 19, 2018 in Brussels, Belgium.
- The European Parliament voted to ratify the VPA/FLEGT on March 12, 2019 and on April 15, 2019, the EU announced the completion of the ratification procedure. Vietnam ratified it in May 2019.

REDD+ IMPLEMENTATION

- UN-REDD Vietnam Program Phase 1 and 2 (Norway funded through UNDP, UNEP, FAO),
- REDD+ Readiness Support Project in Vietnam Vietnam phase 1 and 2 (FCPF-WB), Dien Bien REDD+ Project (JICA), Forests and Deltas Program (USAID), Sustainable Natural Resource Management Project (JICA)...
- Total committed capital funding for Vietnam about 80.00 mil. $US dollars. ➔ contributed to forest restoration in many provinces and other locations.

CONCLUSION

- In recent years, the forestry sector of Vietnam has achieved a high and stable growth rate, making an important contribution to the economic development of the country.
- The forest has been well restored due to the policy of land allocation and forest allocation, the restoration and afforestation programs have brought into wonderful results; good forestry socialization and contributing to hunger eradication and poverty reduction, millions of households and communities have been allocated. The forest area increased steadily over the years, the national forest coverage rate will reach 42% in 2020.
- The forestry sector has been implementing many practical programs and projects with the common goal of promoting the protective function of forests in response to climate change, disaster mitigation, and conservation of forests, biodiversity conservation

(By MARD, 2020)

CONCLUSION (Cont')

- In the coming time, focus on restructuring nesting with climate change response and environmental protection. In addition, it is necessary to promote and focus on forest protection, especially natural forests.
- The forestry sector actively cooperates with ministries, departments, branches and localities to successfully implement the task of "planting 1 billion trees in the next 5 years" launched by the Prime Minister.

(By MARD, 2020)

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- https://sachsongngu.top/xem-online/luat-song-ngu/luat-khac-other-law/luat-lam-nghiep-2017-law-on-forestry-2017/


한국산림과학회
KOREAN SOCIETY OF FOREST SCIENCE
UNITED NATIONS DECADE ON
ECOSYSTEM
RESTORATION
2021-2030
Thank you for your attention!

International Symposium on Ecosystem Restoration for Green and Peace Asia


Ecosystem Restoration on Ex-Mining Areas in Indonesia
TANAMAN SISIPAN
Dr Irdika Mansur
Department of Silviculture-Faculty of Forestry & Environment
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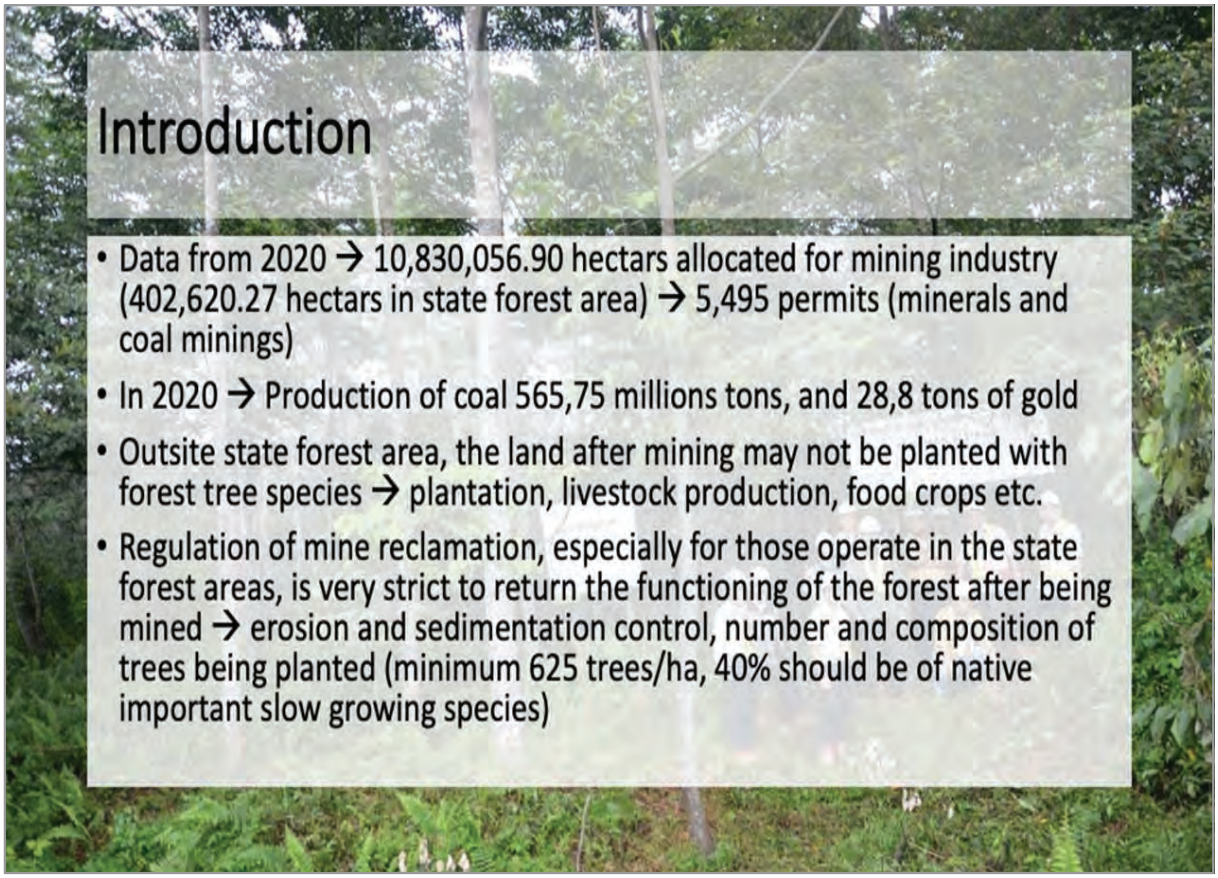
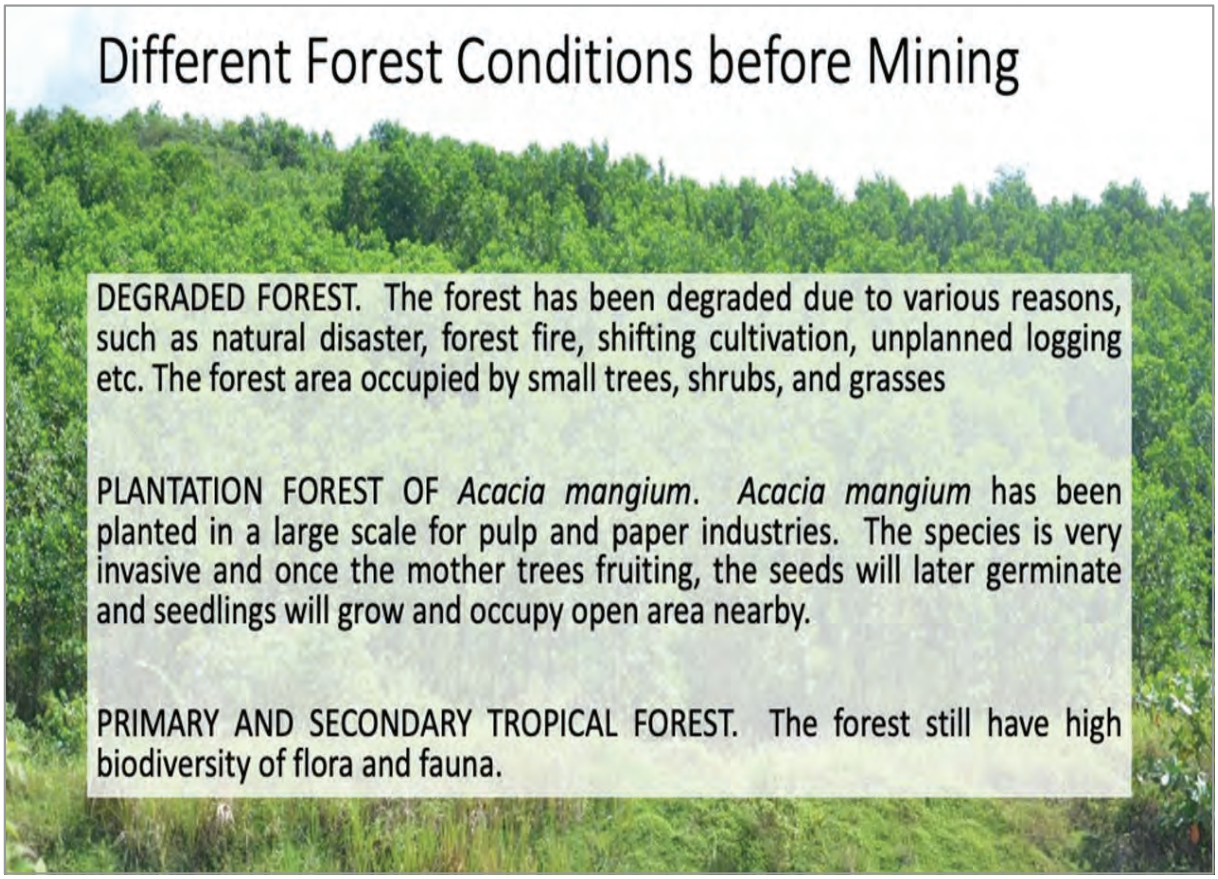
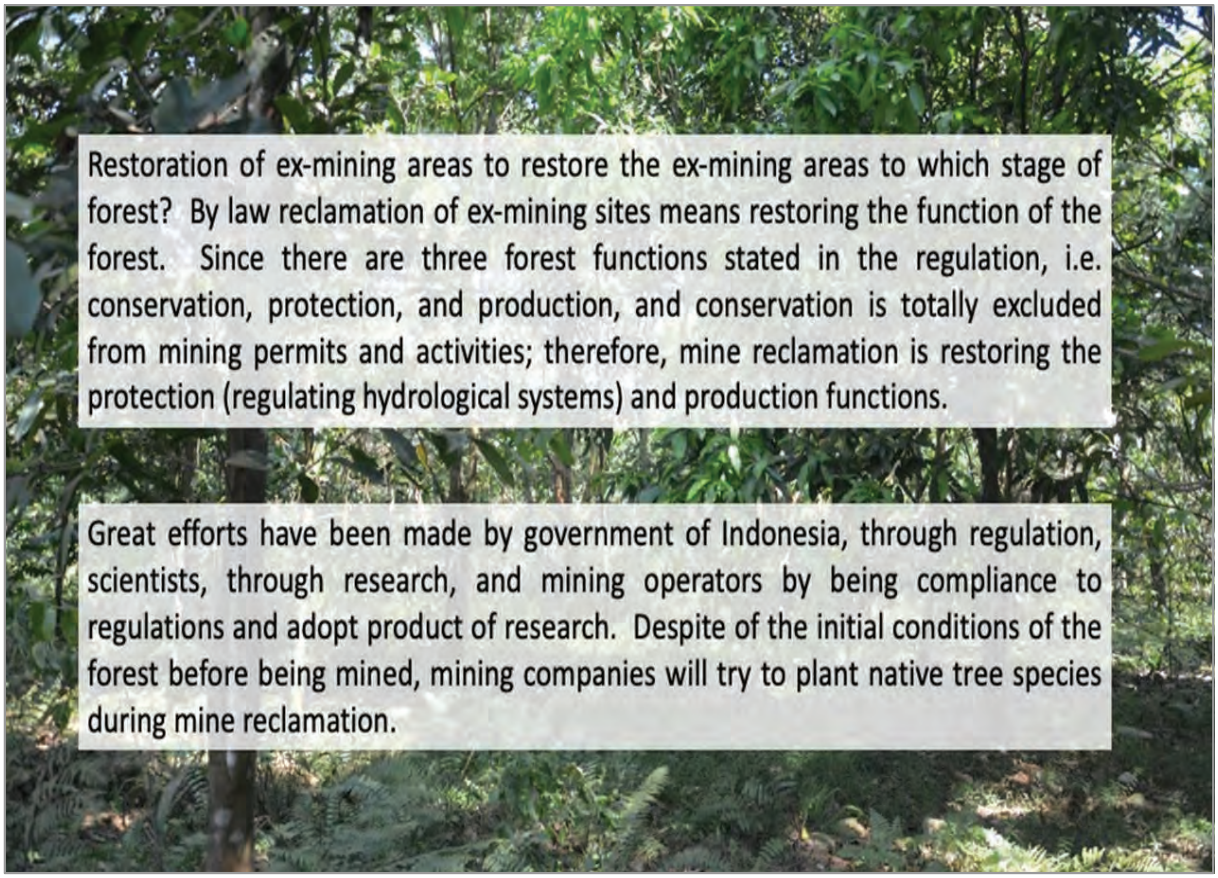
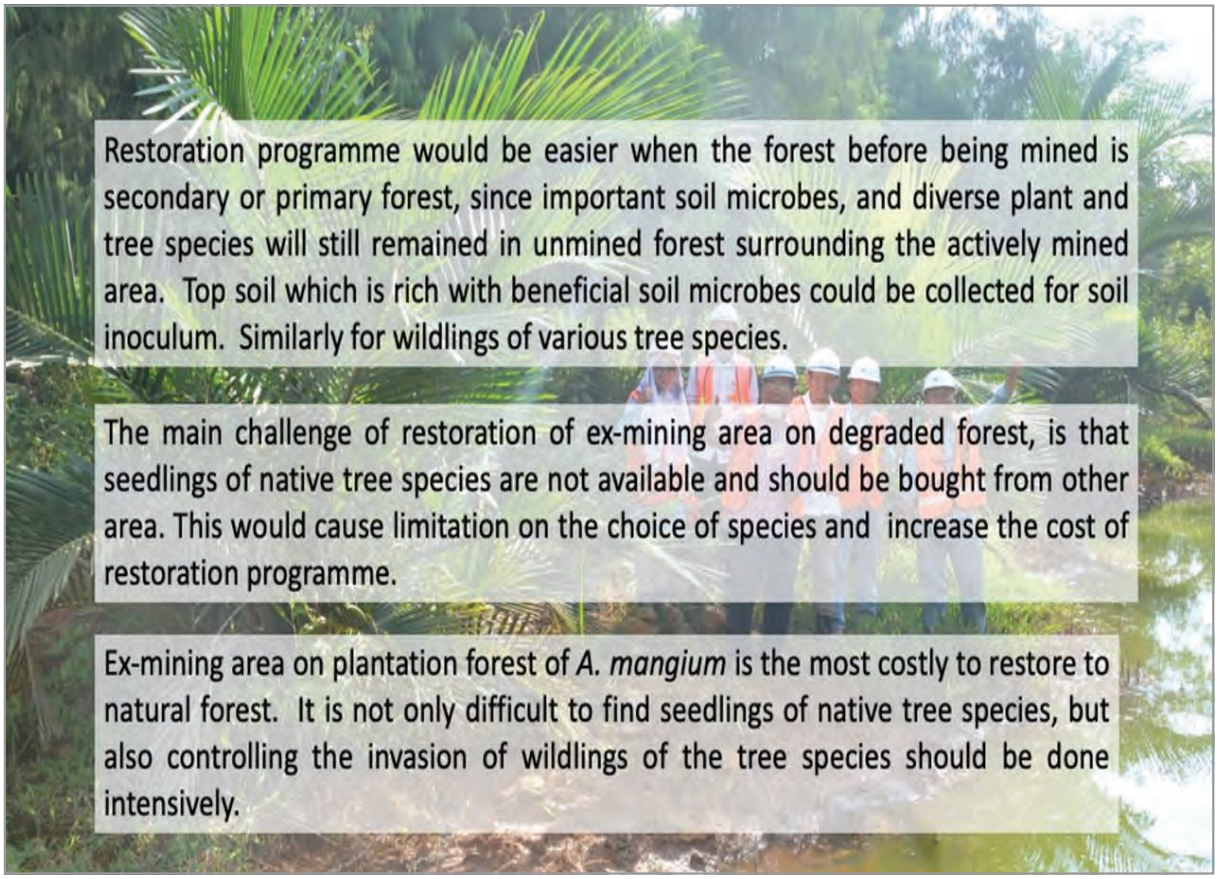
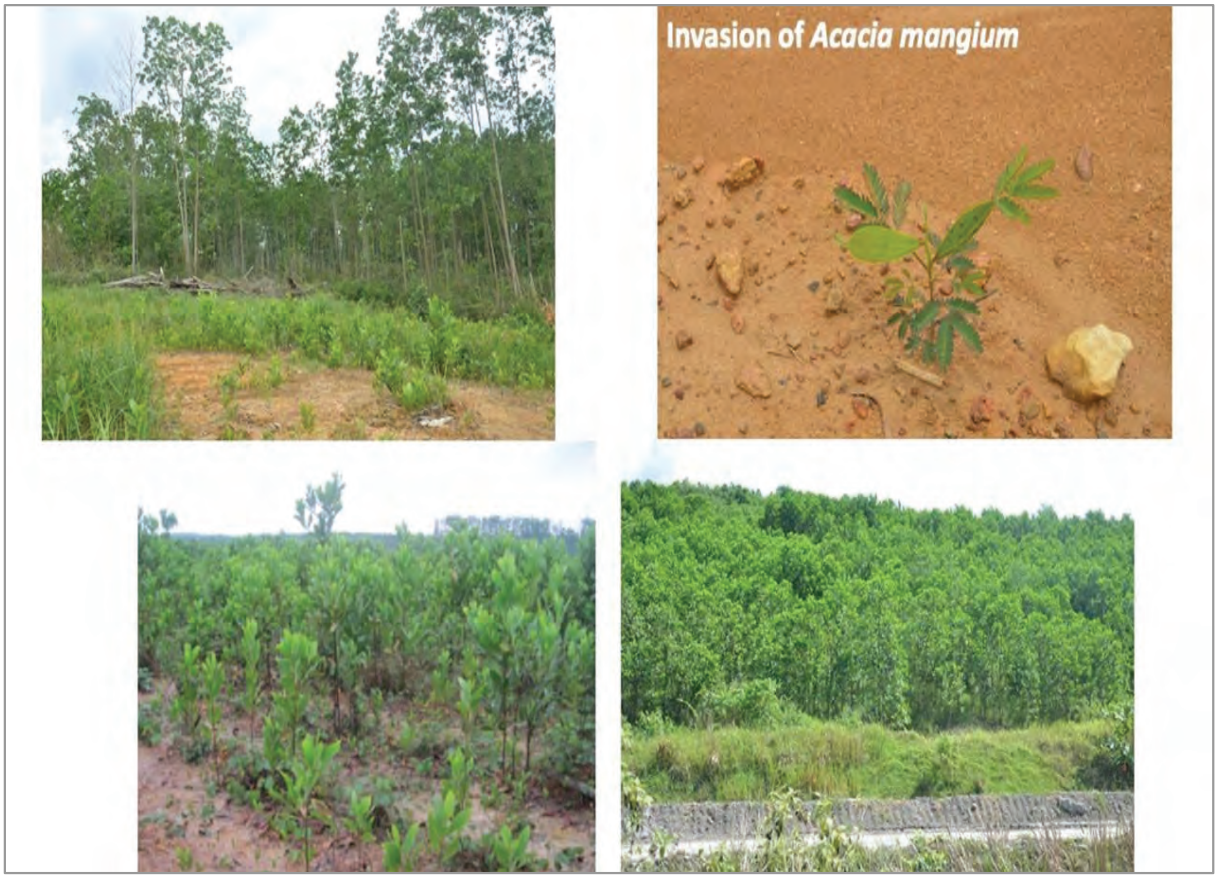
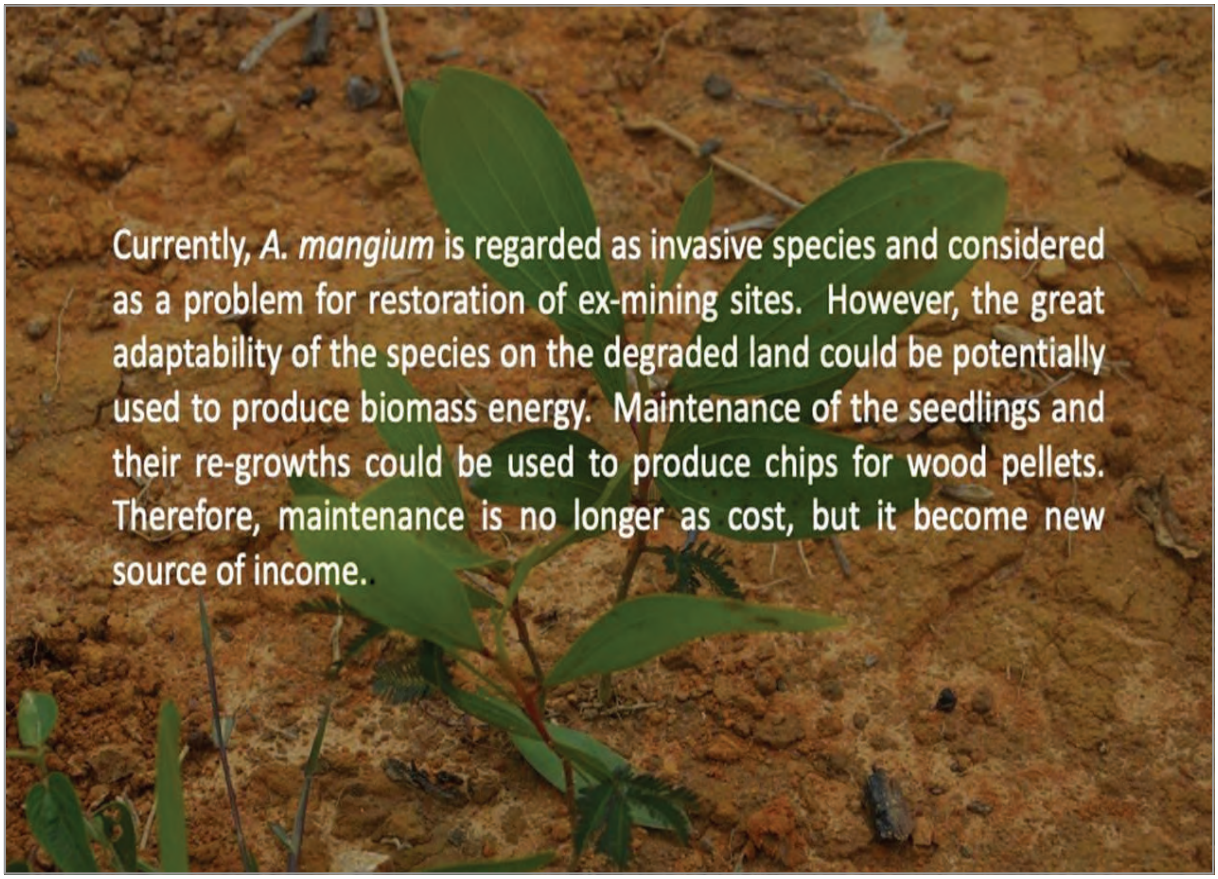

Introduction
• Data from 2020 → 10,830,056.90 hectars allocated for mining industry (402,620.27 hectars in state forest area) → 5,495 permits (minerals and coal minings)
• In 2020 → Production of coal 565,75 millions tons, and 28,8 tons of gold
• Outsite state forest area, the land after mining may not be planted with forest tree species → plantation, livestock production, food crops etc.
• Regulation of mine reclamation, especially for those operate in the state forest areas, is very strict to return the functioning of the forest after being mined → erosion and sedimentation control, number and composition of trees being planted (minimum 625 trees/ha, 40% should be of native important slow growing species)


Different Forest Conditions before Mining
DEGRADED FOREST. The forest has been degraded due to various reasons, such as natural disaster, forest fire, shifting cultivation, unplanned logging etc. The forest area occupied by small trees, shrubs, and grasses
PLANTATION FOREST OF *Acacia mangium*. *Acacia mangium* has been planted in a large scale for pulp and paper industries. The species is very invasive and once the mother trees fruiting, the seeds will later germinate and seedlings will grow and occupy open area nearby.
PRIMARY AND SECONDARY TROPICAL FOREST. The forest still have high biodiversity of flora and fauna.


Restoration of ex-mining areas to restore the ex-mining areas to which stage of forest? By law reclamation of ex-mining sites means restoring the function of the forest. Since there are three forest functions stated in the regulation, i.e. conservation, protection, and production, and conservation is totally excluded from mining permits and activities; therefore, mine reclamation is restoring the protection (regulating hydrological systems) and production functions.
Great efforts have been made by government of Indonesia, through regulation, scientists, through research, and mining operators by being compliance to regulations and adopt product of research. Despite of the initial conditions of the forest before being mined, mining companies will try to plant native tree species during mine reclamation.


Restoration programme would be easier when the forest before being mined is secondary or primary forest, since important soil microbes, and diverse plant and tree species will still remained in unmined forest surrounding the actively mined area. Top soil which is rich with beneficial soil microbes could be collected for soil inoculum. Similarly for wildlings of various tree species.
The main challenge of restoration of ex-mining area on degraded forest, is that seedlings of native tree species are not available and should be bought from other area. This would cause limitation on the choice of species and increase the cost of restoration programme.
Ex-mining area on plantation forest of A. mangium is the most costly to restore to natural forest. It is not only difficult to find seedlings of native tree species, but also controlling the invasion of wildlings of the tree species should be done intensively.


Invasion of Acacia mangium



A good nursery is a key of success for restoration of ex-mining area. Production of target species could be done in the nursery, various propagation techniques could also be applied to meet the characteristics of the species. A nursery could also be used as a show window for the mining company on their commitment to restore their ex-mine area.


Initial planting with legume/grass cover crops to control erosion and fast growing-light demanding tree species to prepare environment for planting of native species, that are commonly of semi-tolerant species (need shade when they are young)

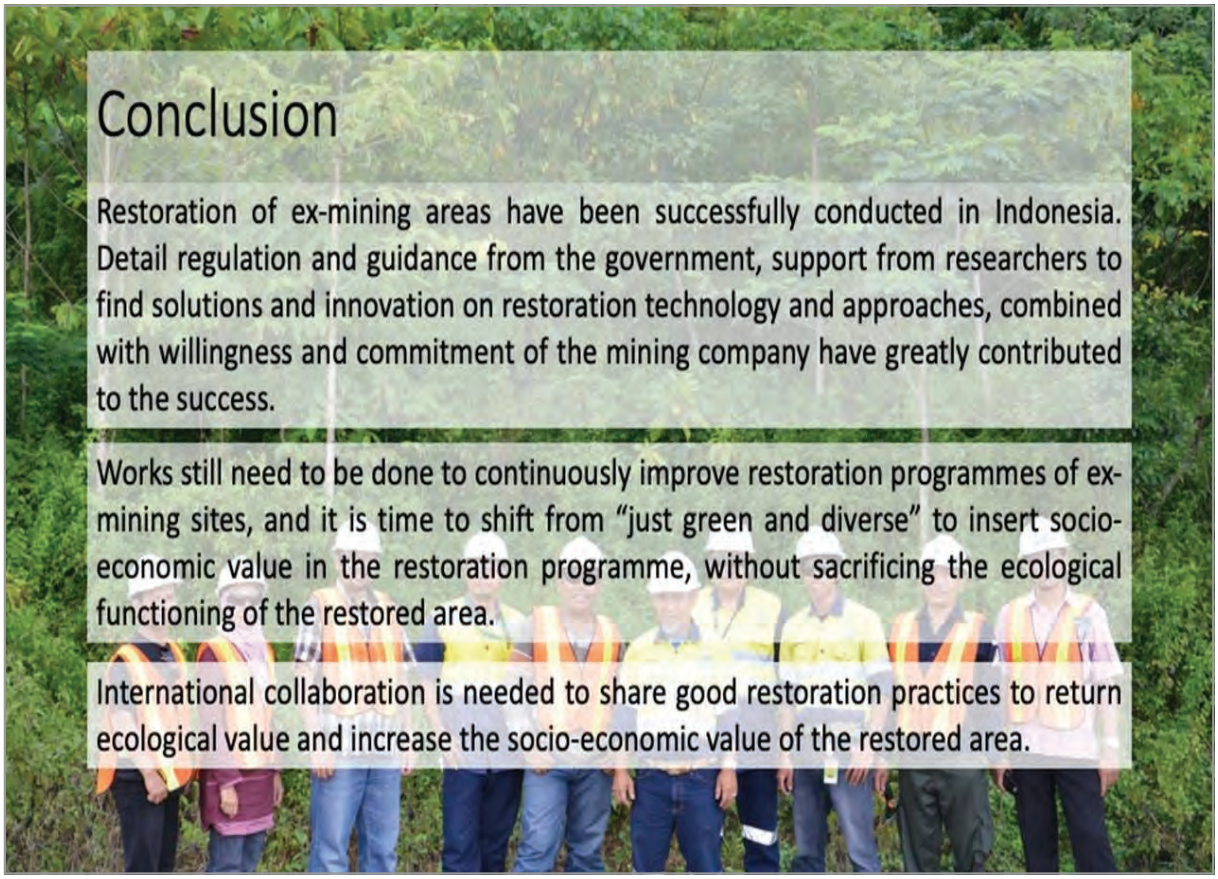
Transplanting native slow growing semi-tolerant tree species under nurse trees (ideally 2 years after planting of the nurse tree species)

Planting of various Dipterocarps species and iron tree (*Eusideroxylon zwageri*) under nurse trees in an ex-gold mining area in Central Kalimantan, Indonesia

12 years old restoration of ex-nickel mining in South Sulawesi, Indonesia. Natural regeneration of some species and litter decomposition have been observed showing the reviving of ecological processes.

14 years old *Shorea leprosula* native highly commercial tree species growing on an ex-coal mining site in East Kalimantan, Indonesia. Hornbill and Eagle have spotted in the area. Hornbill has been categorized as nearly threatened bird species.

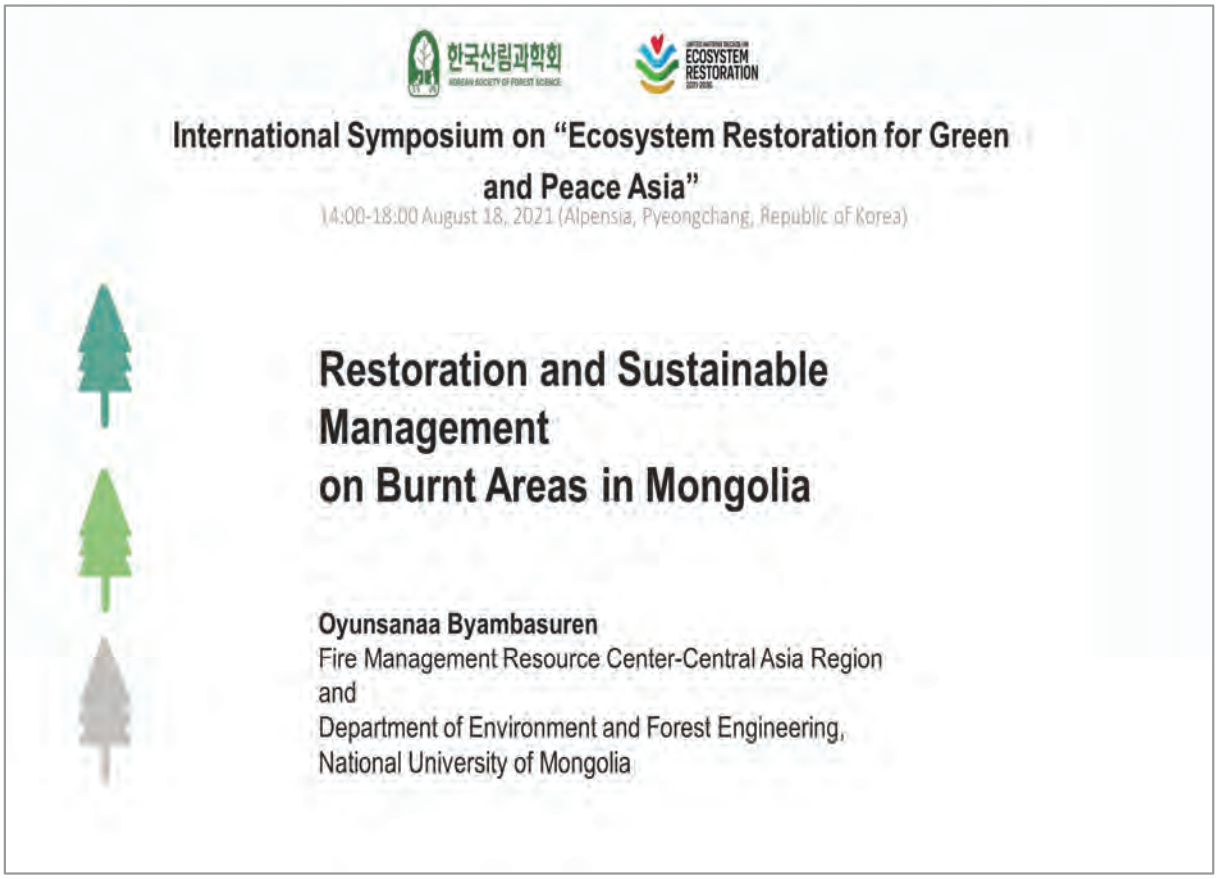
Over-shading of native species by fast growing exotic species has suppressed the growth of the native one. Pruning and thinning are needed since early stage of stand development.

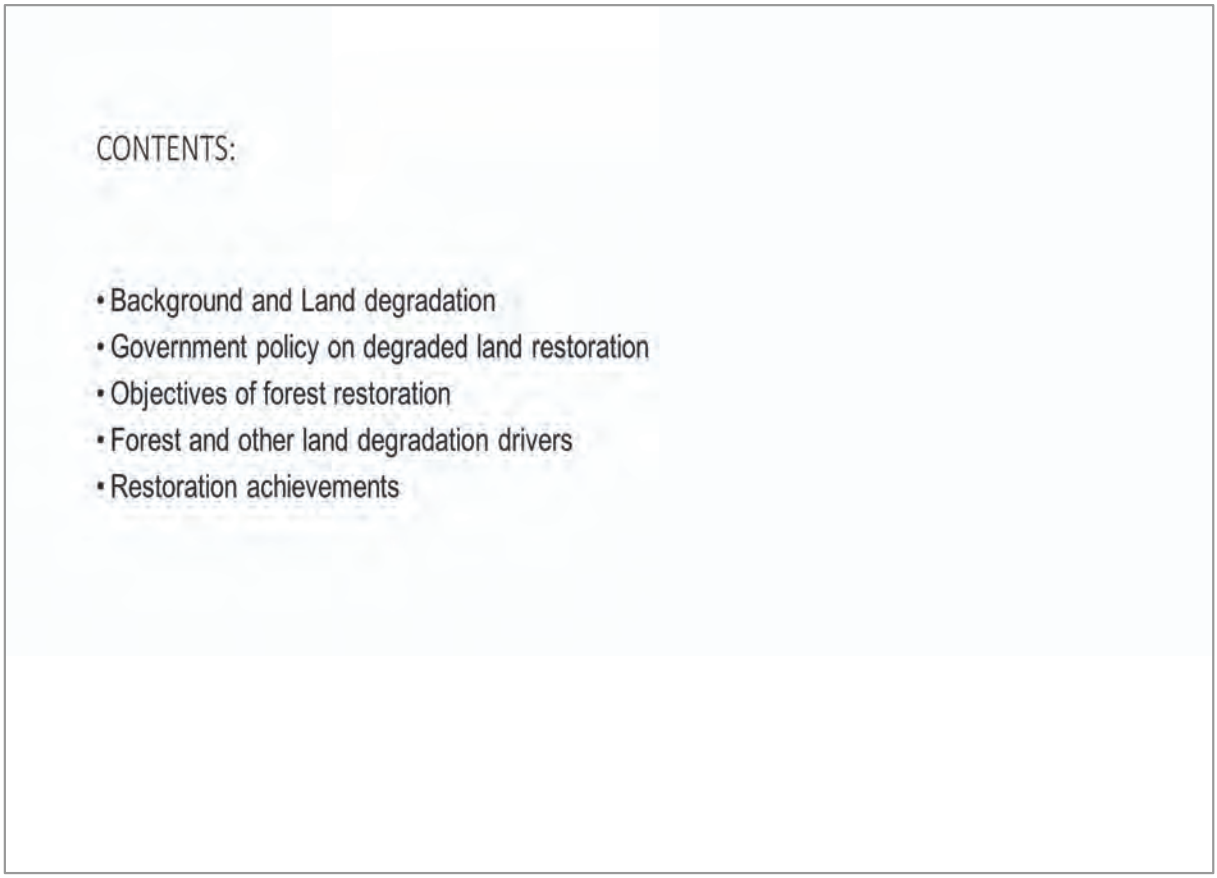


Acknowledgment

- Korean Society of Forest Science (KSFS)
- Prof Ho Sang Kang
- PT Vale Indonesia, PT Berau Coal, PT Aman Mineral Nusatenggara, PT Kasongan Bumi Kencana for the pass and recent collaborations

International Symposium on Ecosystem Restoration for Green and Peace Asia


한국산림과학회
ECOSYSTEM RESTORATION
International Symposium on "Ecosystem Restoration for Green and Peace Asia"
14:00-18:00 August 18, 2021 (Alpensia, Pyeongchang, Republic of Korea)
Restoration and Sustainable Management on Burnt Areas in Mongolia
Oyunsanaa Byambasuren
Fire Management Resource Center-Central Asia Region
and
Department of Environment and Forest Engineering,
National University of Mongolia


CONTENTS:
• Background and Land degradation
• Government policy on degraded land restoration
• Objectives of forest restoration
• Forest and other land degradation drivers
• Restoration achievements

Background

Mongolia has over 76.8 % of its territory under threats of desertification and land degradation including almost all of its grasslands and pastureland.

Land degradation has been the most challenging environmental issues in Mongolia as it is closely related to the most prominent economic sectors – agricultural sector is dominated by livestock which contributes almost 85 % of the sector as a whole, enabling Mongolia being second biggest raw cashmere producer in the world after China.

Background

Land Degradation:
Desertification process (percentage in the total territory)

Assessments made in	Areas slightly affected	Areas moderately affected	Areas strongly affected	Areas severely affected	total
2006	23	26	18	5	72
2010	35.3	25.9	6.7	9.9	77.8
2016	24.1	29.8	16.8	6.1	76.8

Government policy on degraded land restoration

- Government Policy on Ecology,
- National Security Concept of Mongolia,
- Sustainable Development Concept-2030,
- Green Development Policy
- National Action Program to Combat Desertification, prioritized wide-range goals and measures to address the land degradation and desertification /In 2010 the Government approved the NAP, updated in line with the new 10-year strategy of UNCCD/.
- Government policy focuses on the strengthening multilateral cooperation for combating desertification

Objectives of Forest Restoration

Sustainable development goals
(Parliament decree 2016)

I STAGE (2016-2020): Reduce desertification, increase protected areas 25 % of territory, forested area 8.5 %
II STAGE (2021-2025): Reduce desertification, increase protected areas 27 % of territory, forested area 8.7 %
III STAGE (2026-2030): Reduce desertification, increase protected areas 30 % of territory, forested area 9.0 %

State Policy on Forest policy
(Parliament decree 2015)

Objectives

Forested area
2020 yr 8,3%,
2030 yr 9,0%

Implementation stages

2015 yr 12280,0 thous.ha
2020 yr 12984,0 thous.ha
2030 yr 14079,0 thous.ha

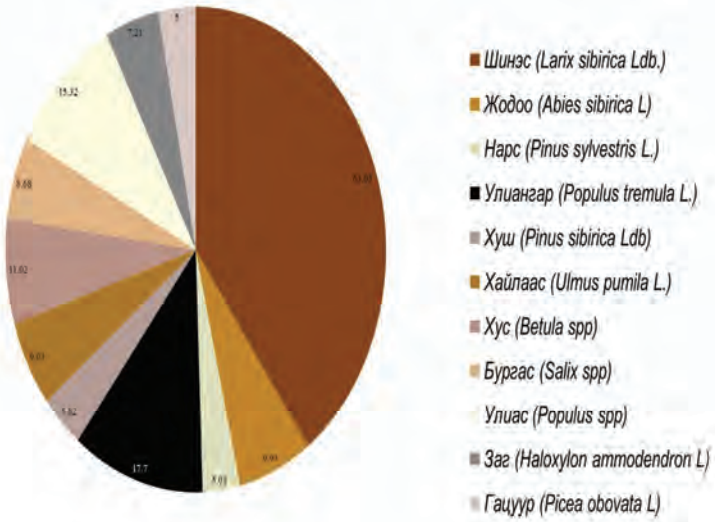
→ Per year (avg) 120,0 thous.ha

Supporting natural regeneration and plantation
2020 yr 310,0 thous.ha,
2030 yr 1500,0 thous.ha

Mongolian forest

In 2020, the total forest land area of the country was estimated 12,9 million ha of closed forest which covers 8,3% of total land area of the Mongolia

Dominant forest tree species of Mongolia

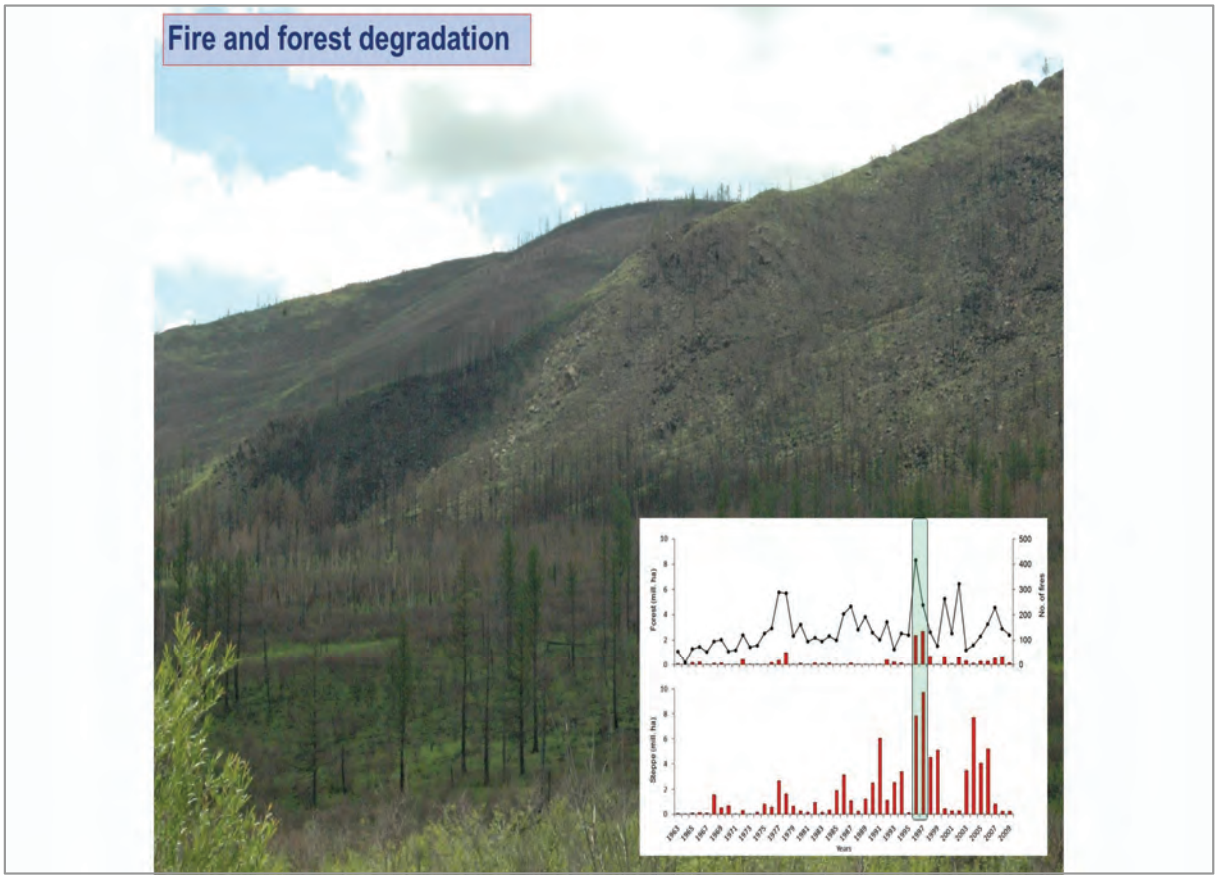


Key drivers of deforestation and forest degradation

	Driver	Direct causes	Indirect causes
1	Forest fires	80-95%, caused by humans	Perverse incentives in regulations
2	Illegal logging	Commercialized illegal logging; small-scale logging; fuel wood collection (cooking and heating)	Weak law enforcement; increasing demand for timber; poverty; lack of alternative fuel sources
3	Insect invasion	Moths and beetles	Lack of research
4	Forest disease		Lack of research
5	Grazing forest areas	Livestock damage on forest regeneration/regrowth	Increased number of livestock; lack of regulation
6	Mining industry	Clearing mining sites and chemical contamination	Mining license overlap with forested areas

Fire situations:

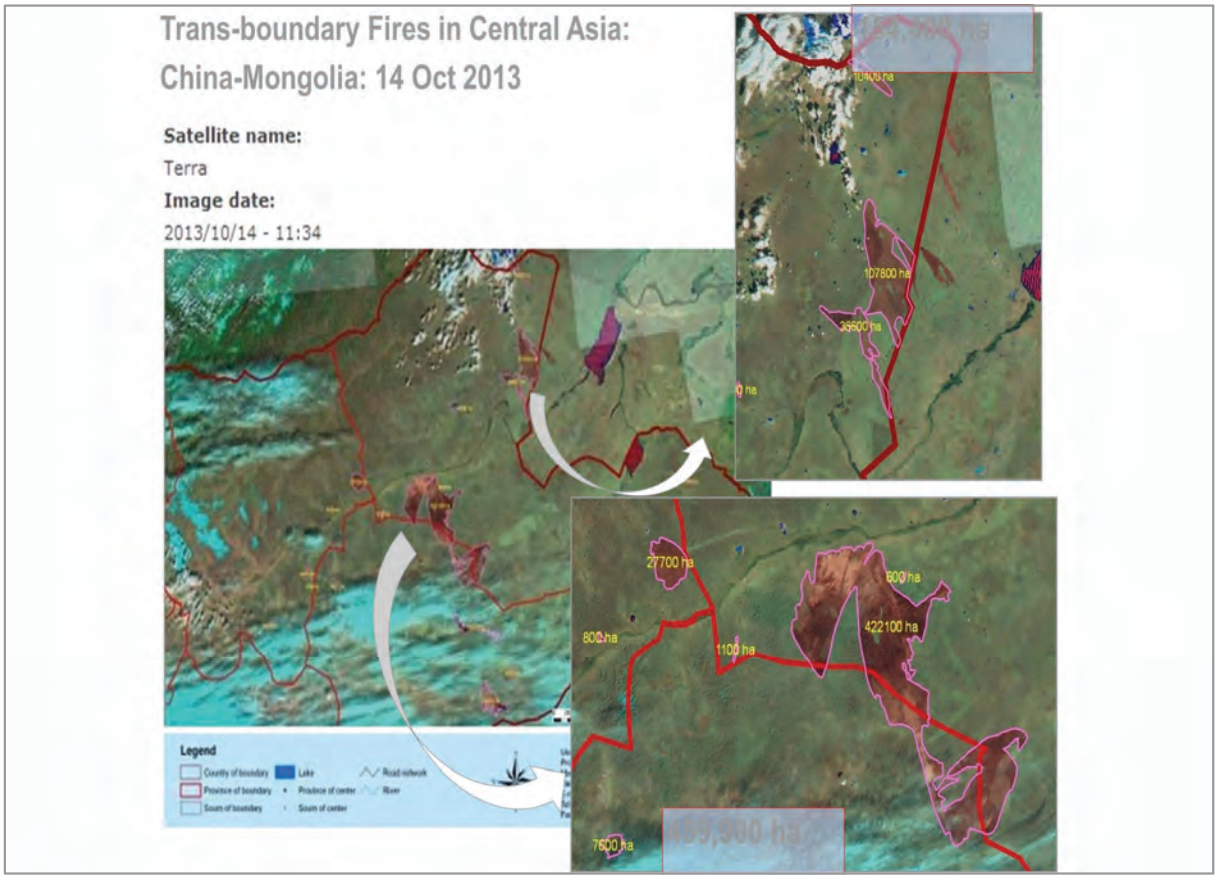
- **Socio-economic changes**
- Environment, human and economic security issues

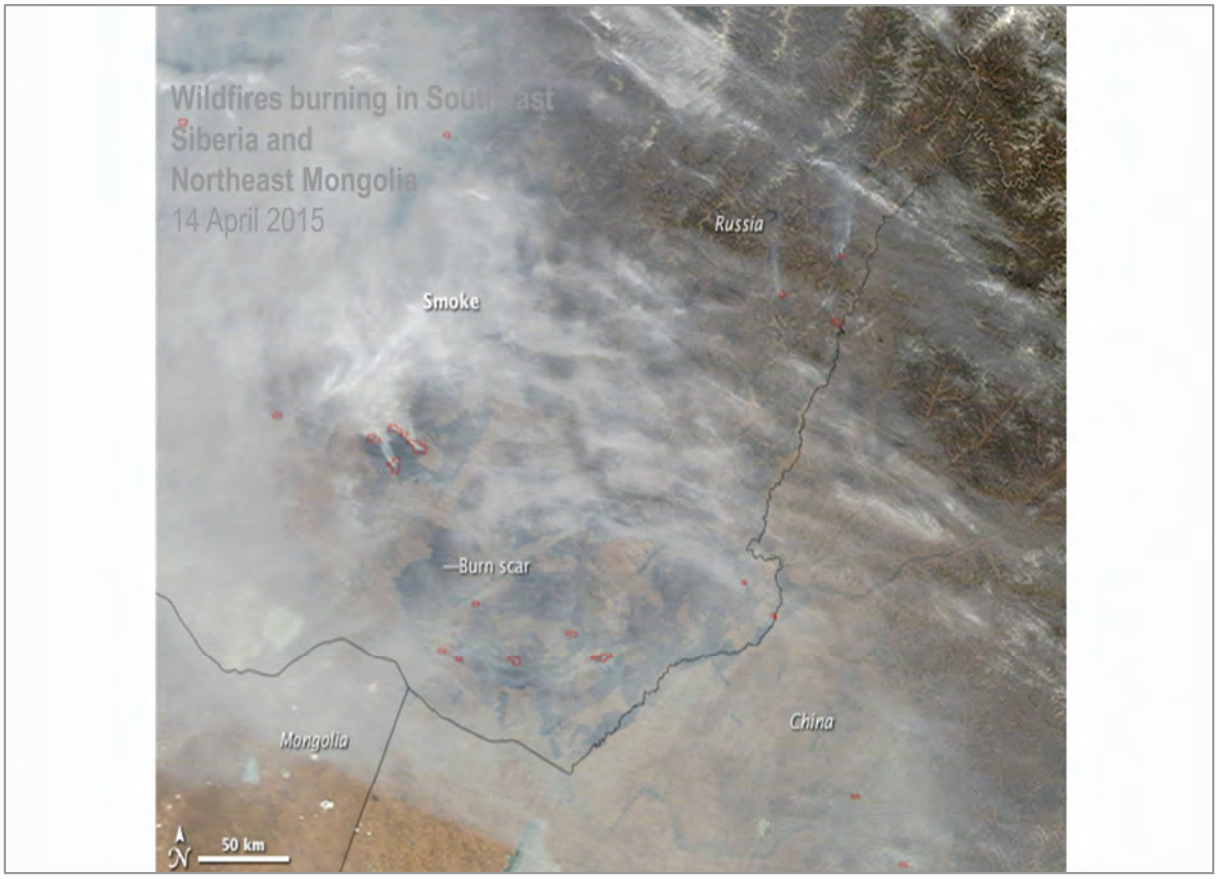

Fire and forest degradation


Fire and forest degradation

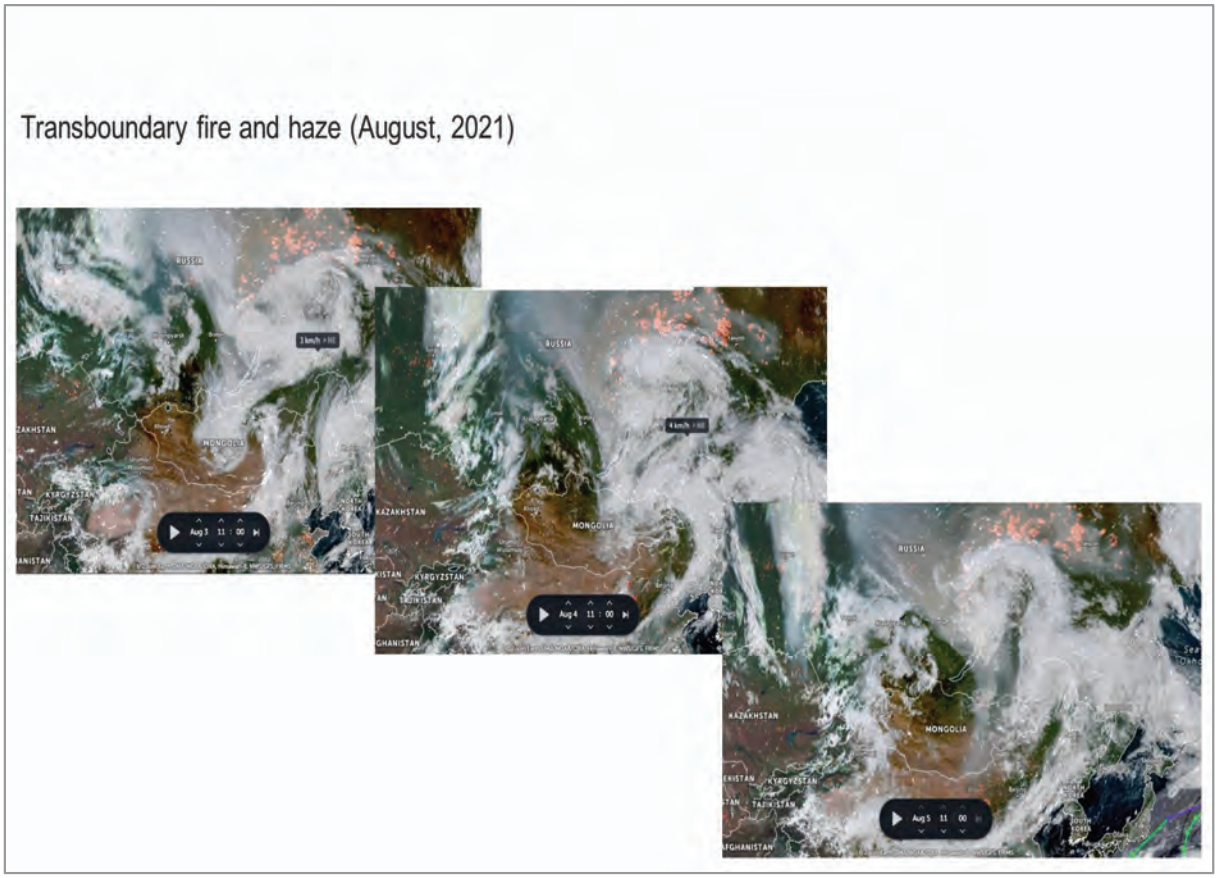

Fire and "Steppezation" in Mongolia

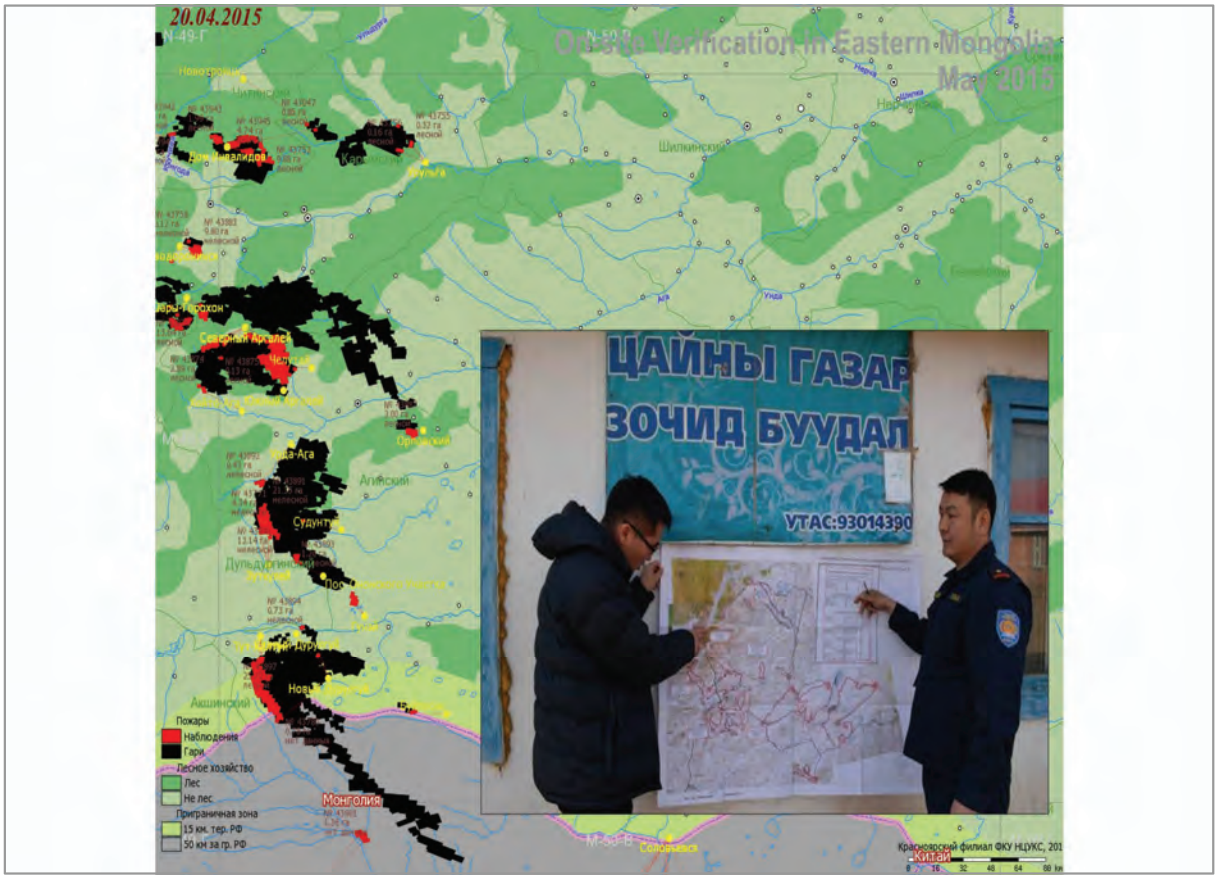

Fire and rural livelihood
Over 2000 livestock burned.
Khentii province,
05 May 2013


Trans-boundary Fires in Central Asia:
China-Mongolia: 14 Oct 2013
Satellite name:
Terra
Image date:
2013/10/14 - 11:34
107800 ha
33600 ha
27700 ha
800 ha
422100 ha
1100 ha
7600 ha
Legend


Wildfires burning in Southeast
Siberia and
Northeast Mongolia
14 April 2015
Russia
Smoke
Burn scar
Mongolia
China
50 km

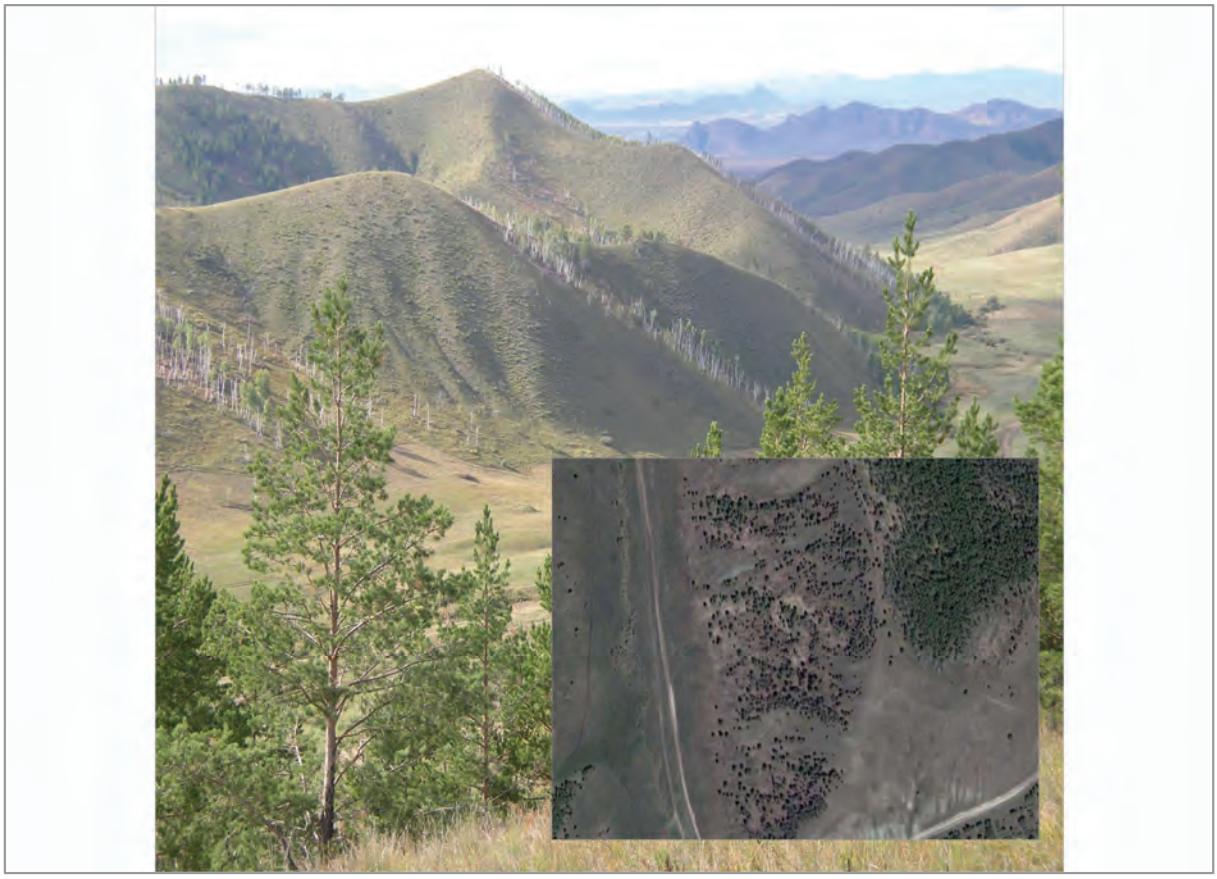

Smoke Export to the Pacific and North America
April 2015
15 April 2015
0.0 Aerosol Index 5.0


Transboundary fire and haze (August, 2021)
RUSSIA
KAZAKHSTAN
MONGOLIA
KYRGYZSTAN
TAJIKISTAN


20.04.2015
On-site Verification in Eastern Mongolia
May 2015
ЦАЙНЫ ГАЗАР
ЗОЧИД БУУДАЛ
УТАС:93014390
Пожары
Наблюдения
Гари
Лесное хозяйство
Лес
Не лес
Приграничная зона
15 км. тер. РФ
50 км за гр. РФ
Монголия
Китай


On-site Verification in Eastern Mongolia
May 2015


National Inter-Agency Round Table
May 2015
БАЙГАЛЬ ОРЧИН, НОГООН
ХӨГЖИЛ, АЯЛАЛ
ЖУУЛЧЛАЛЫН ЯАМ

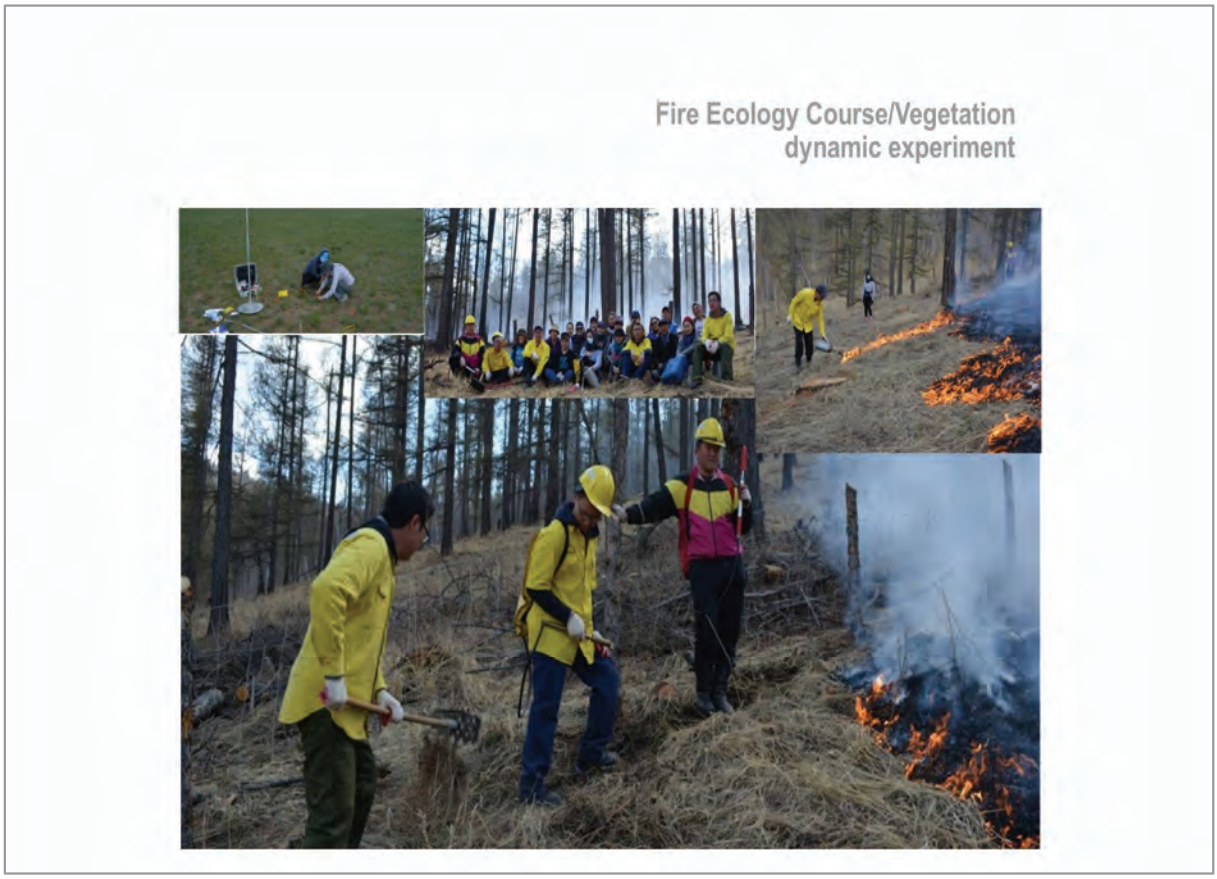



New fire fighting tools


Introduction: The use of Prescribed Fire


Introduction: The use of Prescribed Fire


Fire Behaviour ....


Fire Ecology Course/Vegetation
dynamic experiment


Restoration in Forest-Steppe Ecotone
(Selenge province, Tujiin nars)
2008
2021
Fire, logging, insects
Reforested Scots pine stand 15,000 ha


Restoration in Forest-Steppe Ecotone
(Selenge province, Tujiin nars)


Restoration in Forest-Steppe Ecotone
(Selenge province, Tujiin nars)
20

Afforestation activities for Combating desertification Mongolia-Korea "Green belt project"

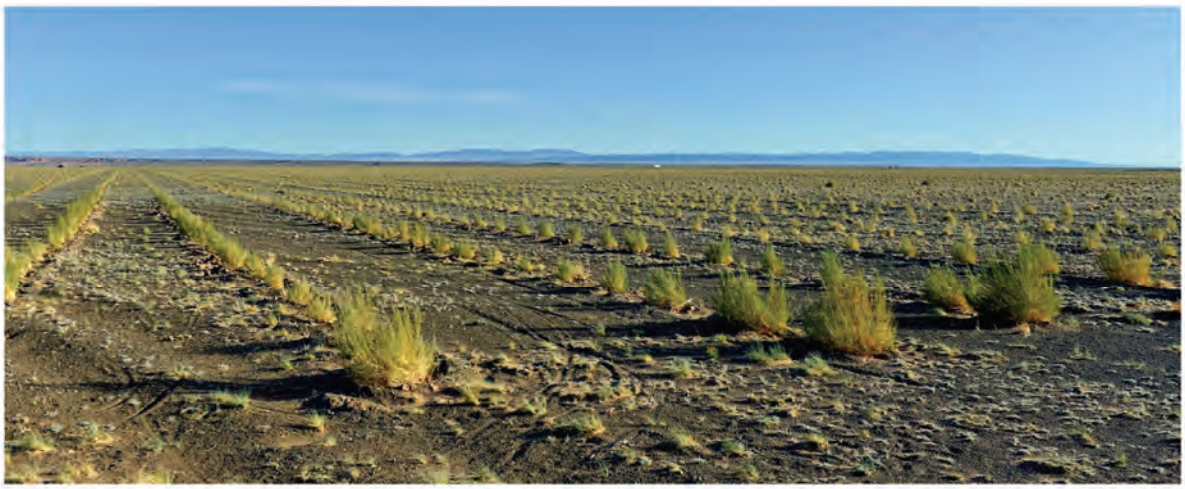
Local nurseries (3 locations) with local vegetation (seed, seedling materials)

Afforestation activities for Combating desertification Mongolia-Korea "Green belt project"

Approx. = 3000 ha for 10 years
Ulmus, Saxaul, Poplar

Afforestation activities for Combating desertification Mongolia-Korea "Green belt project"

Saxaul - native forest covers 1.7 mill, ha. 125,000 ha completely disappeared. 370,000 ha lost its capability to regenerate.



Challenging issues and further actions:

- The following issues are still needed to be improved:
- Improving the legal environment that regulates the use of pasture land;
- The coordination among different sectors;
- The implementation of the Law on Soil protection and Prevention of Desertification and the Law on Crop production;
- Local capacity to combat desertification at aimag level;
- Monitoring and evaluation, and assessment of desertification;
- Encourage the Initiatives from local communities, entities and stakeholders;
- Use of appropriate technology;
- Government and community control over illegal use of natural resources and
- Ecological education of the general public;
- International cooperation – know-how sharing


한국산림과학회
KOREAN SOCIETY OF FOREST SCIENCE
ECOSYSTEM RESTORATION
International Symposium on "Ecosystem Restoration for Green and Peace Asia"
THANK YOU FOR YOUR ATTENTION

International Symposium on Ecosystem Restoration for Green and Peace Asia

KOREAN SOCIETY OF FOREST SCIENCE

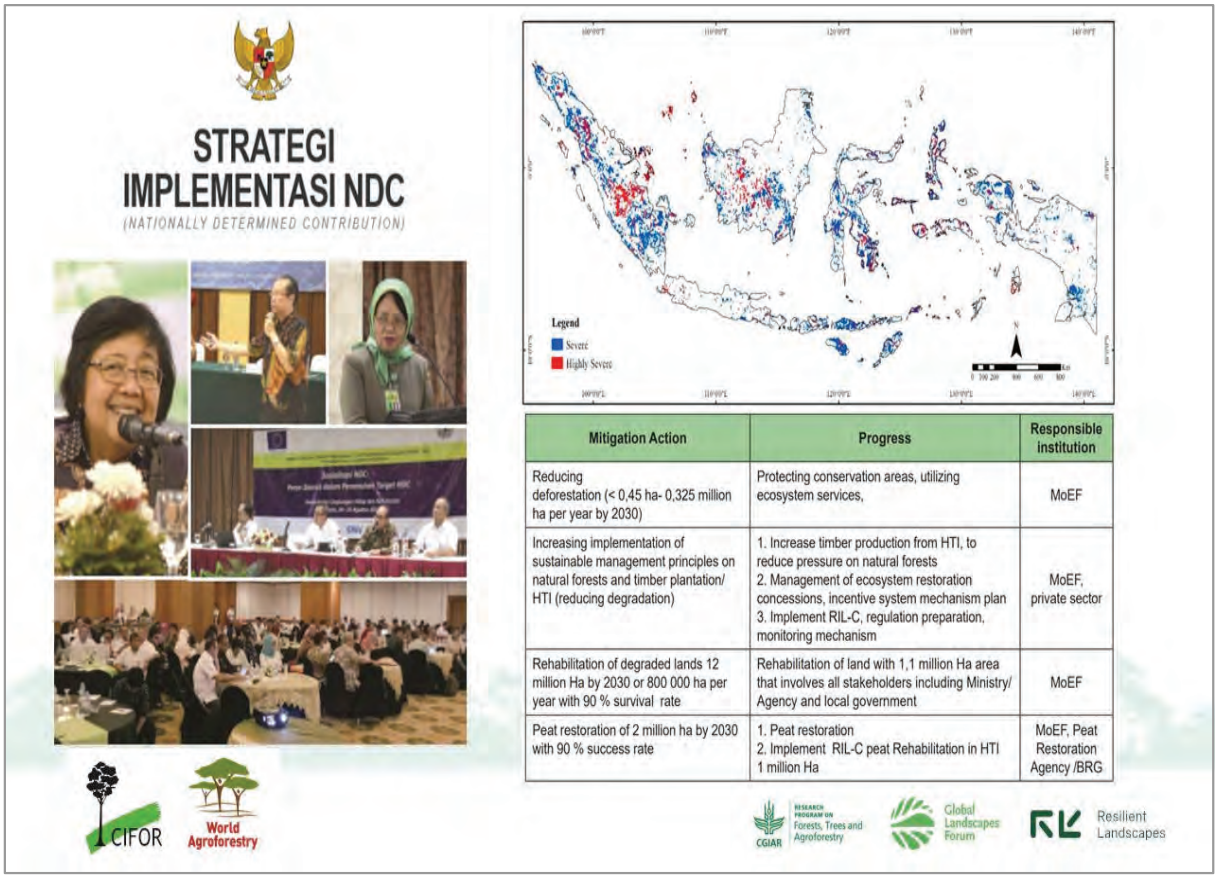
International Symposium on Ecosystem Restoration for Green and Peace Asia

18 August 2021, 14:00 - 18:30 (UTC/GMT+9) Alpensia, Pyeongchang, Republic of Korea

Hosted by KOREAN SOCIETY OF FOREST SCIENCE GBST Sponsored by Korea Forest Service National Institute of Forest Science 평창군 GWTO KOFST IUFRO

Integrating Bioenergy and Landscape Restoration – Lessons from Indonesia

Dr. Himlal Baral
Senior Scientist, Climate Change, Energy and Low Carbon Development, CIFOR



Mitigation Action	Progress	Responsible institution
Reducing deforestation (< 0,45 ha- 0,325 million ha per year by 2030)	Protecting conservation areas, utilizing ecosystem services,	MoEF
Increasing implementation of sustainable management principles on natural forests and timber plantation/ HTI (reducing degradation)	1. Increase timber production from HTI, to reduce pressure on natural forests 2. Management of ecosystem restoration concessions, incentive system mechanism plan 3. Implement RIL-C, regulation preparation, monitoring mechanism	MoEF, private sector
Rehabilitation of degraded lands 12 million Ha by 2030 or 800 000 ha per year with 90 % survival rate	Rehabilitation of land with 1,1 million Ha area that involves all stakeholders including Ministry/ Agency and local government	MoEF
Peat restoration of 2 million ha by 2030 with 90 % success rate	1. Peat restoration 2. Implement RIL-C peat Rehabilitation in HTI 1 million Ha	MoEF, Peat Restoration Agency /BRG

GROWING INTEREST ON BIOENERGY

- 30% rise in global energy demand to 2040 (IEA, 2016)
- Hundreds of millions of people will still left in 2040 without basic energy services (IEA, 2016)
- The Paris Agreement on CC – 'transformative change in the energy sector' is key to reach the agreement
- SD is not possible without access to sustainable energy – SDG 7
- National goal/target related to renewable energy including bioenergy… e.g., Indonesia 23% by 2025…
- Potential linkage between bioenergy and restoration goals

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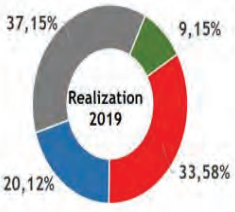
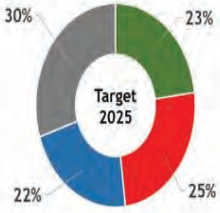
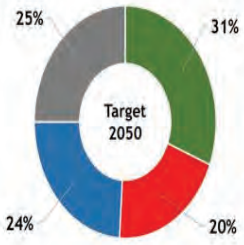
POTENTIAL AND TARGET FOR NRE



1. Energy Consumption: 0,8 TOE/kap
2. Electricity Consumption: 1.084 Kwh/kap
3. Total Generation Capacity: 69,7 GW*)



1. Energy Consumption: 1,4 TOE/kap
2. Electricity Consumption: 2500 Kwh/kap



1. Energy Consumption: 3,2 TOE/kap
2. Electricity Consumption: 7000 Kwh/kap
3. Total Generation Capacity: 443,1 GW*)

Coal · Oil · NRE · Gas

*) Indonesia's population in 2019 was 267 million and by 2050 will reach335 million (based on RUEN assumption).

Source: National Energy Council and Pusdatin

Total Potential 417,8 GW	
17,9 GW	OCEAN
23,9 GW	GEOTHERMAL
32,6 GW	BIOENERGY
60,6 GW	WIND
75 GW	HYDRO
207,8 GW	SOLAR

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FLR TARGETS AND EST FUNDING REQUIRED

Restoration target / priority	Description	Steward/driver	Estimated budget required (billion USD)*	
The Bonn Challenge	150 million hectares to be restored by 2020	IUCN & GPFLR (2011-2020)	359	36
Initiative 20*20	20 million hectares to be restored by 2020 in Latin America.	Latin American Countries & WRI (2014-2020)	48	8
New York Declaration on Forests	100 million hectares of degraded landscapes in Africa under restoration by 2030.	United Nations Climate Summit (2014-2030)	837	49
AFR100	SDG 15: combat desertification, and halt and reverse land degradation and halt biodiversity loss.	African Countries & World Resources Institute (2015-2030)	239	16
Sustainable Development Goals	Land degradation neutrality (SDG Target 15.3)	United Nations (2015-2030)	4780	318

*using TEEB fig – US$2390/ha

Est. funding required to restore 14 million ha of degraded in Indonesia ~US$ 34 billion

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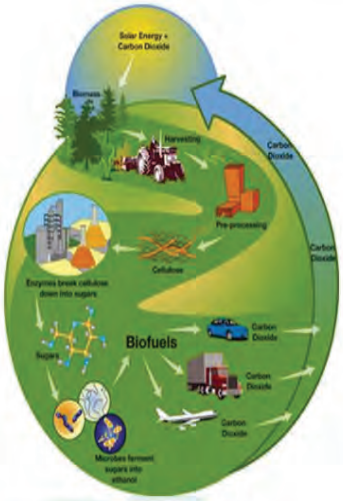
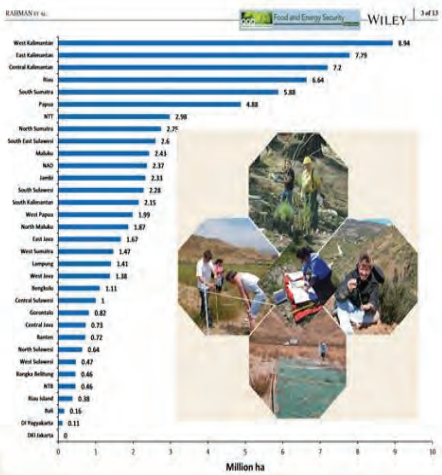
BIOENERGY AS AN OPPORTUNITY TO RESTORE DEGRADED LAND





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INTEGRATION OF BIOENERGY AND LANDSCAPE RESTORATION

- We are investigating the opportunities to restore degraded land while producing bioenergy (and foods) using climate smart agroforestry methods that can simultaneously help to achieve other national targets such as food and energy security in rural and isolated locations and greenhouse gas emissions reductions.

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KEY QUESTIONS

- Q1: How can **sustainable bioenergy** be developed to avoid the **food-energy-environment trilemma** with alternative feedstocks while **restoring degraded** lands in Indonesia?
- Q2: What are the **most promising species** to achieve **efficient bioenergy** production from degraded land in Indonesia? Species characters, **productivity** and additional **environmental values**?
- Q3: What are the **socio-economic and environmental benefits and challenges** of bio-energy plantation on degraded land?

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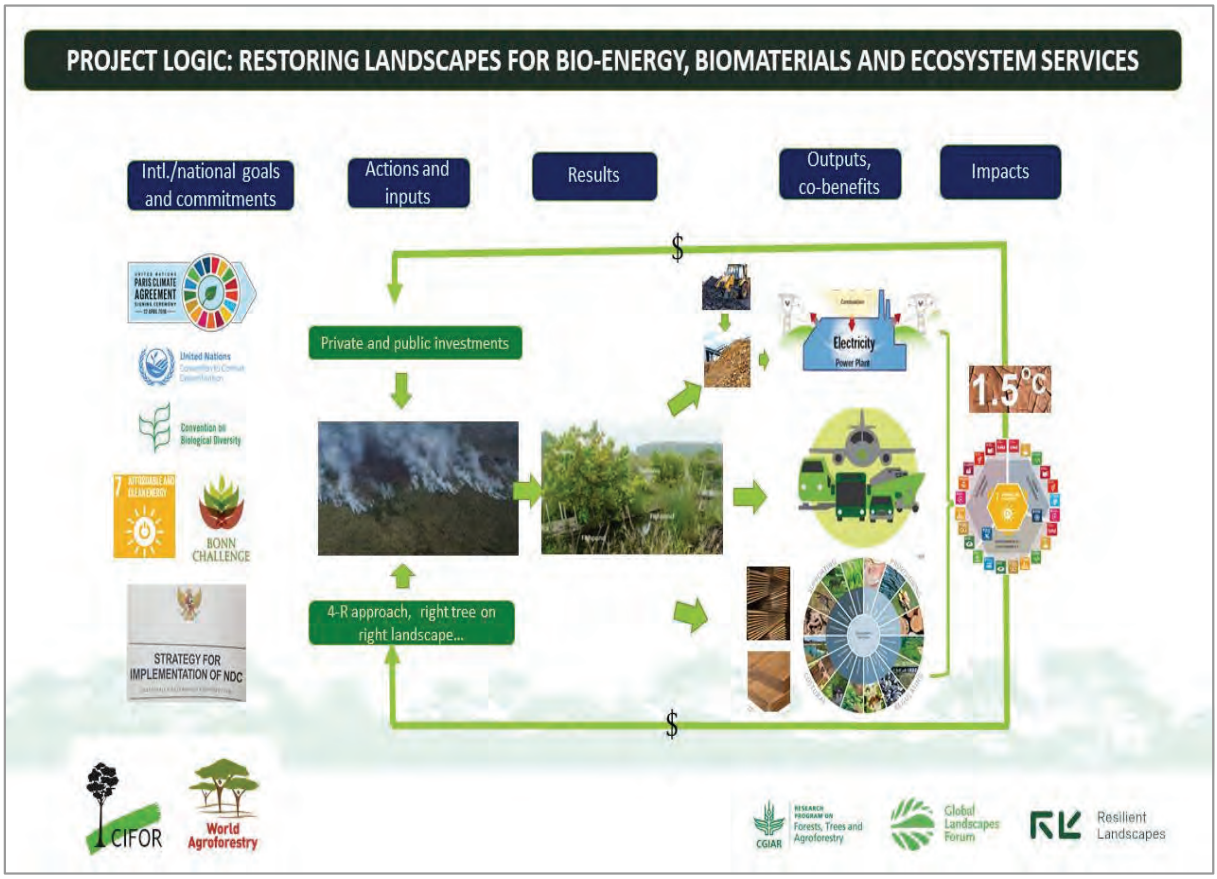
PROJECT LOGIC: RESTORING LANDSCAPES FOR BIO-ENERGY, BIOMATERIALS AND ECOSYSTEM SERVICES
Intl./national goals and commitments
Actions and inputs
Results
Outputs, co-benefits
Impacts
Private and public investments
4-R approach, right tree on right landscape...
Electricity
Power Plant
1.5°C
BONN CHALLENGE
STRATEGY FOR IMPLEMENTATION OF NDC
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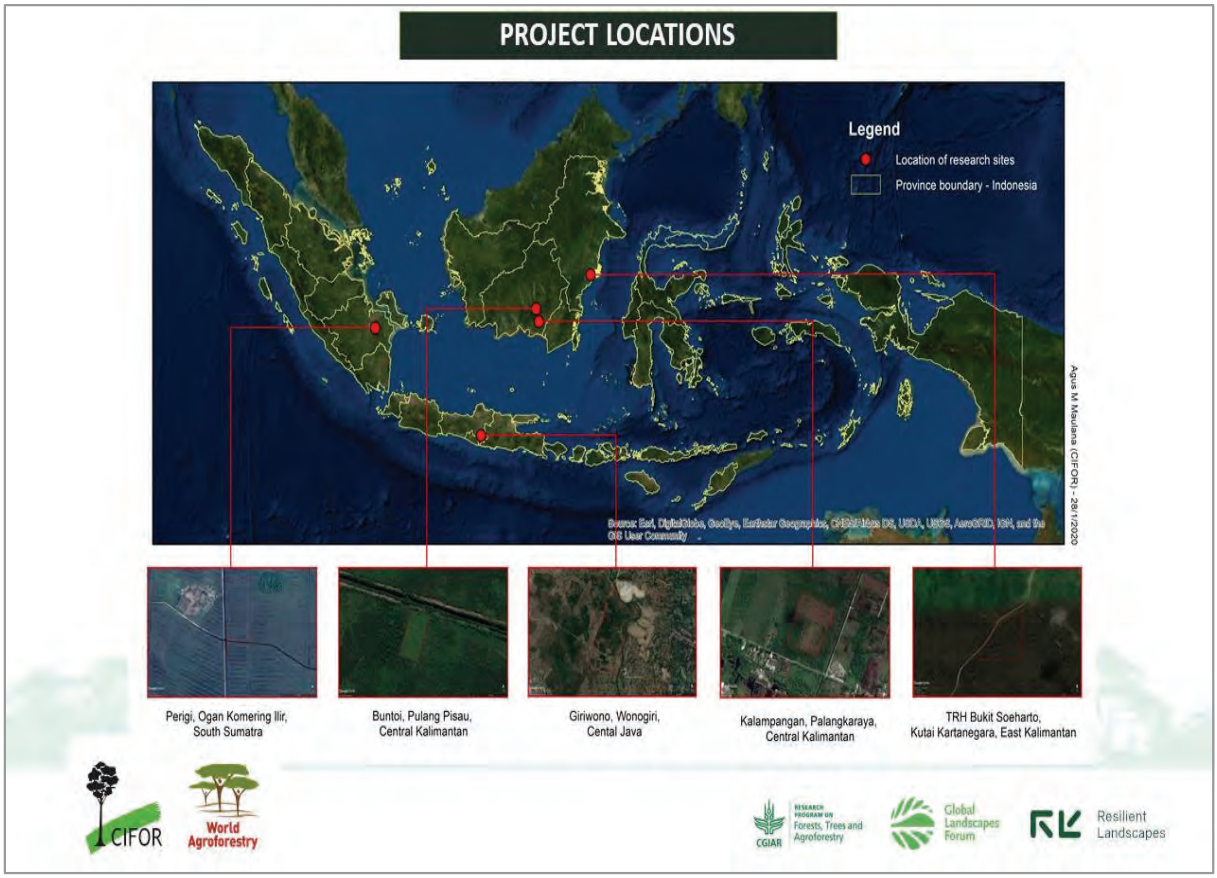
PROJECT LOCATIONS
Legend
Location of research sites
Province boundary - Indonesia
Perigi, Ogan Komering Ilir, South Sumatra
Buntoi, Pulang Pisau, Central Kalimantan
Giriwono, Wonogiri, Cental Java
Kalampangan, Palangkaraya, Central Kalimantan
TRH Bukit Soeharto, Kutai Kartanegara, East Kalimantan
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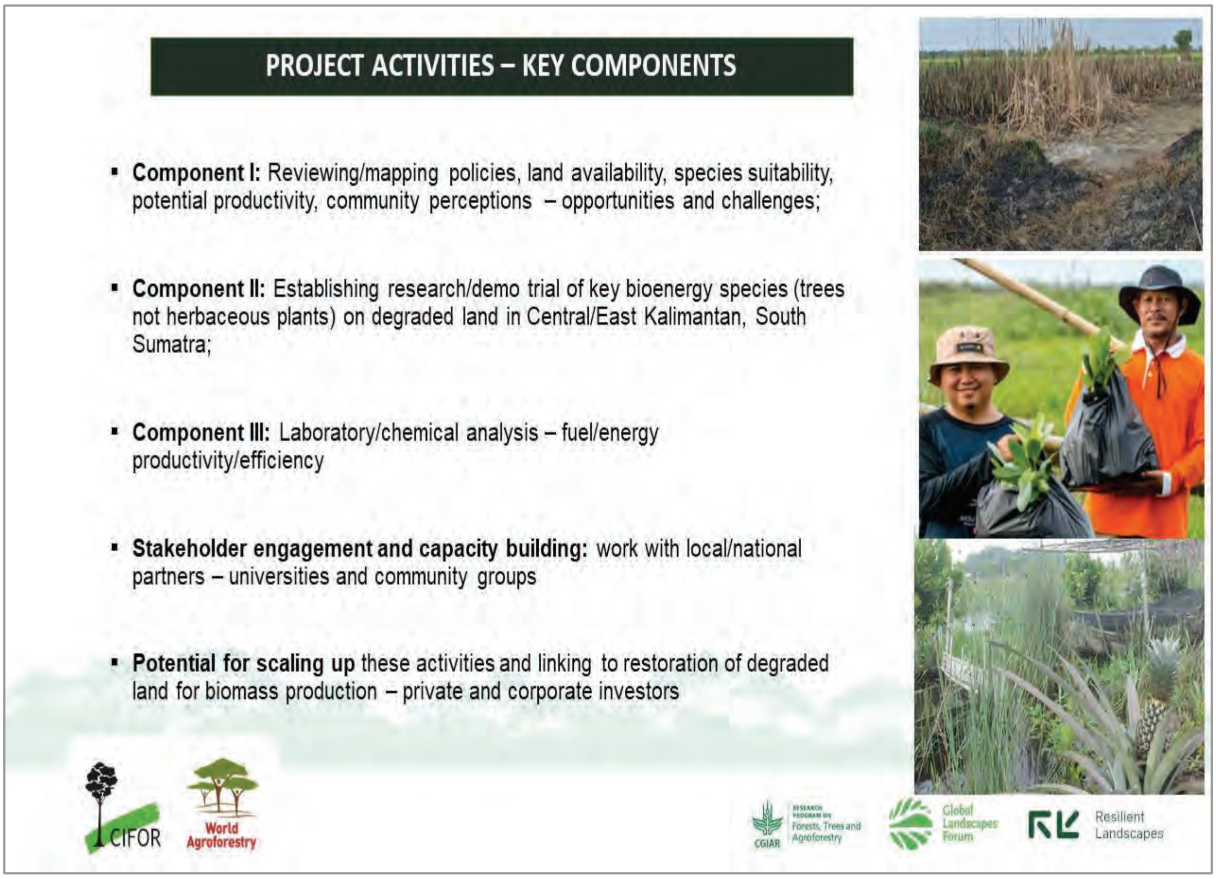
PROJECT ACTIVITIES – KEY COMPONENTS
Component I: Reviewing/mapping policies, land availability, species suitability, potential productivity, community perceptions – opportunities and challenges;
Component II: Establishing research/demo trial of key bioenergy species (trees not herbaceous plants) on degraded land in Central/East Kalimantan, South Sumatra;
Component III: Laboratory/chemical analysis – fuel/energy productivity/efficiency
Stakeholder engagement and capacity building: work with local/national partners – universities and community groups
Potential for scaling up these activities and linking to restoration of degraded land for biomass production – private and corporate investors
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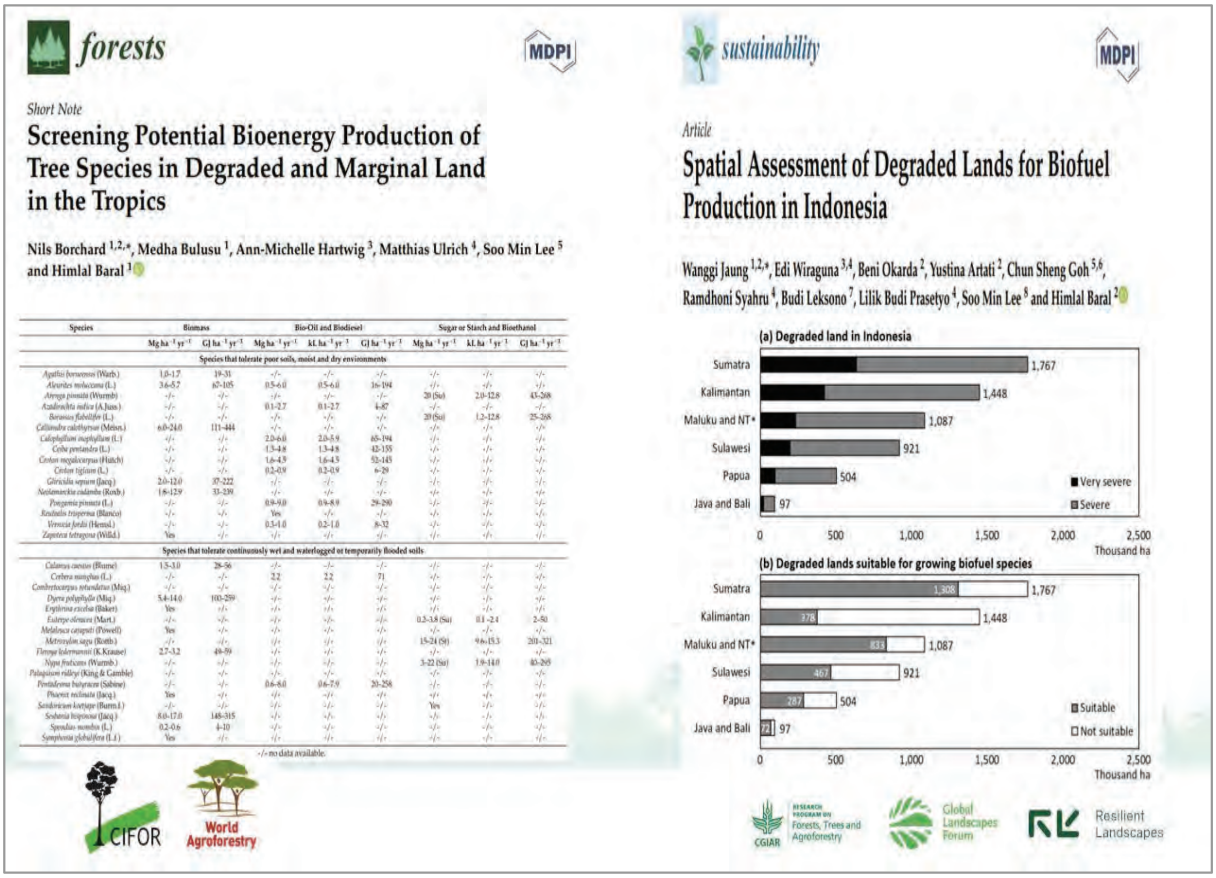
forests
MDPI
Short Note
Screening Potential Bioenergy Production of Tree Species in Degraded and Marginal Land in the Tropics
Nils Borchard 1,2,*, Medha Bulusu 1, Ann-Michelle Hartwig 3, Matthias Ulrich 4, Soo Min Lee 5 and Himlal Baral 1
sustainability
MDPI
Article
Spatial Assessment of Degraded Lands for Biofuel Production in Indonesia
Wanggi Jaung 1,2,*, Edi Wiraguna 3,4, Beni Okarda 2, Yustina Artati 2, Chun Sheng Goh 5,6, Ramdhoni Syahru 4, Budi Leksono 7, Lilik Budi Prasetyo 4, Soo Min Lee 8 and Himlal Baral 2
(a) Degraded land in Indonesia
Sumatra 1,767
Kalimantan 1,448
Maluku and NT* 1,087
Sulawesi 921
Papua 504
Java and Bali 97
Very severe
Severe
0 500 1,000 1,500 2,000 2,500
Thousand ha
(b) Degraded lands suitable for growing biofuel species
Sumatra 1,308 1,767
Kalimantan 378 1,448
Maluku and NT* 831 1,087
Sulawesi 467 921
Papua 287 504
Java and Bali 72 97
Suitable
Not suitable
0 500 1,000 1,500 2,000 2,500
Thousand ha
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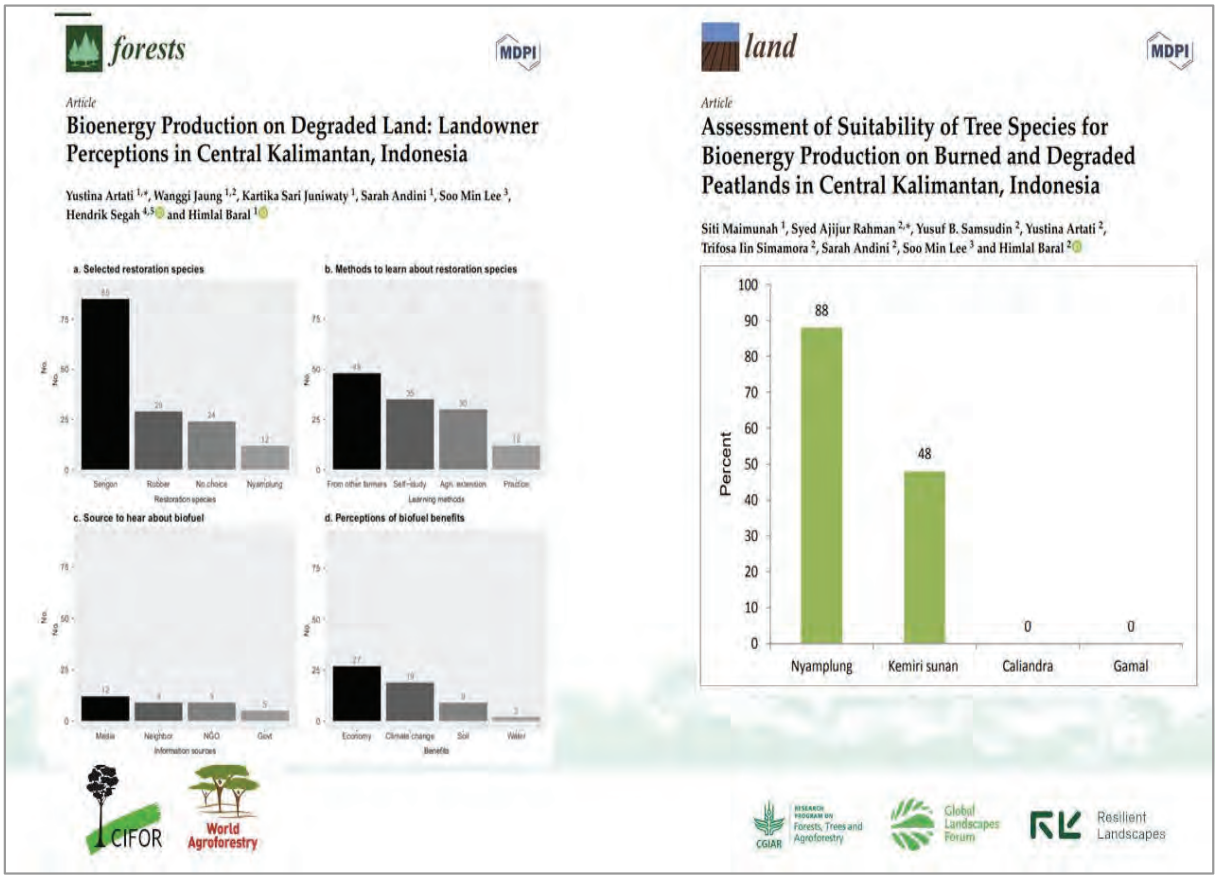

forests

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Article

Bioenergy Production on Degraded Land: Landowner Perceptions in Central Kalimantan, Indonesia

Yustina Artati [1,*], Wanggi Jaung [1,2], Kartika Sari Juniwaty [1], Sarah Andini [1], Soo Min Lee [3], Hendrik Segah [4,5] and Himlal Baral [1]

a. Selected restoration species

b. Methods to learn about restoration species

c. Source to hear about biofuel

d. Perceptions of biofuel benefits

land

MDPI

Article

Assessment of Suitability of Tree Species for Bioenergy Production on Burned and Degraded Peatlands in Central Kalimantan, Indonesia

Siti Maimunah [1], Syed Ajijur Rahman [2,*], Yusuf B. Samsudin [2], Yustina Artati [2], Trifosa Iin Simamora [2], Sarah Andini [2], Soo Min Lee [3] and Himlal Baral [2]

Percent

88

48

0

0

Nyamplung

Kemiri sunan

Caliandra

Gamal

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sustainability

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Opinion

Bamboo as an Alternative Bioenergy Crop and Powerful Ally for Land Restoration in Indonesia

Roshan Sharma [1,2,*], Jaya Wahono [3] and Himlal Baral [2]

[1] School of Global, Urban and Social Studies, RMIT University, 124 La Trobe St, Melbourne VIC 3004, Australia
[2] Center for International Forestry Research (CIFOR), Jalan CIFOR, Situ Gede, Sindang Barang, Bogor (Barat) 16115, Indonesia; H.Baral@cgiar.org
[3] Clean Power Indonesia, Graha Mitra 8th Floor #804 Jl. Gatot Subroto 24, Jakarta 12930, Indonesia; jaywahono@gmail.com
* Correspondence: roshan.sharma@rmit.edu.au

Received: 16 October 2018; Accepted: 20 November 2018; Published: 23 November 2018

check for updates

Table 1. Fuel characteristics of bamboo compared to other biomass sources.

Biomass Type	Ash (%)	Moisture (%)	Volatile Matter (%)	Heating Value (kJ/kg)
Rice husk	12.73	12.05	56.98	14.63
Palm shell	3.66	12.12	68.31	18.44
Corn stalk	3.80	41.69	46.98	11.63
Bamboo	2.70	5.80	71.70	17.58
Acacia *	0.36	11.2	65.7	17.40

Source: [23] and [26]*.

Received: 9 January 2018 | Revised: 21 February 2019 | Accepted: 23 February 2019

DOI: 10.1002/fes3.165

ORIGINAL RESEARCH

WILEY

Food and Energy Security

Integrating bioenergy and food production on degraded landscapes in Indonesia for improved socioeconomic and environmental outcomes

Syed Ajijur Rahman[1,2] | Himlal Baral[3] | Roshan Sharma[4] | Yusuf B. Samsudin[3] | Maximilian Meyer[5] | Michaela Lo[3] | Yustina Artati[3] | Trifosa Iin Simamora[3] | Sarah Andini[3] | Budi Leksono[6] | James M. Roshetko[7] | Soo Min Lee[8] |

Land restoration and biodiversity conservation

Biofuel for cleaner and renewable energy

Social qualities

Agroforestry prospect

Other values

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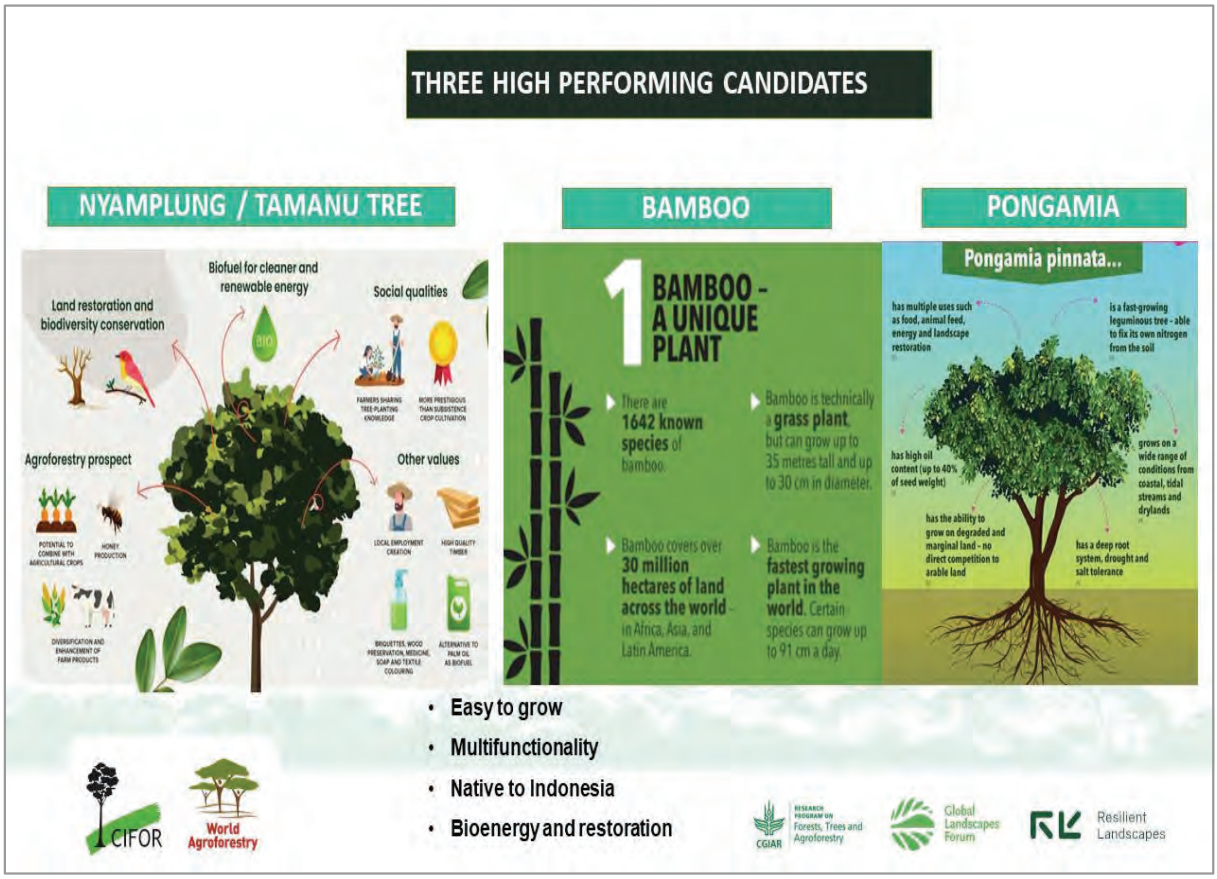
THREE HIGH PERFORMING CANDIDATES
NYAMPLUNG / TAMANU TREE
BAMBOO
PONGAMIA
Land restoration and biodiversity conservation
Biofuel for cleaner and renewable energy
Social qualities
Agroforestry prospect
Other values
1 BAMBOO - A UNIQUE PLANT
There are 1642 known species of bamboo.
Bamboo is technically a grass plant, but can grow up to 35 metres tall and up to 30 cm in diameter.
Bamboo covers over 30 million hectares of land across the world - in Africa, Asia, and Latin America.
Bamboo is the fastest growing plant in the world. Certain species can grow up to 91 cm a day.
Pongamia pinnata...
has multiple uses such as food, animal feed, energy and landscape restoration
is a fast-growing leguminous tree - able to fix its own nitrogen from the soil
has high oil content (up to 40% of seed weight)
grows on a wide range of conditions from coastal, tidal streams and drylands
has the ability to grow on degraded and marginal land - no direct competition to arable land
has a deep root system, drought and salt tolerance
Easy to grow
Multifunctionality
Native to Indonesia
Bioenergy and restoration
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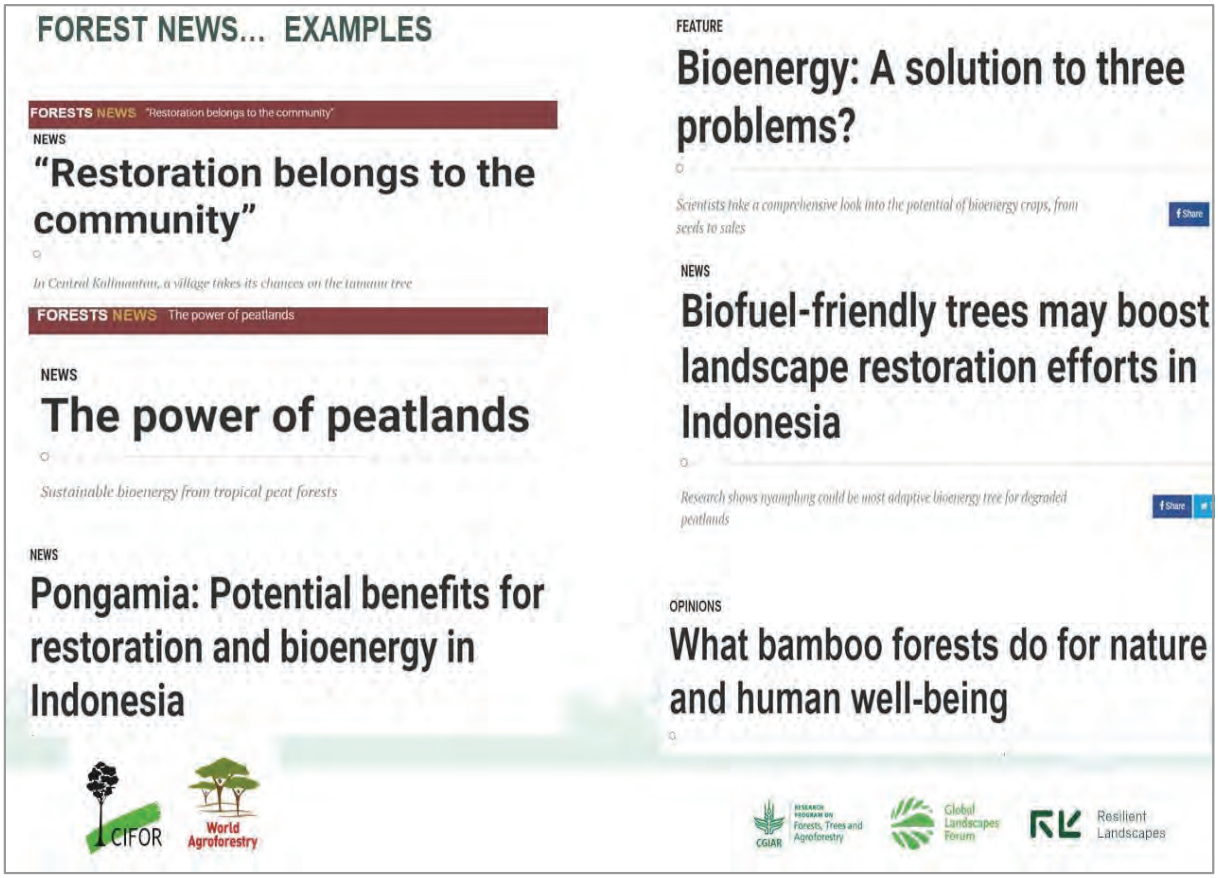
FOREST NEWS... EXAMPLES
FORESTS NEWS "Restoration belongs to the community"
NEWS
"Restoration belongs to the community"
In Central Kalimantan, a village takes its chances on the tamanu tree
FORESTS NEWS The power of peatlands
NEWS
The power of peatlands
Sustainable bioenergy from tropical peat forests
NEWS
Pongamia: Potential benefits for restoration and bioenergy in Indonesia
FEATURE
Bioenergy: A solution to three problems?
Scientists take a comprehensive look into the potential of bioenergy crops, from seeds to sales
NEWS
Biofuel-friendly trees may boost landscape restoration efforts in Indonesia
Research shows nyamplung could be most adaptive bioenergy tree for degraded peatlands
OPINIONS
What bamboo forests do for nature and human well-being
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LAND AVAILABILITY FOR BIOENERGY PLANTATION

- **Common myth:** There is not enough land on which to grow biofuel crops. Currently, they supplant much needed food crops and environmental conservation areas

- **Fact:** Our research suggests large areas of degraded and underutilized land is available in Indonesia (and globally). The degraded land can be restored with climate-smart agroforestry systems that support food, energy and environmental conservation goals (Jaung et al. 2018)

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BIOENERGY AND ENVIRONMENT

- **Common myth:** Bioenergy plantations destroy native vegetation and lead to biodiversity loss

- **Facts:** Initial findings from our work in Indonesia demonstrate that bioenergy plantations on **degraded land are a promising approach for land restoration and enhance native biodiversity**. Our two-year-old bioenergy research and demonstration plot is colonized by several bird species and such insects as bees and butterflies.

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FUEL OR FOOD

- **Common myth:** Bioenergy plantations displace food production areas and increase food prices.
- **Fact:** Our research from Indonesia shows that bioenergy and food production, including rice, pineapple and fish can be combined at plot and landscape scale - increasing the value of the land, enhancing food security and supporting rural livelihoods

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KEY MESSAGES

- Bioenergy production from degraded and underutilized land strengthens the **economic incentives** to the community groups, smallholder farmers and private sector investors to **undertake restoration efforts**,
- With **4R approach** – bioenergy can **boost farm production**, and support **climate and development** goals
  - Right crops in right landscape
  - Right business model
  - Respecting community rights
- The potential competition for land and for raw material with other biomass uses must be **carefully managed.**

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