2016 FAO Asia-Pacific Forestry Week

Forest Landscape Restoration and Land Degradation Neutrality in Asia

26 February 2016, Clark in the Philippines

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[Organized by]

IUFRO working Party 1.01.13
National Instrumentation Center for Environmental Management

[Supported by]

Asia Pacific Association of Forestry Research Institutions
National Institute of Forest Science

Editors

Ho Sang Kang, Miin Bang, Hyo Cheng Cheng, Jeong Ho Park

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

APAFRI	Asia Pacific Association of Forest Research Institutions
APFW	Asia Pacific Forestry Week
DPRK	Democratic People's Republic of Korea
DZGD	Dry Zone Greening Department (Myanmar)
FAO	Food and Agriculture Organization of the United Nations
FD	Forestry Department (Myanmar)
FLR	Forest Landscape Restoration
GLADIS	Global Land Degradation Information System
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
LADA	Land Degradation Assessment
LDNW	Land-Degradation Neutral World
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MoLEP	Ministry of Land Environment Protection (DPR of Korea)
NDDI	Normalized Difference Drought Index
NICEM	National Instrumentation Center for Environmental Management
NIFoS	National Institute of Forest Science
ROAM	Restoration Opportunities Assessment Methodology
ROK	Republic of Korea
SDGs	Sustainable Development Goals
SNU	Seoul National University
UNCCD	United Nations Convention to Combat Desertification
VAFS	Vietnam Academy of Forest Science

I. INTRODUCTION

A. Session Description

Deforestation, forest degradation and land degradation manifest themselves in many different forms across the vast region of Asia. Out of a total land area of 4.3 billion ha, Asia contains some 1.7 billion ha of arid, semi-arid and dry sub-humid land including deforested land areas. There are expanding deserts in China and Mongolia, and land degradation is in severe level in DPR of Korea in particular. Those deforestation, forest degradation and land degradation have also affected negatively to human livelihood. Forest Landscape Restoration (FLR) approach has pursued ecological integrity in forest/land restoration as well as human well-being enhancement at the same time. It includes not only tree planting, managing natural regeneration and improving land management, but also encouraging the active stakeholders' engagement in sustainable agriculture, agroforestry, protecting wildlife reserves, watershed protection etc., which is more holistic approach in restoring environment and human livelihood. This Side Event will share the experiences and knowledge on this approach in Asia and discuss further cooperative ways. The presenters will be the representatives from IUFRO, the Ministry of Land Environment Protection (MoLEP) of the DPR of Korea, National University of Mongolia, Vietnam Academy of Forest Science, Dry Zone Greening Department in Myanmar. This Side Event is opened to any audience who is interested and would like to learn and discuss on combating land degradation and forest landscape restoration approach in Asia.

B. Date/Locations

This session was convened on 26 February 2016 at the Holiday Inn Hotel, Clark in the Philippines during the FAO Asia Pacific Forestry Week.

C. Program

Time	Program
	Moderator: Dr. Ho Sang Kang
09:00-09:35	Opening Remark by Prof. Don Koo Lee (Yeungnam University)
09:35-10:00	Forest Landscape Restoration in Central Asia by Dr. John Stanturf (US Forest Service, IUFRO Working Group 1.06.00)
10:00-10:25	Integrated Landscape Restoration in the Dry Zone of Myanmar by Mr. Wai Myo Hla (Dry Zone Greening Department)
10:25-10:50	Five Mha Reforestation Project in Vietnam: Lessons Learnt by Prof. Nguyen Hoang Nghia (Vietnam Academy of Forest Science)
10:50-11:15	National Policy on Reforestation and Sustainable Forest Management in the DPR of Korea by Mr. Kwang Chun Ryu & Mr. Il Ha Kim (Ministry of Land Environmental Protection)
11:15-11:40	Status of Desertification and Korea-Mongolia Joint "Green Belt" Plantation Project in Mongolia by Prof. Nyam-Osor Batkhuu (National University of Mongolia)
11:40-12:10	Panel discussion and wrap-up

D. Moderator and Speakers

No.	Name	Position, Organization
Moderator		
1	Dr. Ho Sang Kang	Research Associate Professor, NICEM, Seoul National University
Speakers		
2	Dr. Don Koo Lee	Endowed Professor, Yeungnam University
3	Dr. John Stanturf	Senior Scientist, US Forest Service / Coordinator, IUFRO Working Group 1.06.00
4	Mr. Wai Myo Hla	Director, Dry Zone Greening Department of Myanmar
5	Dr. Nguyen Hoang Nghia	Professor, Vietnam Academy of Forest Science
6	Mr. Kwang Chun Ryu	Director, Ministry of Land Environmental Protection, DPR of Korea
7	Mr. Il Ha Kim	Member of National Committee for FAO, DPR of Korea
8	Dr. Nyam-Osor Batkhuu	Professor, National University of Mongolia

II. PRESENTATIONS

A. Opening Remark

Opening Remark

Don Koo Lee
Endowed Professor
Feb 26, 2016

Mr. Kwang Chun Ryu, DPRK Ministry of Land Environmental Protection; Dr. Ho Sang, Kang, NICEM, SNU; Prof. Nguyen Hoang Nghia, Vietnam Academy of Forest Science; Prof. Batkhuu Nyam-Osor, National University of Mongolia; Mr. Wai Myo Hla, Myanmar Dry Zone Greening Department; and Dr. John Stanturf, IUFRO Working Group 1.06.00.

Ladies and gentlemen, Good morning!

Welcome to this Stream Event on Forest Landscape Restoration and Land Degradation Neutrality in Asia jointly organized by IUFRO Working Party 1.01.13, APAFRI and NICEM, SNU during this Asia-Pacific Forestry Week in Clark, Pampanga, Philippines.

According to IUCN, there are over 2 billion hectares of degraded and deforested land across the world while the majority of some 2 billion people in the world`s drylands live under the poverty line. In Asia alone, it contains some 1.7 billion ha of arid, semi-arid and dry sub-humid land, including deforested areas. The global consensus has been made on the trans-boundary adverse impact of these issues and its close interconnection with other impending global challenges including poverty, climate change, biodiversity loss, food security and water strain.

Considering these, the UNCCD participating countries highlighted in their reports the status of land degradation. For instance, land degradation in Indonesia was 24.3 million ha in 2013 (MoF) while in Namibia land productivity dynamics between 1998 and 2013 has decreased. In Ethiopia the country's forests cover reduced significantly by around 400,000 ha within 2000 to 2010. Main causes of land degradation are many and interlocking, including inappropriate land use, unavailability of soil and water conservation measures, anthropogenic factors, among others. This shows that sustainable land and forest management will serve not only as a first step to address these issues, but also as a solid foundation for national development.

The major concern over the land has prompted the UNCCD to take action on this. It was in June 2013 that the Consultative Meeting on a Land-Degradation Neutral World (LDNW) was held in Seoul, Republic of Korea. It paved the way to implement the outcomes of the UN Conference on Sustainable Development (Rio+20) whereby countries committed to achieve a land-degradation neutral world. As a follow up, the UNCCD's 11th Conference of the Parties

was held in Namibia in September 2013 wherein the recommendations on targets, indicators and the modalities for implementation were discussed at the expert meeting.

In response to this worthy undertaking, international organizations like IUFRO, IUCN and FAO have shared their way of supporting the UNCCD's land degradation neutrality. For instance, new IUFRO publication draws on examples of restoration activities from around the world to demonstrate the key role of forest land restoration in climate change mitigation and adaptation. As part of a collaborative project – "Inspire, Support and Mobilize Forest and Landscape Restoration" – a group of forest scientists led by IUFRO Research Group 1.06.00 (Restoration of degraded sites), undertook an exhaustive review of scientific literature on the subject and an analysis of restoration case studies. In addition, IUFRO Research Group 1.06.00 has developed a framework to demonstrate how forest landscape restoration contributes to climate change mitigation and adaptation and how this contribution can be enhanced through more efficient methods and systems.

IUCN, on the other hand, has a different approach to forest landscape restoration by working with partners to gather knowledge, develop and package tools, build capacity, and support policy-makers, practitioners, researchers and landowners to restore degraded and deforested lands around the world. Just recently, the Restoration Opportunities Assessment Methodology (ROAM), produced by IUCN and the World Resources Institute, provides a flexible and affordable framework approach for countries to rapidly identify and analyze forest landscape restoration potential and locate specific areas of opportunity at a national or sub-national level. ROAM thus can provide vital support to countries seeking to move forward with developing restoration programmes and landscape-level strategies. It will also enable countries to define and implement pledges to the Bonn Challenge target to restore 150 million hectares worldwide by 2020.

Correspondingly, FAO through the Land Degradation Assessment (LADA) in drylands project develops tools (i.e. Global Land Degradation Information System or GLADIS) and methods to assess and quantify the nature, extent, severity and impacts of land degradation on dryland ecosystems, watersheds and river basins, carbon storage and biodiversity at a range of spatial and temporal scales. The project also contributes to the Developmental Goals of UNCCD and UN multi-lateral agencies to improve people's livelihoods and economic well-being.

All of these activities on Forest Landscape Restoration and Land Degradation Neutrality are related to 16 Sustainable Development Goals (SDGs), from ending poverty to promoting inclusive and sustainable economic growth, and to protecting, promoting sustainable use of terrestrial ecosystems.

Last year, the UNCCD and the UNEP have come together in celebration of the United Nations General Assembly adoption of the '2030 Agenda for Sustainable Development' to highlight the importance of SDG target 15.3, which is to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Let us all work together to achieve this goal and contribute to forest landscape restoration and land degradation neutrality.

For today we will hear particularly interesting topics on forest landscape restoration and land degradation neutrality in Asia. It is important that we should recognize the opportunity we have here to present our best thinking about these issues and to work toward what is best for our forest landscapes, especially in Asia.

Before I end, I would like to thank again the organizers for the arrangement of this important event.

Thank you very much! Maraming Salamat po!

# B.   Forest Landscape Restoration in Central Asia (Dr. John Stanturf)

Forest Landscape Restoration in Central Asia

John A. Stanturf
IUFRO Coordinator Restoration Degraded Sites
IUFRO Deputy Task Force Restoration and Adaptation
US Forest Service
jstanturf@fs.fed.us

Participants from Central and Northeast in IUFRO Expert Workshops
2014 Ulaanbaatar, Mongolia
2015 Bishkek, Kyrgyzstan

Acknowledgements

Map 1 (Elevation):

50°0'0"E   60°0'0"E   70°0'0"E   80°0'0"E   90°0'0"E

N

50°0'0"N

Irtysh River

Astana

Altai Mountains

Kazakhstan

Caspian Sea

Balkhash

Aral Sea

Syrdarya

Ili River

Uzbekistan

Tian shan Mountains

Bishkek

40°0'0"N

Amudarya

Kyrgyzstan

Pamir

Tashkent

Turkmenistan

Tajikistan

Ashkhabad

Duschanbe

Elevation(m)
-134 – 0
0 – 50
50 – 100
100 – 300
300 – 500
500 – 700
700 – 1,000
1,000 – 2,000
2,000 – 5,000
>5,000

Legend
● City
☐ National Boundaries
☐ Water bodies

800

Kilometers

60°0'0"E   70°0'0"E   80°0'0"E

Map 2 (Precipitation):

50°0'0"E   60°0'0"E   70°0'0"E   80°0'0"E

N

Russia

50°0'0"N

Kazakhstan

Balqash Lake

Aral Sea

Caspian Sea

Uzbekistan

Kyrgyzstan

China

40°0'0"N

Turkmenistan

Tajikistan

Iran

Afghanistan

[mm/year]

50-100 100-200 200-400 400-600 600-800 800-1200

0   250   500   1.000

km

Source: Chen 2013

Picea Forest

Larix Plantation

Fruit /Juglans Forest

Juniperus Forest

Pistachia Forest

Riparian Forest

Haloxylon , Salsola
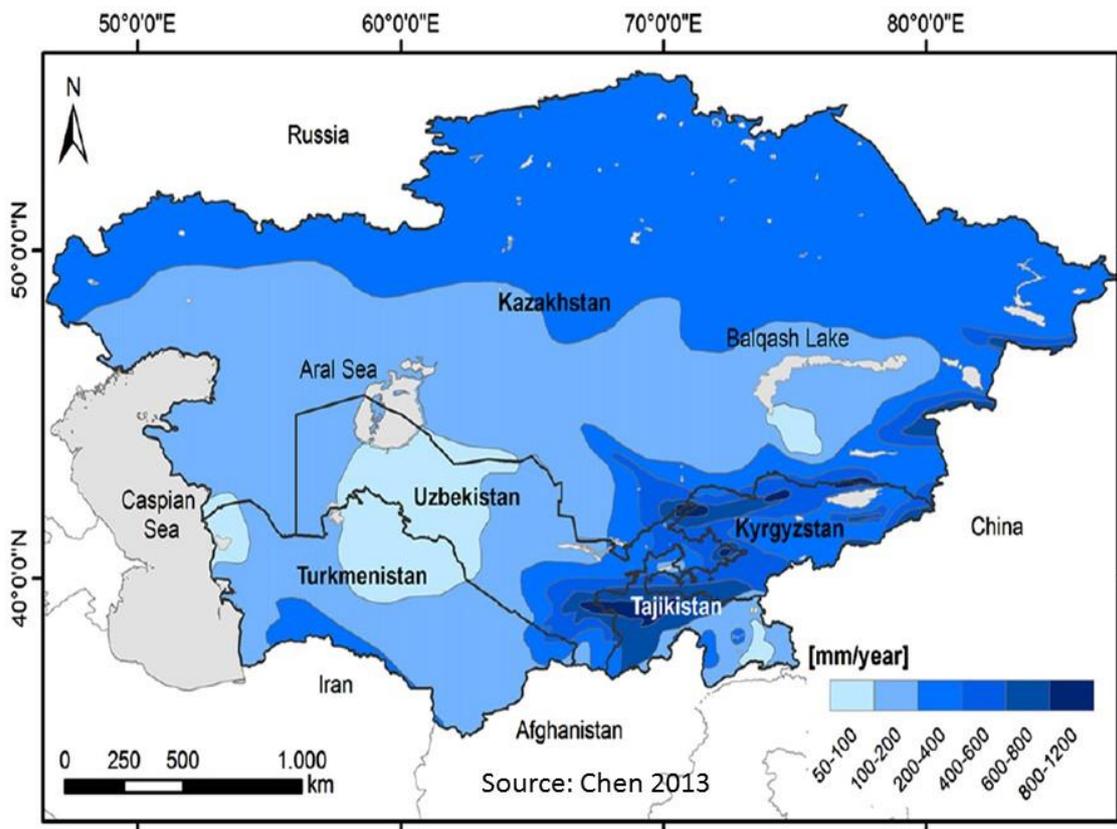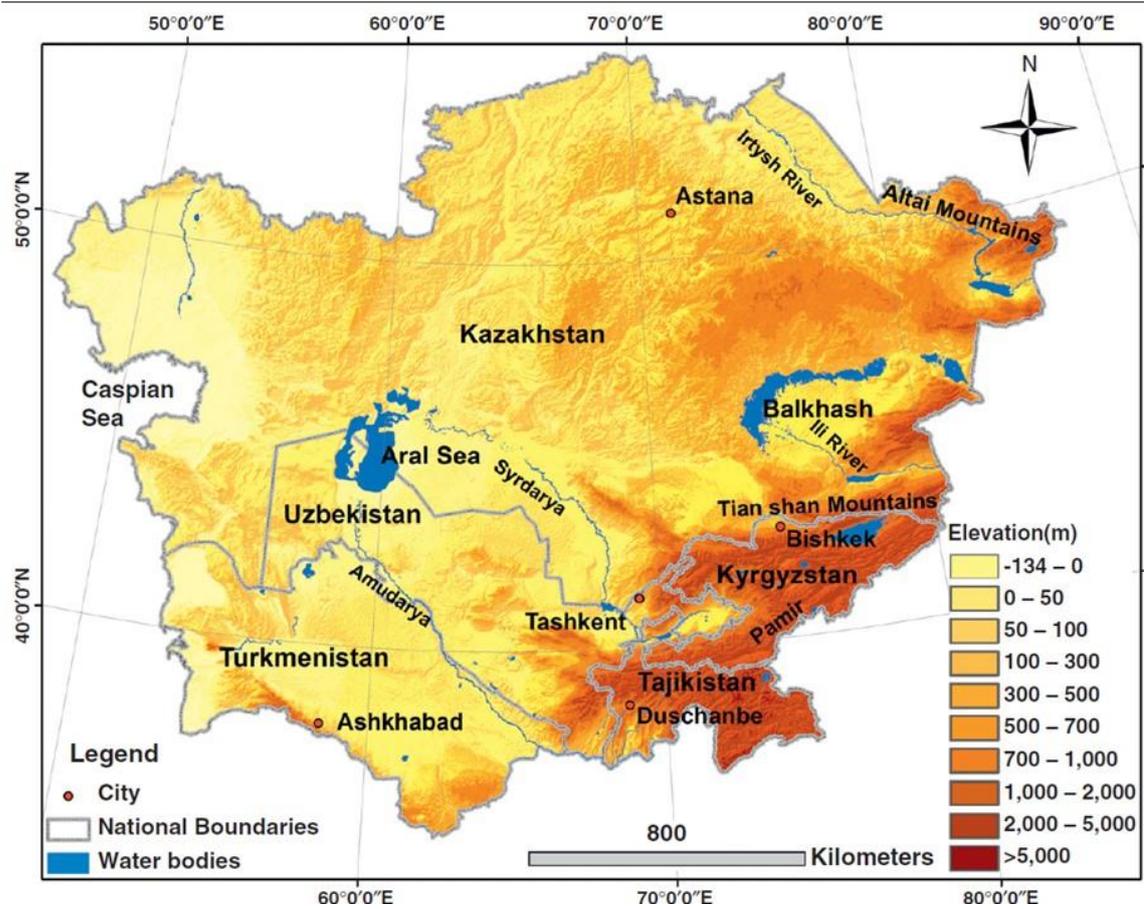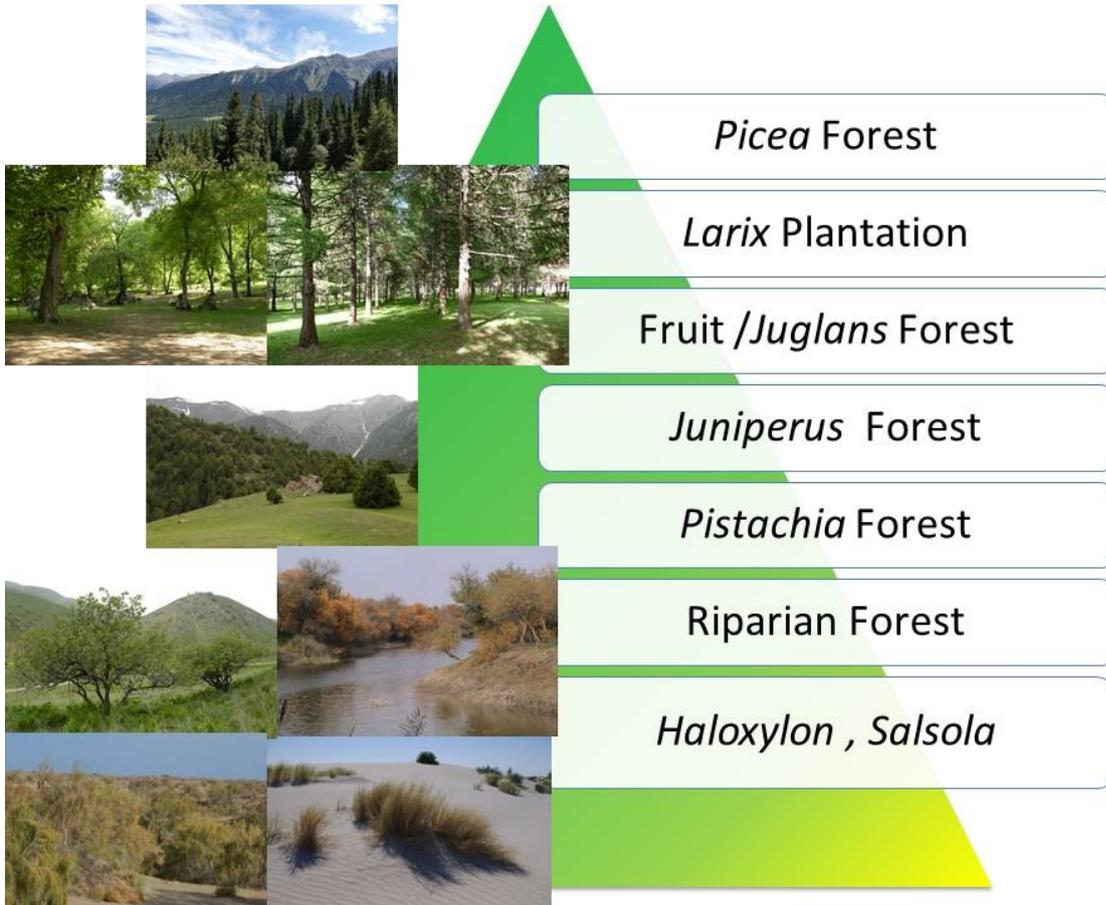
Mountain Forests Are Biodiversity Hotspots

Disturbances

- **Wildfire**
- **Mass movements**
- **Windstorms**
- **Drought**
- **Climate Change**

Climate Change
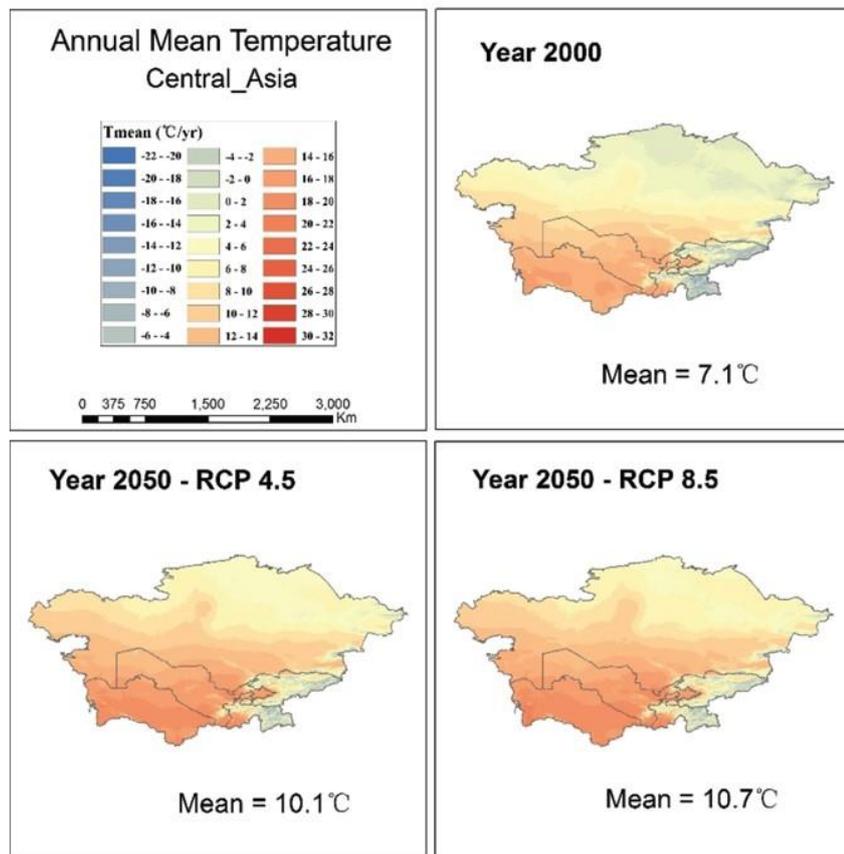
Source: Zomer et al (2015)
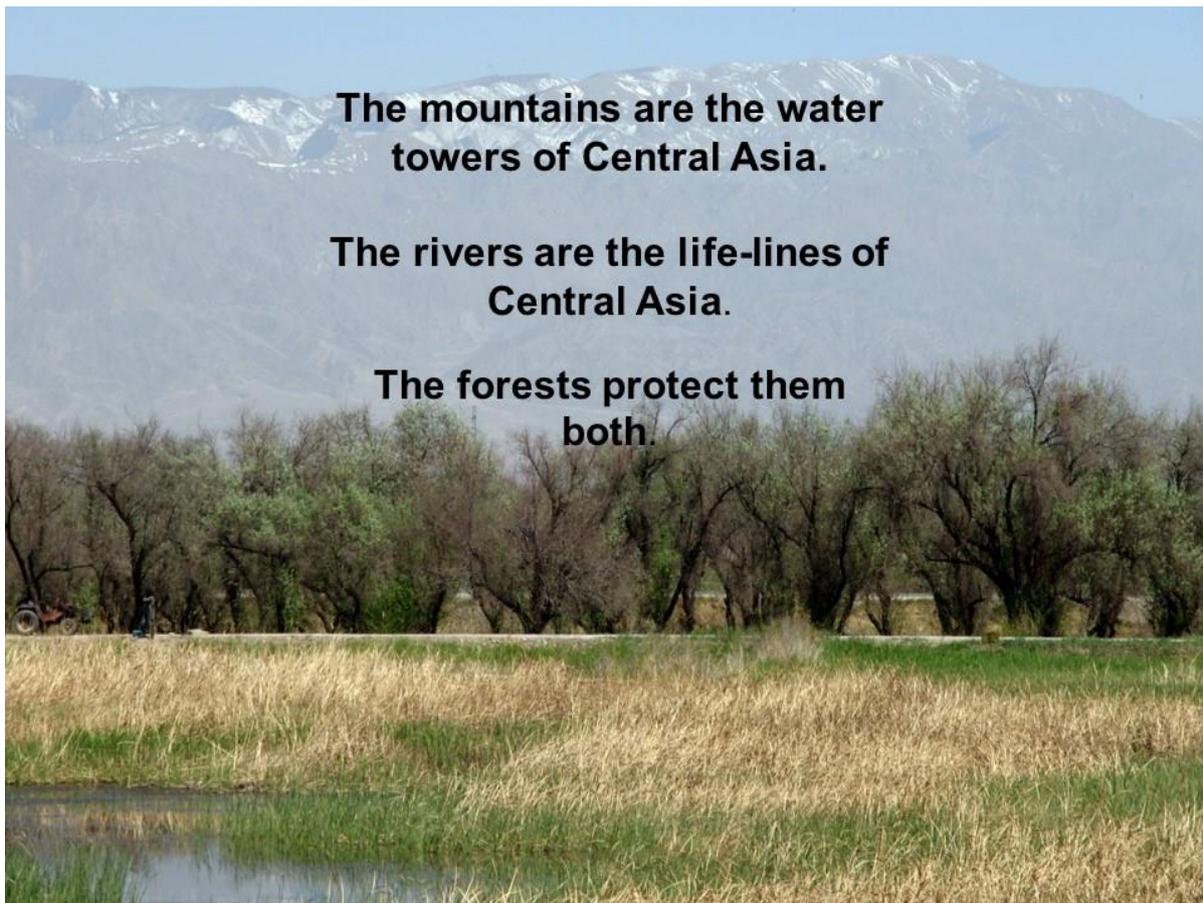
The mountains are the water towers of Central Asia.

The rivers are the life-lines of Central Asia.

The forests protect them both.

Threats to Forests:

- Overharvesting for use as fuel wood and housing construction
- Overgrazing on forested lands
- Unsustainable exploitation of non-timber forest products
- Wind and water soil erosion on sloping lands
- Other land uses (development, mining, agriculture)

Impacts

Flooding
Dust storms
Loss of resources
Decreased biodiversity
Desertification

Obstacles to Forest Landscape Restoration

- **Inadequate legal framework for sustainable forest and land management**

- **Inadequate land tenure reforms**

- **Out-dated approaches to sustainable forest and land management**

- **Limited capacity of local institutions**

- **Lack of adequate financial resources for forest management**

Source: FAO 2015

Passive or Active Restoration of Native Species?

Restoration Strategies that Promote Natural Regeneration

Benefits:

- Minimize restoration costs
- Secure locally adapted genotypes
- Promote development of natural biodiversity

Necessary Conditions:

- Adequate sources of desired species must be available
- Site conditions must be suitable

Caution!

- Climate change may change conditions for site adaptation

Infrastructure and Supply Chain Needed for Appropriate Plant Materials

Mixtures Plantings for Watershed Protection and Wood Supply
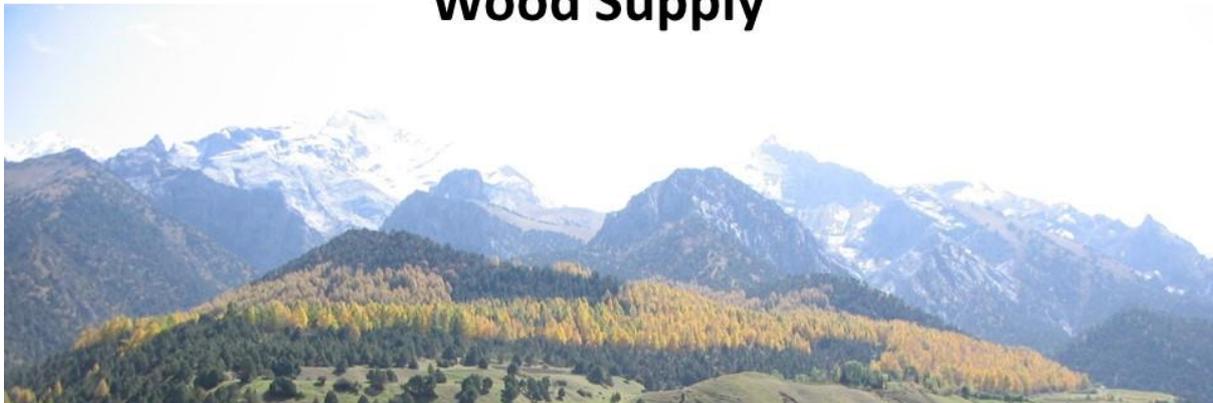
Poplar plantation to drain waterlogged land, Issyk-Kul, Kyrgyzstan

Source: Djanibekov et al. 2015

March 2004   May 2006   August 2007

Source: Khamzina et al (2012).

Afforestation of highly salinized marginal croplands, Khorezm, Uzbekistan

Potential agroforestry practises for restoring mosaic landscapes in Central Asia

Tree rows/belts as windbreaks

Fruit tree based agroforestry

Alley cropping

Issyk Kul

Ferghana Valley, Uzbekistan

Potato + Walnut, Arslanbop
(Courtesy Niels Thevs, ICRAF)

Hay + Fruit trees, Arslanbop

Special Case—Novel Ecosystem Establishing Protective Plantings in the Dry Bottom of the Aral Sea

Source: Micklin 2010

Declining River Inflow to the Aral Sea

Source: Micklin 2010

1960   1971   1976

1989   2009 (Sept)   2025?
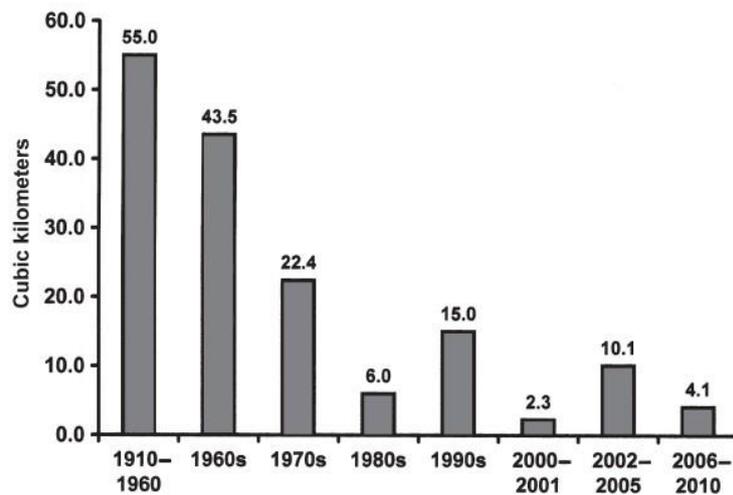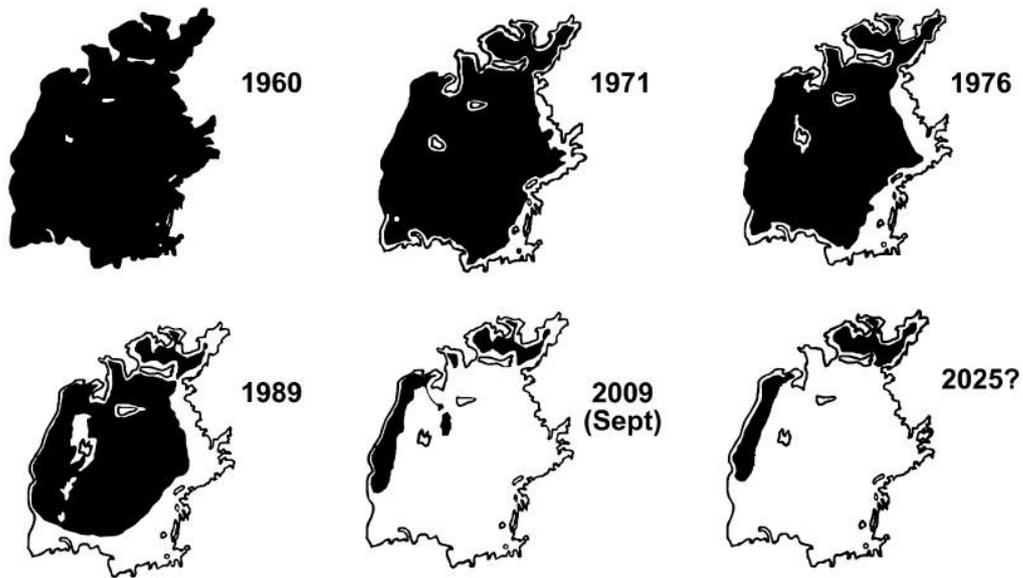
Source: Micklin 2010

Forestry authority created about 500,000 ha of protective plantings

Source: Ganiev 2014

About 15-20,000 ha planted annually in the dry bottom of the Aral Sea

Haloxylon (saxaul)

Source: Ganiev 2014

Thank You! Spasibo! Gracias!

C. Integrated Landscape Restoration in the Dry Zone of Myanmar (Mr. Wai Myo Hla)

The Republic of the Union of Myanmar
Ministry of Environmental Conservation and Forestry (MOECAF)
Dry Zone Greening Department (DZGD)

Integrated Landscape Restoration in the Dry Zone of Myanmar

Wai Myo Hla

Director, Dry Zone Greening Departmet, Magway Region

Feb, 25, 2016

Location Map of Myanmar

Location Map of Dryzone Areas in Myanmar
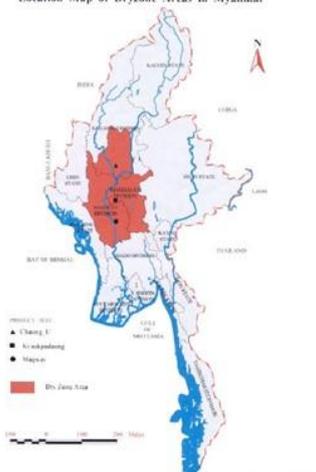
Background Information of Dry Zone

Area, Population and Income

Area	81,650 Km² ,**12%** of the country total
Population	~ 15 Million, > **25%** of the country
	(Earliest Settlement Area of Myanmar)
Cattle	~ 4 million (~**50%**of country total)
Income	<3 $ per head per day

Climatic and Edaphic Condition

Rainfall	300mm – 1000mm
Temperature	10 ° C – 45 ° C (Avg. 26.7 ° C)
Soil	Sandy, Gravel, Poor Fertility

Natural Vegetation

Dry forest

2

LOCATION AND AREA COVERAGE

Sr.	Region	Dis-trict	Town-ship	Area (million ha)
1	Sagaing	4	17	2.144
2	Mandalay	5	15	2.379
3	Magway	4	21	3.642
	Total	13	53	8.165

Land-use of Nation Vs. Dry Zone
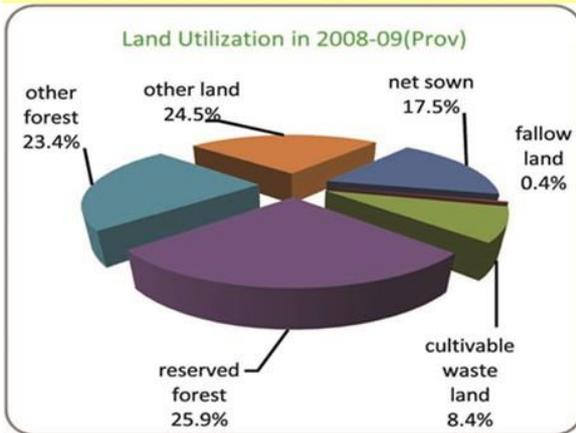
National

Dry Zone
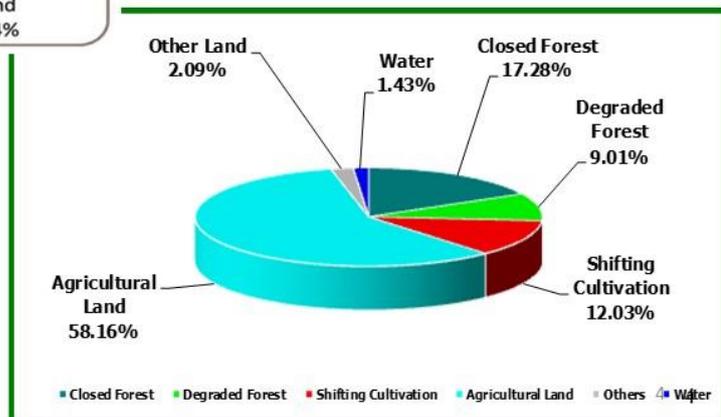
Landscapes in the dry zone

Abiotic

Desert like formation; Bare land

Biotic

Rural forest landscape

Degradation vs. Restoration

Simplified diagram of degradation process in dry zone

Primary Forests

Unsustainable use

Degraded Primary Forests

Secondary Forests

Degraded Forest Land

Landscape composed of various land cover/ land use types

Restoration efforts aiming to return to original state

Existing stand completely removed and replanted
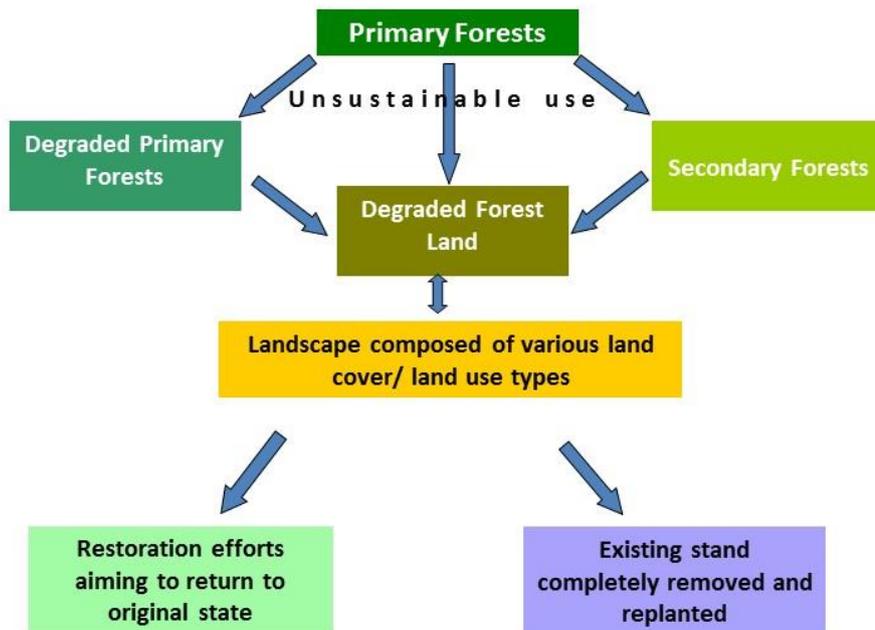
How and What to Restore?
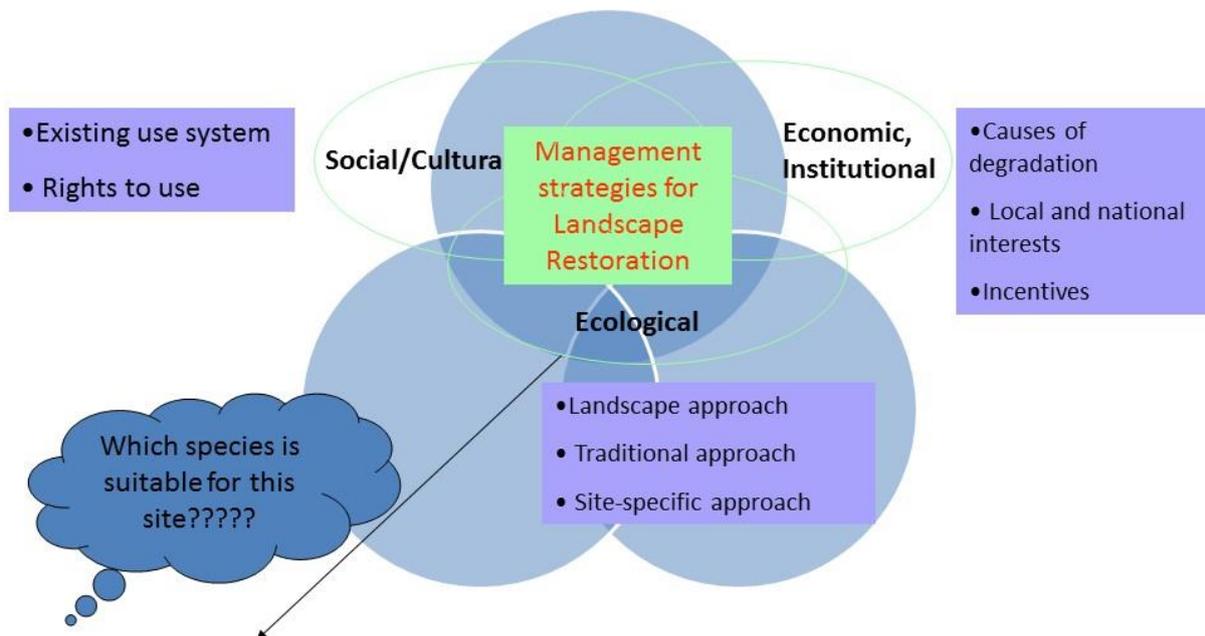
BACKGROUND HISTORY OF DRY ZONE LANDSCAPE RESTORATION

Due to degradation of forests, soil & water and related socio-economic problems

1953-54 to 1963 September
❖ The 'Agricultural and Rural Development Corporation' **(ARDC)** carried out reforestation works

October 1963
❖ the Forest Department **(FD)** took over the responsibility of the works

In 1994
❖ Special Region **Nine District Greening Project** was adopted in order to be more successful and effective in implementing greening activities

July 22, 1997
❖ Dry Zone Greening Department **(DZGD)** was constituted

8

33

Shorea siamensis - Tectona hamiltoniana forest alliance

Tectona hamiltoniana - Terminalia oliveri forest alliance

Tectona hamiltoniana - Acacia catechu forest alliance

Acacia catechu - Prosopis juliflora - Waltheria indica woodland alliance

Village woodland alliance

Probability that a woody vegetation in the region to be each alliance

Max for each alliance

0

N

Wei & Koike (2015)

9
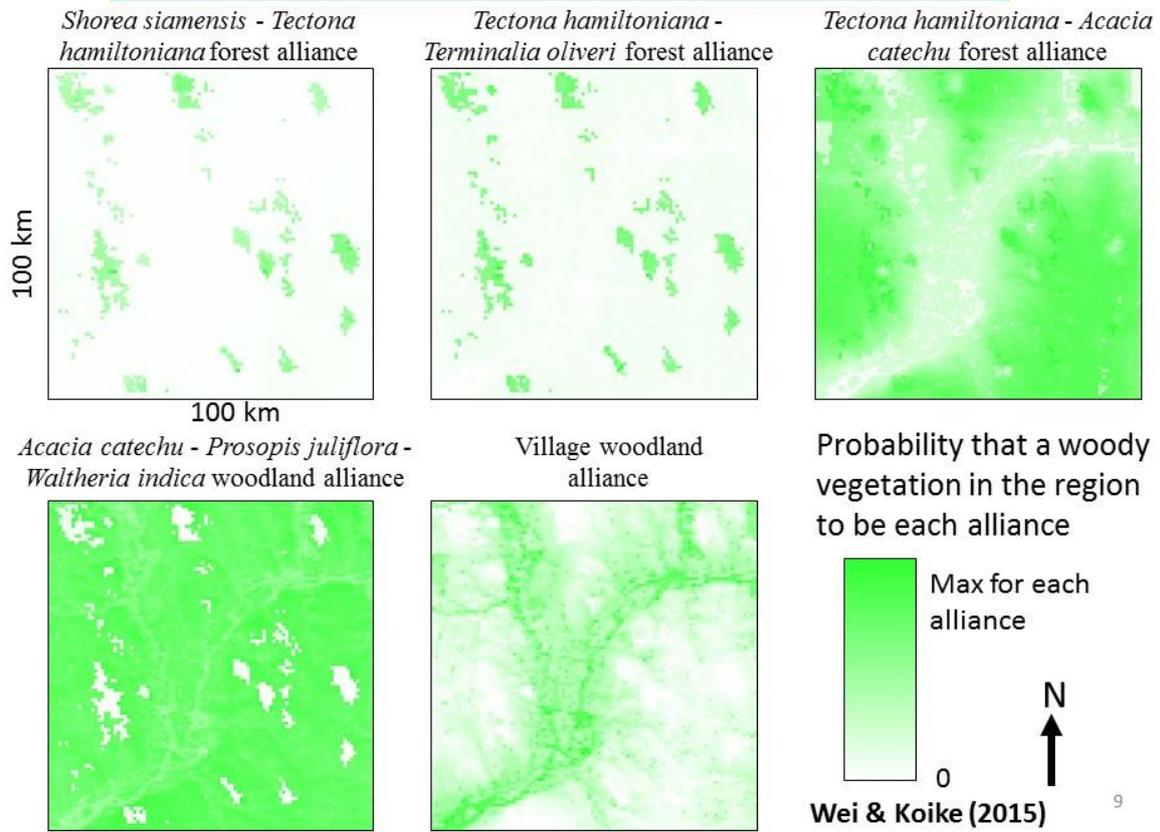
Conceptual Model for Landscape Restoration in the Central Dry Zone

➤Process of assisting recover of an ecosystem degraded, damaged or destroyed

Social & Cultural Values

Perception of degradation is a social construct (Emborg et.al 2012)

10
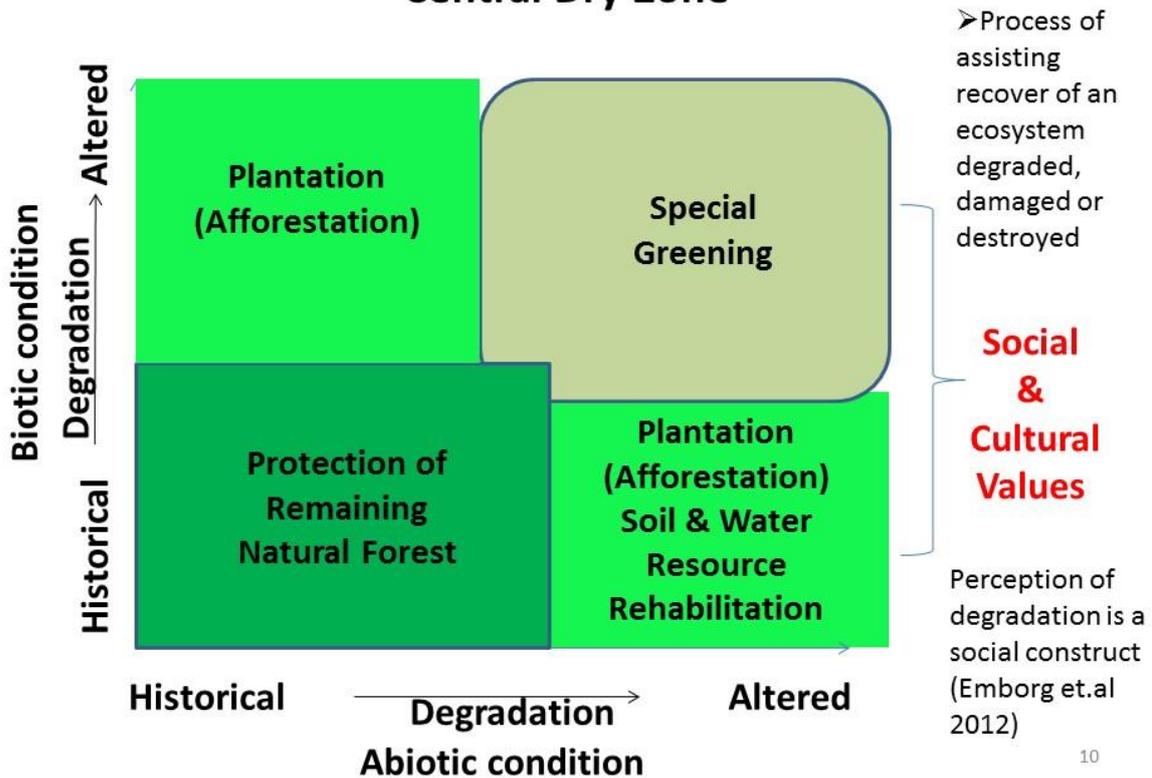
Objectives of Dry Zone Greening Department (DZGD)

➢ Make the arid region lush, green and beautiful;

➢ Maintain ecology system;

➢ Fulfill basic forest produce requirements of the rural people;

➢ Carry out socio-economic development of the rural people;

➢ Make the regional people aware of the value and essence of forest and trees;

➢ Enhance public knowledge about conservation and promotion of natural environment; and secure its participation;

➢ Maintain climatic balance that will help cultivation works;

➢ Prevent desertification.

11

Four Main Tasks for Landscape Restoration

i.   Establishment of Forest Plantations

ii.   Protection of Remaining Natural Forests

⎱ Main Strategy

iii. Promotion on Utilization of Fuel-wood Substitutes

iv.   Water Resources Development

⎱ Supporting Strategy

12

1. Establishment of Forest Plantations

Fuel-wood Supply Plantation

Forest Nursery

Digging Operation

From 1997 to January 2016 147,281 ha Currently, each year about 2,023 ha

13

Bukin Area- After Digging-2009

Bare Land to Green Land →

Bukin Area- 2015
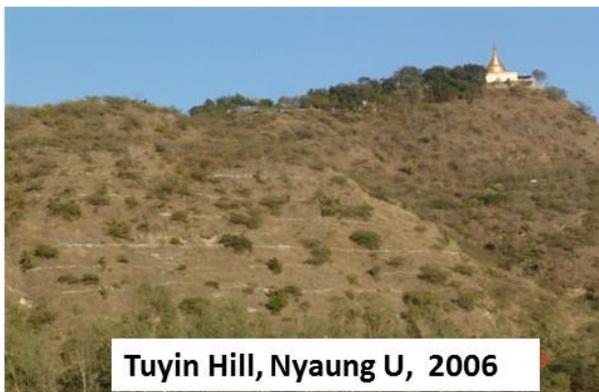
Tuyin Hill, Nyaung U, 2006
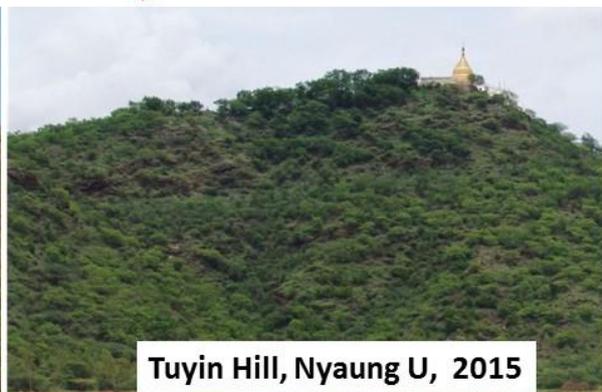
Tuyin Hill, Nyaung U, 2015

Become Ecotourism Site

14

36

Hill Special Re-greening Activities by DZGD

2005

2015
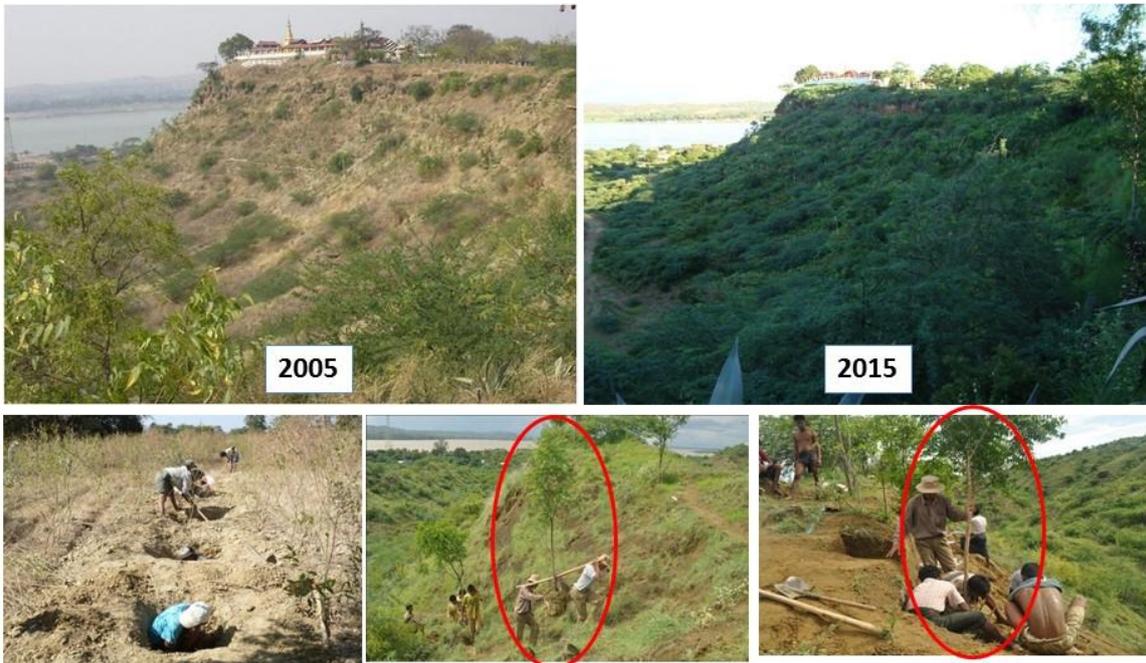
Shwe Bon Hill , Chauk Township, Magway Region

15

2. Protection of Remaining Natural Forests

❖ **On areas where mother trees , stumps and seed sources are still remained**

- Takes time but Highly Cost Effective

- Major field operations include

➢ Forest boundary repair

➢ Building guard house

➢ Clearing inspection paths

➢ Putting warning signboards

➢ Assignment of forest guards

➢ Regular patrol to protect against fire, grazing, illegal cutting, encroaching and other disturbances

16

2. Protection of Remaining Natural Forests

Boundary pillar, Signboard and Guard house

Area under full protection
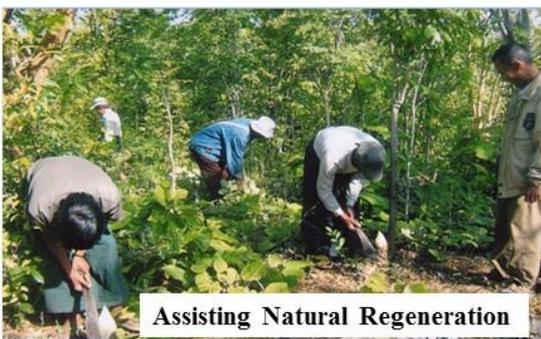
Assisting Natural Regeneration
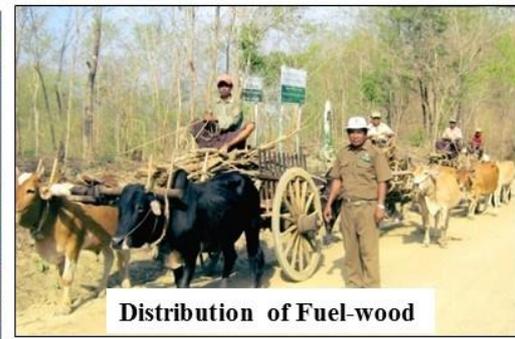
Distribution of Fuel-wood

From 1997 to January 2016, 851,853 ha (Takes time but Highly Cost Effective)

Results after 20 years

- Total area 7,687 ha , heavily degraded in 1994
- Total rehabilitated area, protection and plantation 7,089 ha
- 92% of the whole mountain area has rehabilitated and re-green
- Soil and water quality improved, natural streams recur, wild life re-entered
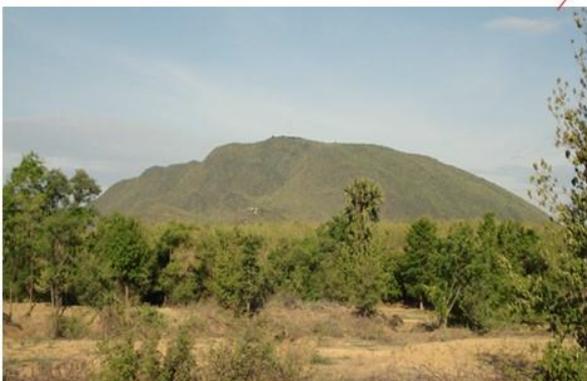
Shin-ma-taung Hill 1995

Shin-ma-taung Hill 2015

Provide Basic Needs for Local Livelihoods

3. Promotion of Fuel-wood Substitutes Utilization

Demonstration of 40% Efficient Cooking Stove

Extension and Distribution

Collection of Agriculture Residues

Utz. of Efficient Stove with Agri. Residues

Up to January 2016 – 512,596 Efficient Stoves and 560,680 tons of Agri. Residues [19]

Private Sector Involvement

13 Efficient Stove Producers in Dry Zone with Production Capacity of 135,000 number per annum [20]

Promotion on utilization of Briquettes

Rise husk

Charcoal

Sawdust
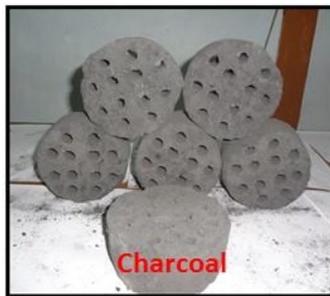
67 Briquette Producers in Dry Zone with Production Capacity of 2.7 million number per annum

Model Village Establishment on Utilization of Fuel-wood Substitutes

Up to January 2016, 497 Model Village has established in Dry Zone 22

Environmental Education

Up to January 2016

- **13,193 number of Environmental Education activities** with special focus on young generation

4. Water Resources Development

Pond

Tube Well

Rain water collection tank

4. Water Resources Development

Check dam and contour bands

Target and Accomplishments of 30-Year Comprehensive Master Plan (2001-02 to 2030-31)

| No	Activity	Unit	Target	Accomplishment (Up to Jan, 2016)
1	Establishment of Forest Plantations	ha	424,929	147,281
2	Protection of Remaining Natural Forests	ha	728,450	851,853
3	Promoting Utilization of Fuel-wood Substitutes			
	(a) Utilization of Improved Cooking Stove	No.	900,000	512,596
	(b) Utilization of Briquette	No.	1,350,000,000	107,601,894
	(c) Utilization of Agricultural Residues	Ton	450,000	560,680
	(d) Model Village on Utilization of Fuel-wood Substitutes	No. of Village		497
	(e) Environmental Education	No.		13,193
	(f) Establishment of Extension Centre	No.		253
4	Water Resources Development			
	(a) Construction of Pond	No.	2,100	1,788
	(b) Construction of Check-dam	No.	4,300	2,484
	(c) Drilling of Tube-well	No.	150	123
	(d) Rain Water Collection Tank	No.		10
	(e) Construction of Small Dam	No.		7
5	Special Greening Activities			
	(a) One Village One Acre Plantation	ha		59,490
	(b) Planting 20 Hard-wood Trees by Households	No.		1,050,520
	(c) Planting 3 Teak Trees by Households	No.		148,839
	(d) Community Initiative Tree Planting	No.		98,050

Expectation of Forest Cover Change after 30-year Master Plan Period

LAND COVER MAP OF DRY ZONE IN MYANMAR BEFORE 30 YEARS PLAN (2001)
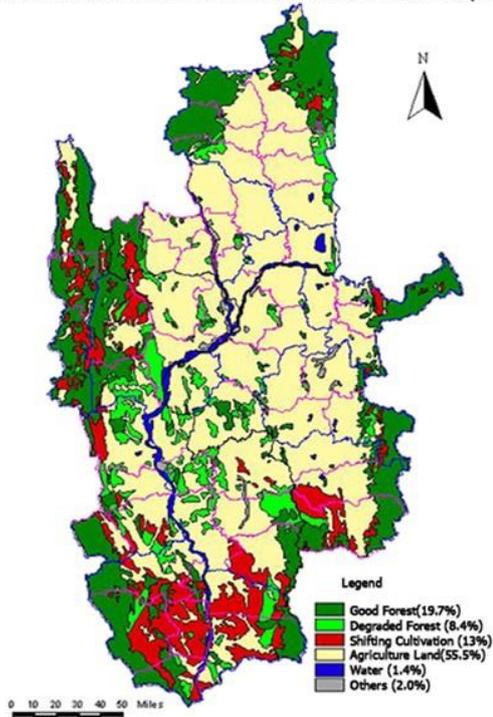
LAND COVER MAP OF DRY ZONE IN MYANMAR AFTER 30 YEARS PLAN (2030)

Legend
Good Forest(19.7%)
Degraded Forest (8.4%)
Shifting Cultivation (13%)
Agriculture Land(55.5%)
Water (1.4%)
Others (2.0%)

0 10 20 30 40 50 Miles

Legend
Good Forest(35.0%)
Shifting Cultivation (6.19%)
Agriculture Land(55.5%)
Water (1.4%)
Others (2.0%)

0 10 20 30 40 50 Miles
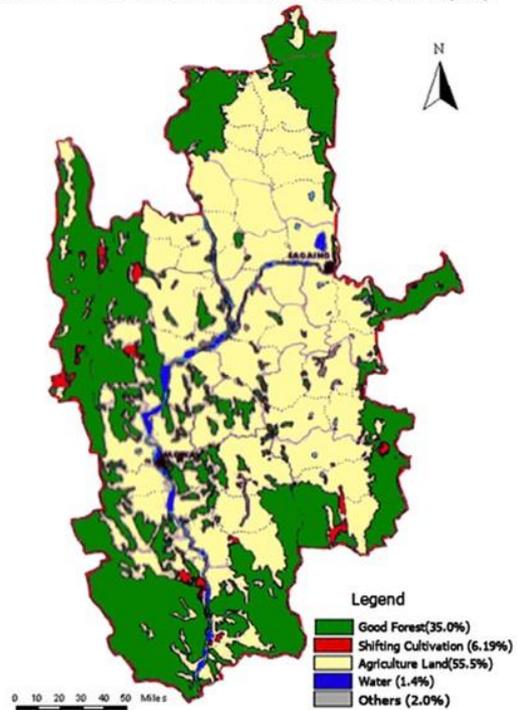
Cooperation with KOREA and DZGD

Project Phase	Period	Project Site	Major activity	Financial Assistant (US$)
Phase I	1998-99 to 2000-01	Nyaung U	Afforestation 120 ha	0.18 million
Phase II	2004 to 2005	Nyaung U	Afforestation 330 ha	0.30 million
Phase III	2009 to 2011	Nyaung U	Afforestation 150 ha and environmental education	1.5 million
New project (Phase IV)	2014-2015	Nyaung U	Afforestation 240 ha and environmental education	2.3 million
		Total	Afforestation 840 ha	4.28 million

Phase I, II, III Project   = Greening of the Dry Zone of Central Myanmar
New Project   = Capacity Building for Forest Management to Address
Climate   Change in Central Dry Zone of Myanmar

28

43

Experiences from Landscape Restoration

➢ The process of assisting the recover of an ecosystem that has been degraded, damaged or destroyed

Structure   &   Functions
(Species composition, Cover, Physiognomy)   (Productivity, Energy Flow, Nutrient Cycling)

➢ Historical setting will be useful for restoration

➢ Type of Restoration Adopted depends upon degree of degradation and objectives

➢ Takes time, Hard work

➢ Need intensive care in early stage

29

Lessons Learnt

Technical Constraints	Social and Physical Constraints
➢ Scale	➢ Poor soil fertility
➢ Nursery (Vigor of seedling)	➢ Severe climatic condition
➢ Choice of species	➢ Poverty (high dependency on natural resources)
➢ Soil Preparation	➢ Lack of alternative income and energy sources
➢ Research on habitat suitability	➢ People participation

30

General Conclusion

1. **Should consider not only technical aspect but also social aspect**

2. **Participation of people is crucial for effective landscape restoration**

3. **Exchanging experiences and more research activities are required**

31

D. Five Mha Reforestation Project in Vietnam: Lessons Learnt (Prof. Nguyen Hoang Nghia)

FIVE MILLION HA REFORESTATION PROJECT IN VIETNAM: LESSONS LEARNT

NGUYEN HOANG NGHIA
VIETNAMESE ACADEMY OF FOREST SCIENCE

CHANGE OF FOREST AREA

Hình 22
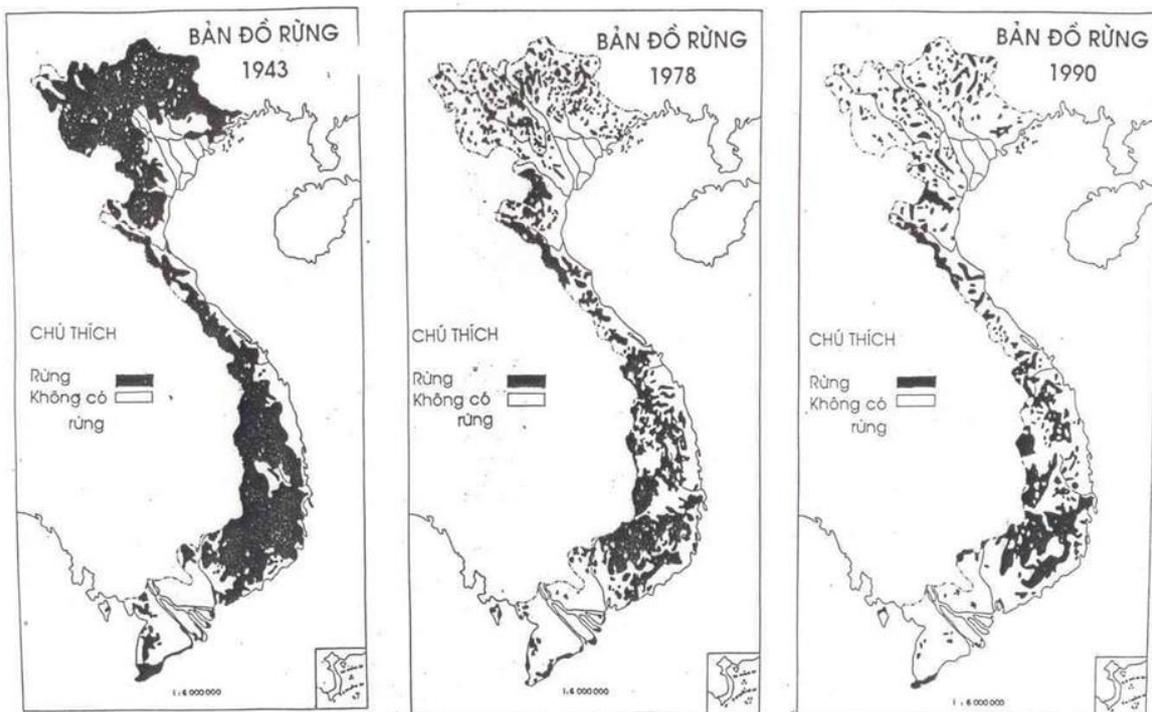
DESTRUCTION RATE

- TOTAL FOREST AREA
- 1943: 43% of total land area (14.3 million ha)
- 1980: 32.1 %
- 1985: 30 %
- 1990: 27 %
- 1995: 28 %
- RATE OF DESTRUCTION: about 100,000 ha/yr during 1945 – 1980s.
- REASONS: long-lasting wars, over-exploitation, shifting cultivation,

FOREST DESTRUCTION
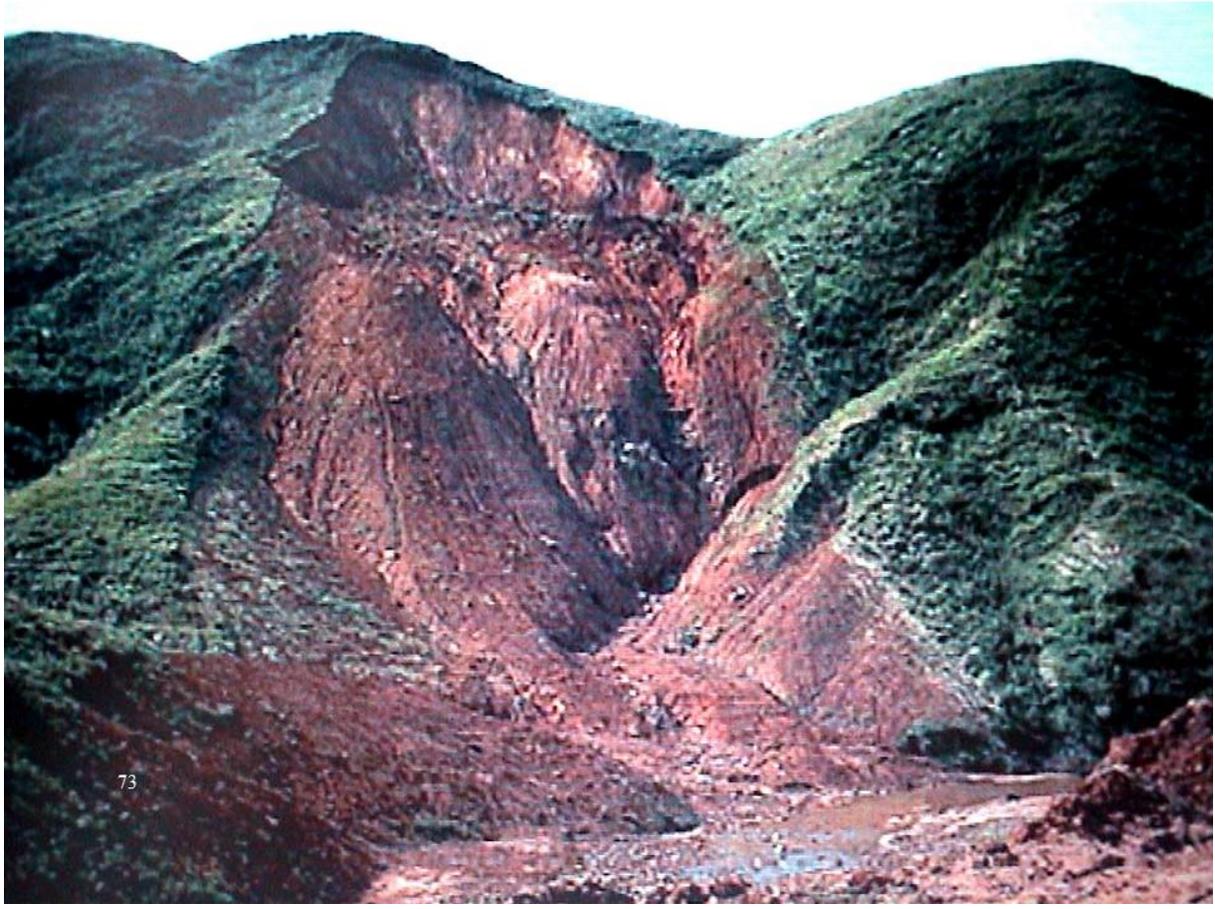
HISTORY

- 1992: Government Decree 327 → Greening bare hill and denuded land, period 1992-1997

- 1997: Gov. → Project "Close Forest"

- → Project "5 million ha reforestation", period 1998-2010, approved by the National Assembly

OBJECTIVES

- 2 million ha protected and special-use forest (National Park, Nature Reserves), Gov. supported
- 3 m. ha production forest → private sector, households, farmers

Main Activities

- Forest protection and regeneration
- Reforestation
- Land allocation
- Forest contract for protection
- Policies

SHIFT IN FORESTRY

- Change: from using timber exploited from natural forest to using wood from high yielding plantations
- Technology change: from processing big logs to small logs
- Change: from exploiting to planting
- Change: from large enterprises to small households

EXPLOITATION REDUCTION

- Ban on exploitation from natural forest
- Exploitation during 1980-1990s
  - About 2 million m^3/year
  - Not including illegal cutting
- Since 1998: 700 000 m^3/year
- 2010: 100 000 m^3/year

WHERE TIMBER COME FROM?

- Natural forest: 2 Forest Enterprises (FSC)
- Import: Timber and processed wood from other countries →1 million m^3 import
- Plantation: ~ 3 million ha of commercial plantation (Eucalypts, Acacia, pines)
    ~16 million m^3 from plantation
- Scattered tree planting

PLANTATION

* 2013 → 3,5 million ha: 42/63 provinces →

* Acacia: 990.000 ha

   * *A. mangium*   : 591.000 ha

   * Acacia hybrid : 302.000 ha

   * *A. auriculiformis*: 92.000 ha

   * *A. crassicarpa*:   5.000 ha

* Eucalypts: 163.000 ha

· Pines: 275.000 ha

Achievement

Activities	Objective 2010	Achievement 2010	%
1 Forest protection	2 m. ha	2.50 m. ha	166
2 Forest regeneration	1 m. ha	1.28	128
3 Reforestation	3 m. ha	2.52	84
3.1 Protected forest	1 m. ha	0.89	90
3.2 Production forest	2 m. ha	1.50	75
4 Industrial trees	1 m. ha	0.11	11

FOREST RESOURCES (Million ha)

Year	Natural Forest	Plantation	Total	Coverage
1945	14.300		14.300	43%
1976	11.077	0.092	11.169	33
1990	8.430	745	9.175	27
1995	8.252	1.050	9.302	28
1999	9.444	1.471	10.916	33.2
2005	10.283	2.333	12.616	37
2011	10.304	2.726	13.030	39.5

Forest Area Change 2000-2010

Country	Forest area (1000 ha)	Change of forest area	
		1000 ha/yr	% change
Cambodia	10,094	-145	-1.3
Myanmar	31,773	-310	-0.9
Laos	15,751	-78	-0.5
Thailand	18,972	-3	0
Philippines	7,665	55	0.7
Vietnam	13,797	207	1.6

BAMBOO PLANTATION

Artificial eucalypt hybrid

WOOD PRODUCT EXPORT

1996: 61 million USD
2000: 219,3 m USD
2002: 435 m USD
2003: 576 m USD
2004: 1.080 billion USD
2005: 1,57
2006: 2.0
2007: 2.7
2012: 4.5
2013: 5.0
2014: 6.3
2015: 7.2

LESSONS LEARNT

1. Strong political will

2. Awareness of people and local leaders

3. Socialization in forestry

4. Contribution of scientific achievements

LESSONS LEARNT

Strong political will:

- National Assembly approved the Project
- Government supported
- MOF and then MARD implemented
- Issued all needed policies
- Local governments and people supported

LESSONS LEARNT

Awareness of people and local leaders:

* Realize: Importance of forest and environment

* Recognize: economic and social impact

- - income and livelihood
- - labor and employment (work)
- - stable society

LESSONS LEARNT

Socialization in forestry:

* Gov. support protected and special-use forest

* Private sector: invest in production forest and processing enterprises

* Local farmers get land for planting, sign contract for protection → get money

* International support

* Good protection,less fire and illegal cutting

LESSONS LEARNT

Contribution of scientific achievements:

* Many high yielding cultivars for planting

* Many planting techniques

* Scientists involved in technology transfer

* Scientists involved in extension work

* High productivity → high price → income

* Less bare land: 3.5 m. ha plantation

Hedge orchard of Acacia hybrid for vegetative propagation

Acacia hybrid
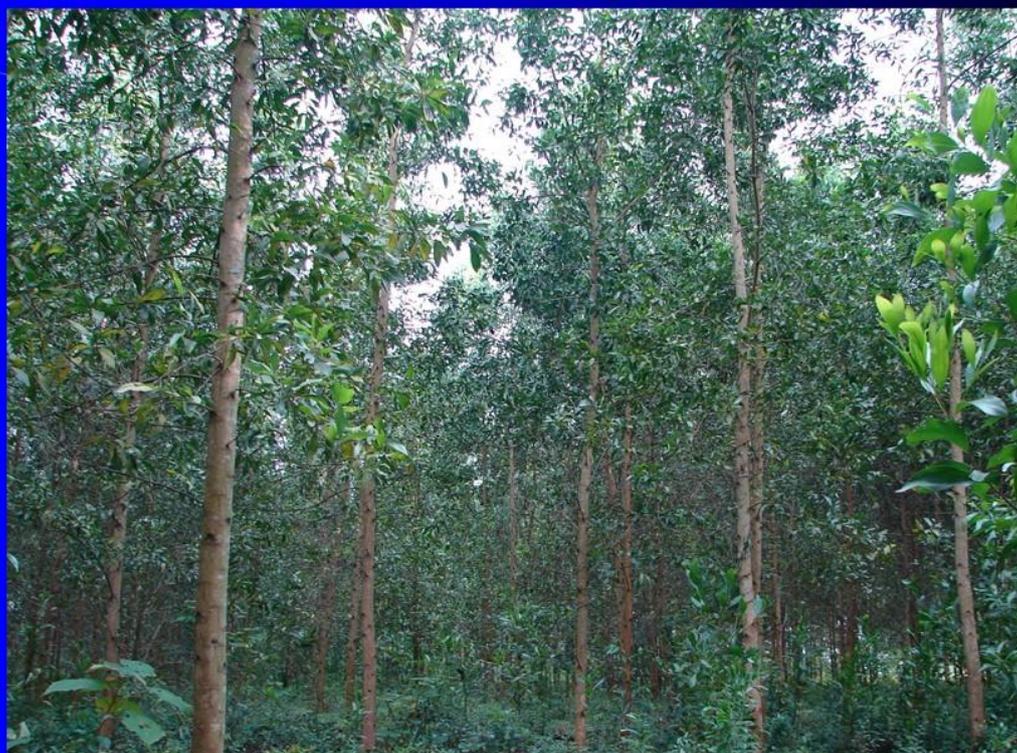
ACACIA AURICULIFORMIS PLANTATION

AA9, South Vietnam, 38 m³/ha/yr

E.   National Policy on Reforestation and Sustainable Forest Management in the DPR of Korea (Mr. Kwang Chun Ryu & Mr. Il Ha Kim)

National policy on reforestation and sustainable forest management in the DPR of Korea

Ministry of Land and Environment Protection
February, 2016

The role and functions of forest in DPR Korea

The forest area covers over 80% of total terrestrial land, plays important role in national economy development.

➢ Forests, and goods and services they provide, are essential for local industries and human well-being

➢ Forest is indispensable for land conservation and natural disaster mitigation.

Status of deforestation and land degradation

- **Conversion of forest lands for food and raw materials**

- **Forest destruction for infrastructure development and other development activities**

- **Over-exploitation of timber and fire woods**

- **Forest fires, disease and pest damages**

Consequences of deforestation and forest degradation

Impacts	Consequences
□ Productivity loss of forest lands	■ Destruction of forest ecosystems
□ Shrinking supply of water resource(for drinking, economic, irrigation)	■ Threatening to total ecosystems (incl. stream and coastal ecosystems)
□ Inundation, sediment of reservoirs and watercourse	■ Adverse impacts onto the sustainable socio-economic development including agriculture and people's livelihood improvement
□ Irregular water supply for hydraulic power	
□ Decreased biodiversity	
□ Deterioration of Bio-geochemical circulation process(carbon sequestration and storage, micro-climate, meso-climate)	■ Adverse impacts on regional and global environmental
□ Increased diseases and pest damage	
□ landslides	

Efforts to address the deforestation and forest degradation

National policy

To rehabilitate the degraded and destructed forests through forest restoration campaign within near future of ten years

- Greening and gardening of the whole country

- Sustainable and rational use of mountains and forests to contribute to the economic development and livelihood improvement

- Improvement of forest ecosystems and strengthening their environmental protective functions to minimize the natural disaster risks

National planning

- **Forest perspective planning**

- **Long-term and annual afforestation/reforestation planning**

- **Rotational timber logging planning**

National and public activities

- **Based on preparation phase (2015), implement the forest restoration campaign since 2016**
- **General turn-off period for land management in spring and autumn**
- **Afforestation/reforestation by public participation**
- **Community-based forest management**

Constraints in implementing the forest restoration campaign and sustainable forest management

- Lack and limits in scientific seed production and collection system and relevant techniques
- Limited material and technical bases for intensive and industrialized production of tree seedlings/saplings
- Limited technologies and knowledges on improved forest management (techniques for mixed forest establishment, natural regeneration and integrated pest management, etc)
- Weak legal enforcement for protection and sustainable use of forest and its resources
- Low understanding on sustainable forest management.

Priority issues

- Development of criteria and indicators for sustainable forest management.

- Forest survey and evaluation, establishment of regular monitoring system

- Training and capacity building for competent forest technicians

- Public awareness raising on sustainable forest management.

- Demonstration and extention of sustainable forest management

- Fostering the research and development on sustainable forest management, promoting international exchanges.

F. Status of Desertification and Korea-Mongolia Joint "Green Belt" Plantation Project in Mongolia (Prof. Nyam-Osor Batkhuu)

**Status of Desertification and
Korea-Mongolia Joint "Green belt"
Plantation Project in Mongolia**

Nyam-Osor Batkhuu
(National University of Mongolia)

Table of Contents

- Background
- Project Outline
- Main Activities
- Outcomes

Background

Desertification status
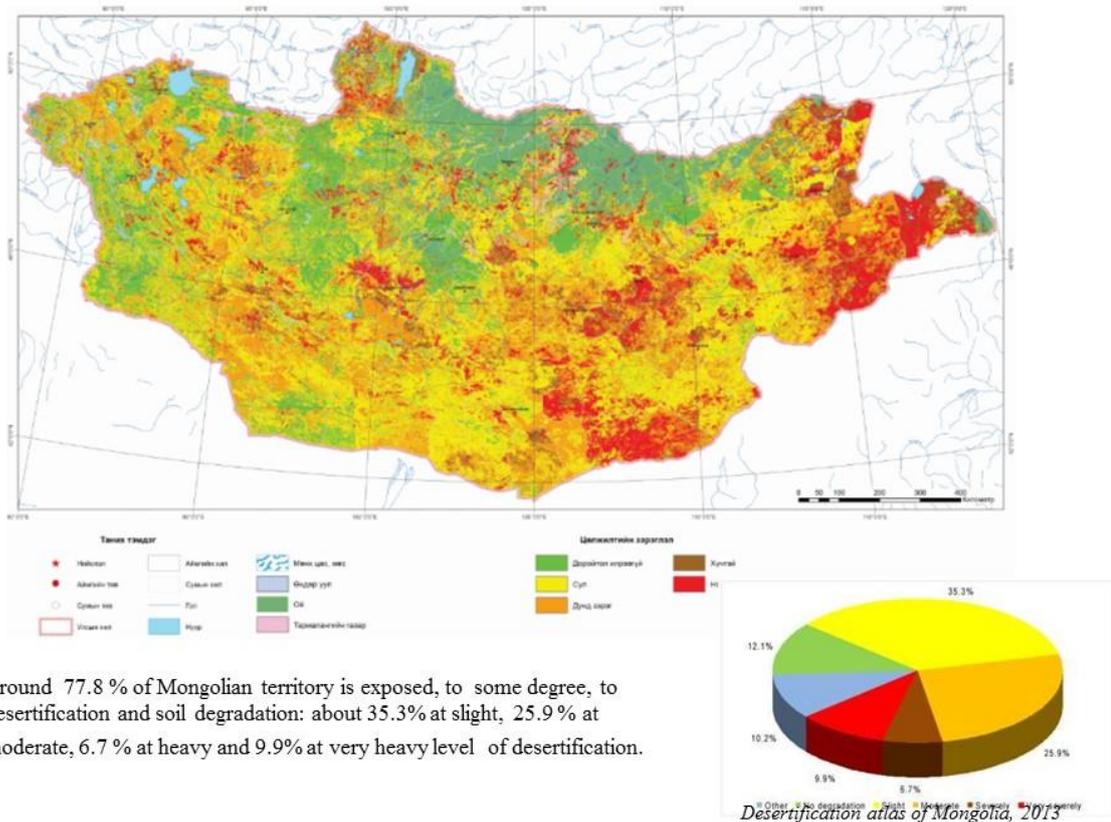
- Around 77.8 % of Mongolian territory is exposed, to some degree, to desertification and soil degradation: about 35.3% at slight, 25.9 % at moderate, 6.7 % at heavy and 9.9% at very heavy level of desertification.

Desertification atlas of Mongolia, 2013

Climatic indicator

$$K_y = \frac{\sum_{I-XII} P}{(0.2 \cdot \sum_{IV-x} T + 306)}$$
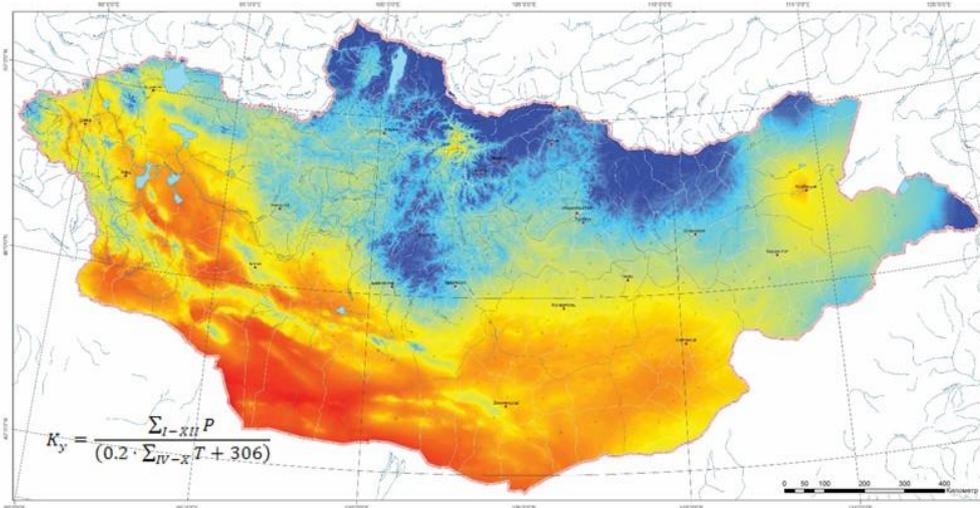
- Aridity was assessed using Mezentsev's coefficient of moisture, developed in 1970s for Western Siberia

About 91 % of total territory are drylands.
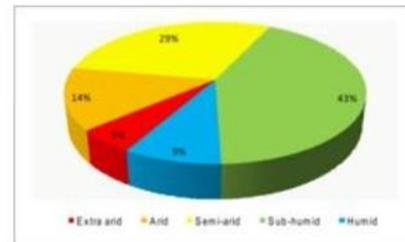
*Desertification atlas of Mongolia, 2013*

Climatic indicator

- Drought

❑ There are many methods for assessing drought

❑ The remote sensing method by calculating NDDI was used in this study.

$$NDDI = \frac{NDVI - NDWI}{NDVI + NDWI}$$

❑Intensity and severity of the drought were analyzed using time-series for last decade.

Drought intensity
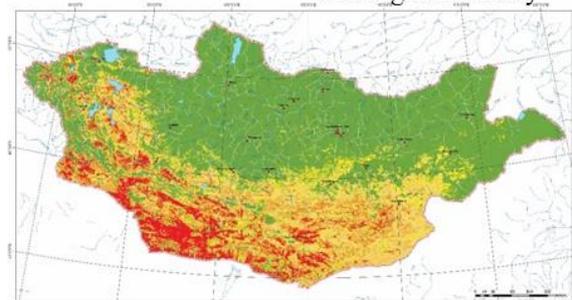
Drought frequency
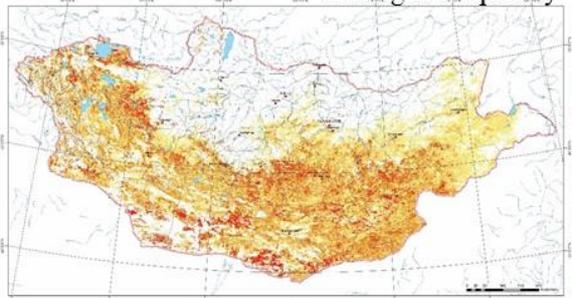
Desertification atlas of Mongolia, 2013

Soil indicators
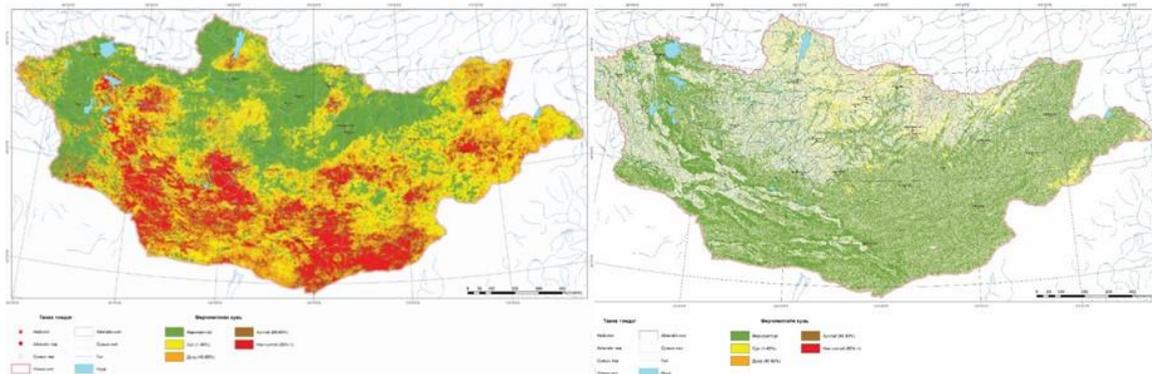
- Soil erosion by wind
- ❏ The WEQ model was a basis to assess areas affected by wind erosion

> More than 60% of total territory are affected by wind erosion.

- • Soil erosion by water
- ❏ Soil erosion by water was assessed using RUSLE model

> About 9 % of total territory are affected by water erosion.

Desertification atlas of Mongolia, 2013

Vegetation indicators
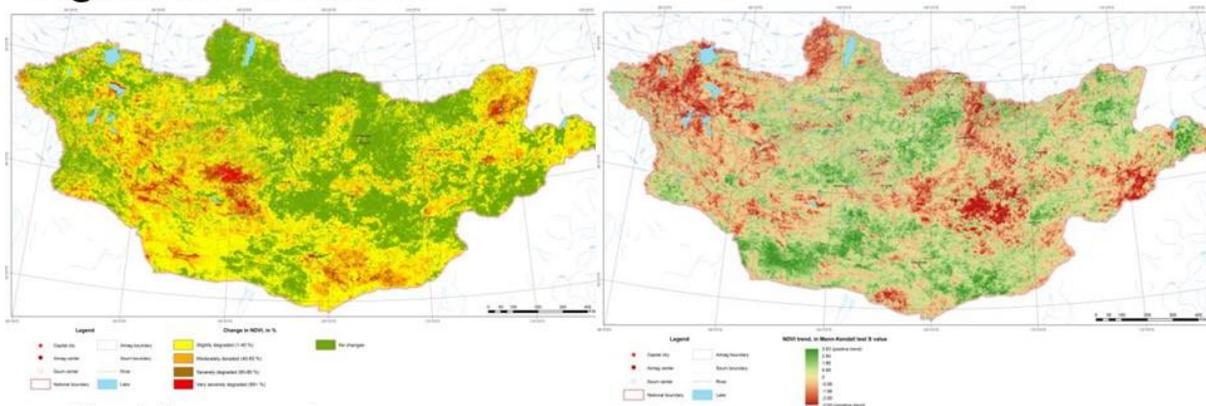
- **Vegetation cover change**

- ❏ The state of the vegetation cover assessed using NDVI time-series data from MODIS/Terra with 250 m resolution.

- ❏ The change in vegetation cover within last decade evaluated using change index method.

> The vegetation cover of approximately 65% of total territory are scattered.

- **Vegetation cover change trend**

- ❏ The trend in the vegetation cover change assessed using Mann-Kendall non-parametric test.

- ❏ The trend in vegetation cover change within last decade was evaluated.

> About 50 % of total territory may experience vegetation cover decline in a future.

Desertification atlas of Mongolia, 2013

Socio-economic indicators
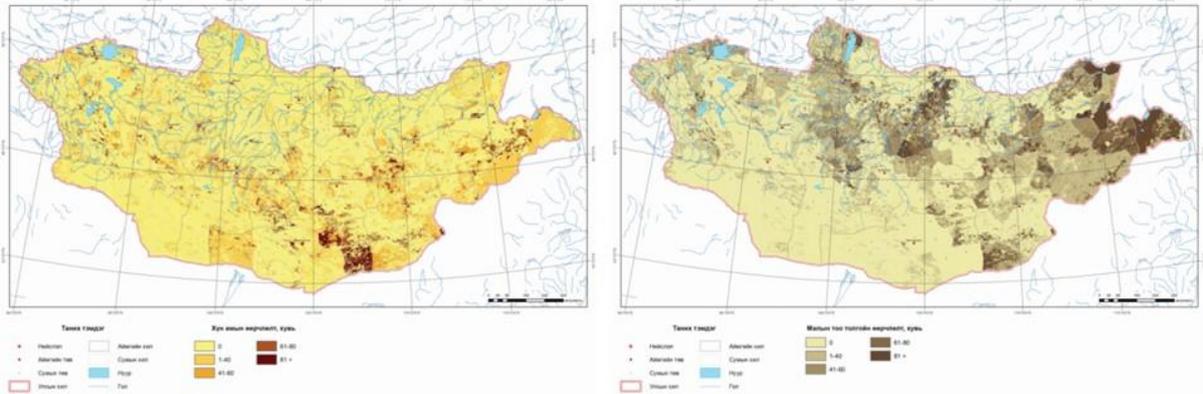
- Population
  - ☐ During the last two decades Mongolia faces intensive internal migration of the population from rural areas to cities.
  - ☐ By the 2010 in the capital city Ulaanbaatar was living 41.4 % of the Mongolian population .
  - ☐ Nationally, 63.3 % of the total population (1760.4 thousand people) is living in urban areas
  - ☐ In some aimags like Dornod, Dornogovi, Govisumber, Orkhon and Darkhan-Uul Aimags more than half of the population is living in the urban or settled areas.
  - ☐ These changes in population settlement may become the causes of land degradation and ecological conditions near urban areas.

- Livestock
  - ☐ The growth and decline pattern of livestock numbers since 1960, it fluctuated somewhere between 20-25 million during 1970-1990. However, livestock number doubled since 1995.
  - ☐ In the past livestock number has not remained constant and has been fluctuating in a "growing-declining-growing-declining" pattern.
  - ☐ the results of our estimations showed that 32 % of the total livestock of Mongolia is in Khangai region, 29 % is in western region, 15 % in eastern region, 14 % in Govi region and 9 % in central part of Mongolia.

Desertification atlas of Mongolia, 2013

Desertification factor
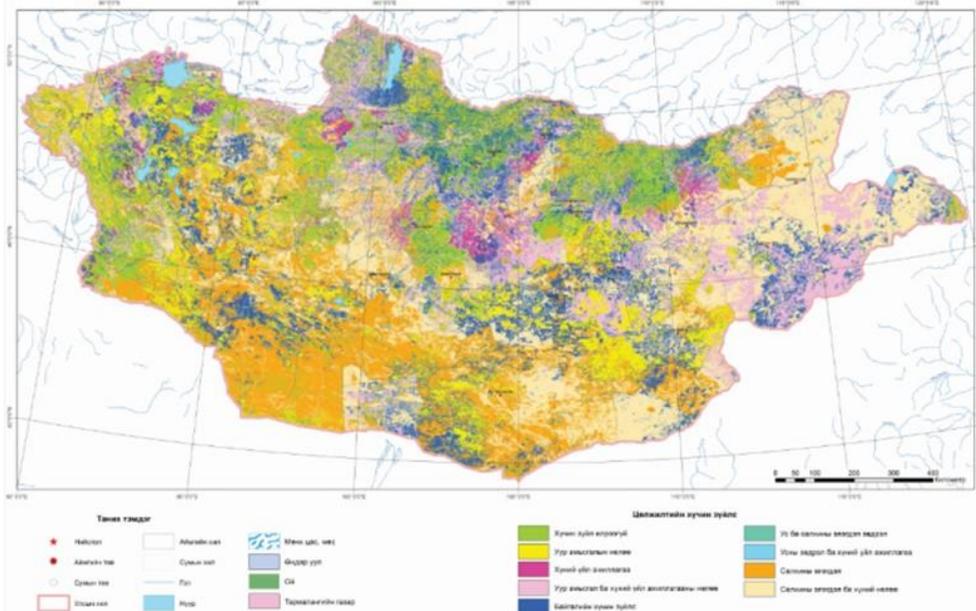
- ☐ 10.4% of the territory does not yet affected by desertification or no indication of any factor's impact.
- ☐ 1.9% is under the impact of human activities, 16.0% is affected by the complex of natural factors, 13.8% is affected by climate factor.
- ☐ On the 20.8% and 0,1% of the territory are dominating wind erosion and water erosion respectively, 13.1% is under the combined impact of human activities and climate, 23.9% is under the combined impact of wind and human action attributed factors.

Desertification atlas of Mongolia, 2013

74

Average Air Temperature between 1940-2004
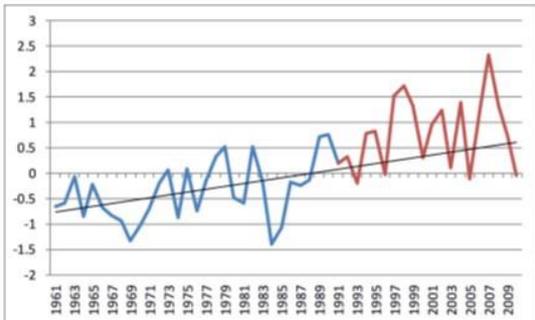
The long-term average annual air temperature
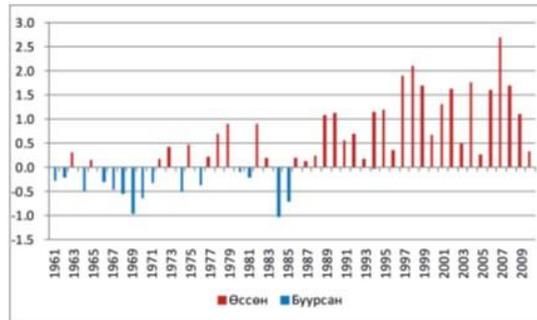
The average annual temperature anomalies (compared with average of 1961-1990)

According to research on Global Climate change effects in Mongolia Average air temperature between 1940-2004, have being increased by 1.9°C (Natsagdorj et al. 2005).

Especially after 1990, Mongolia has experiencing warming with increase of average air temperature of 1.6°C compared with average air temperature between 1961-1990. Within last decades, extreme warming observed in 2001, 2004, 2007 with increased air temperature of 1.3-2.7°C compared with long-term average air temperature.

Source: Desertification map of Mongolia, 2013

Korea-Mongolia Bilateral Cooperation

Forestry cooperation between Korea and Mongolia since 1998

⬇

Summit Meeting between two countries in 2006

⬇

MOU in Combating Desertification in 2007

⬇

Korea-Mongolia Greenbelt Plantation Project

Korea-Mongolia "Greenbelt Project" Organization

Mongolia

Ministry of Environment and Green Development

Korea

Korea Forest Service

Korea-Mongolia Greenbelt Project

Forestry Agency

Forest Research Institute

Institute of Geoecology

Joint Research Team

Regional office (Lun)

Regional office (Dalanzadgad)
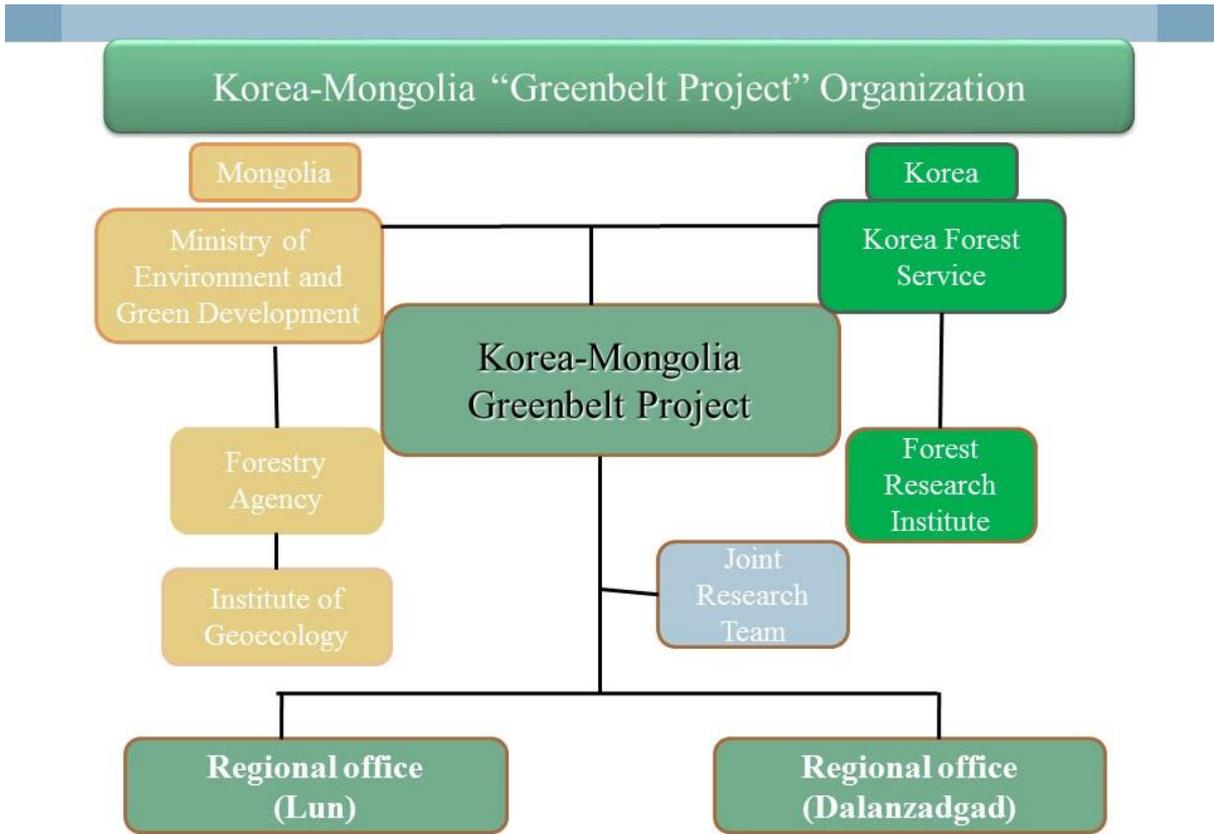
Mongolia 'Green Wall National Program'

"Green Wall" of Mongolian Gobi and steppe regions

Legend
Boundary of aimag
Boundary of sum
Centre of sum
Centre of aimag
Green Wall -Ekotrass
main trass
assist trass
Railway
Lake
River
Water complex (2005-2025year)
Water resources
Relief
Forest area
Coniferous and leaves forest
Saxaul

- Government Resolution of Mongolia, in 2005

- Afforestation of 3,700km greenbelt line
  1st Phase (2005-2015), 2nd Phase (2015-2025), 3rd Phase (2025-2035)

Korea-Mongolia Greenbelt Plantation Project

PLANTATION PROJECT

━━━ National Greenbelt Program (Mongolian Government)

🌳 Greenbelt Plantation Project (Korean Government)

- Duration : 2007~2016(10 years)
    1st stage (2007): Preparation and basic planning works
    2nd stage (08~11): Implementation of main activities
    3rd stage (12~16): Cooperation with North East Asia Countries
- Budget : 9.5M USD, Project Site : Lun, Dalanzadgad

Project Contents

Classification	Details
Nursery and Tree Planting	- Nursery establishment in two project sites - Forest strips of 3,000 ha areas in two sites
Training and capacity building	- Field training: practice and training by demonstration - Education for public servants, local managers, NGOs and representatives of communities
Dispatching professionals	- Long term: project manager responsible for the whole project work - Short term: professors, specialists from the Korea Forest Research Institution (KFRI)
Joint research	- 4 kinds of research subjects - Tree selection, Improving soils, irrigation system, grassland recovery test and etc.
Symposium and workshops	- To organize joint symposium involving international organizations civil organizations and governments of north-east Asian countries
Assessment	- Annual progress assessment - Interim assessment after 5 year implementation

1. Seedling Nursery

- **Lun Nursery**
  20 ha, 20 tree species

룬숭 양묘장 배치도

- **Dalanzadgad Nursery**
  24 ha, 15 tree species

Nursery Layout

달란자드가드 양묘장 배치도
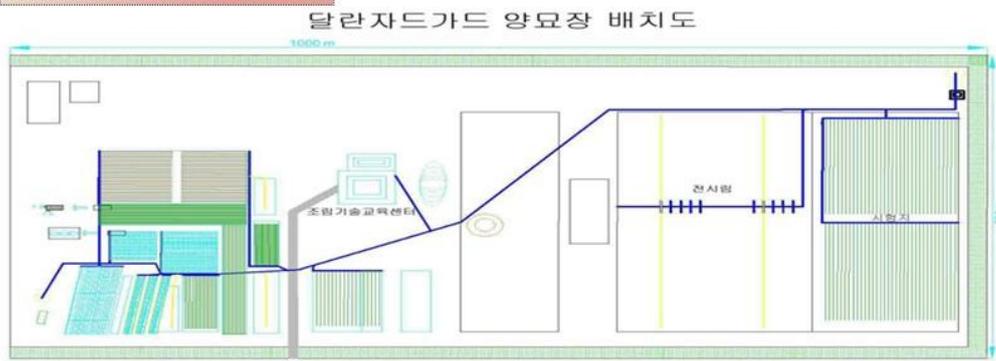
2. Afforestation

<Site condition>

Lun soum

Dalanzadgad

<Plantation design>
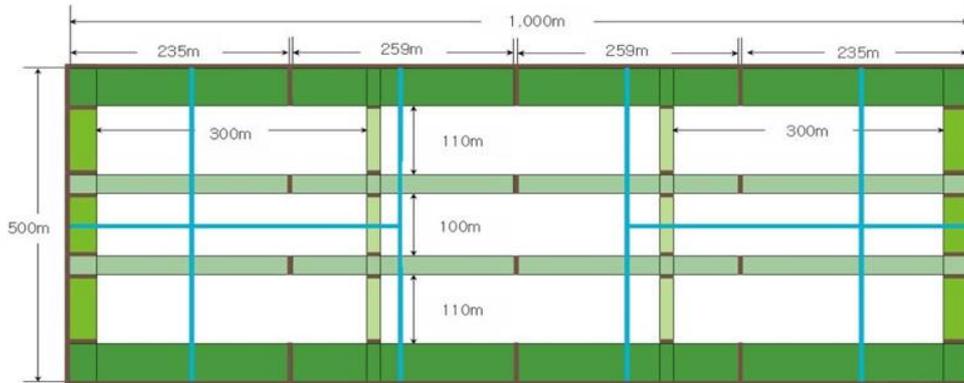
• Main Tree species for planting

Ulmus pumila

Hippophae rhamnoides

Tamarix ramosissima

Caragana microphylla

Eleagnus moorcroftii

Amygdalus mongolica

- Planting Methods

1. Digging a deep hole for planting

2. Making a long furrow for planting
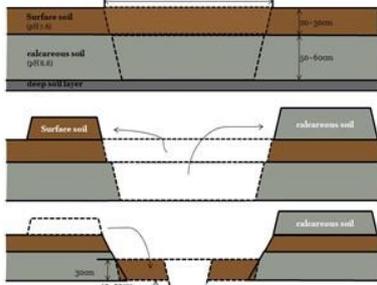
Method 1 (hole planting)

Method 2 (furrow planting)

100cm

Surface soil (pH 7.6)   20~30cm

calcareous soil (pH 8.8)   50~60cm

deep soil layer

Surface soil   calcareous soil

calcareous soil

30cm

10~20cm
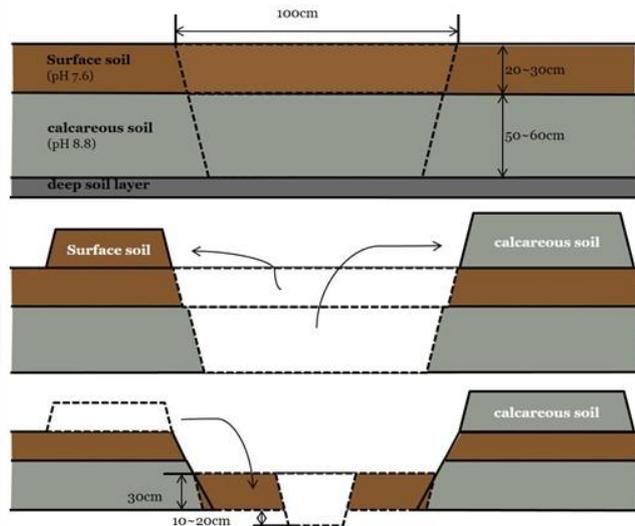
- Irrigation system

(50ha : 1,000m × 500m)

(region 1)   (region 2)

1-1   1-2   2-1   2-2

1-4   1-3

| well | Water tank | pump | valve | Water pipe | Region |
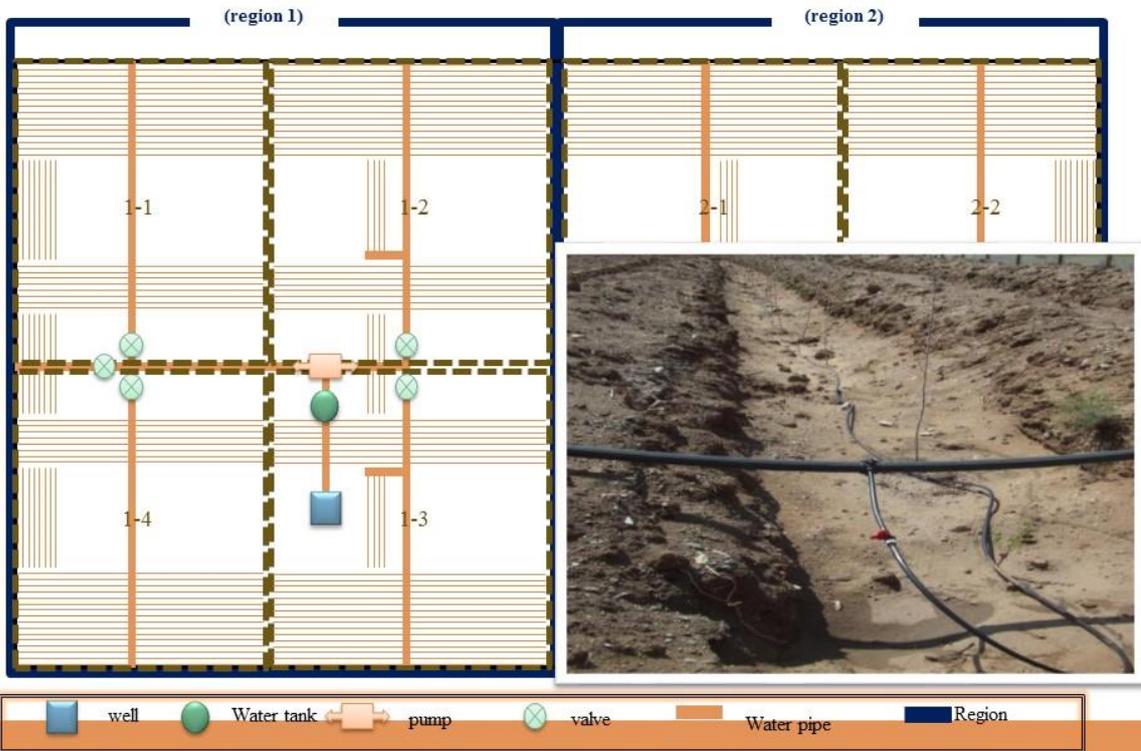
PLANTATION WORK FLOW CHART

① *Soil analysis*   ② *Underground water survey and development*   ③ *Setting up a fence*

⑥ *Soil improvement by compost*   ⑤ *Instullation of irrigation system*   ④ *Planting preparation*

⑦ *Planting*   ⑧ *Weeding*   ⑨ *Intensive management and protection*

* Maintenance of machinery and equipment
* Maintenance of irrigation system
* Protection from the livestock, animals and rodents
* Other facilities maintenance

GREEN BELT

- Plantation

Before

(Groundwater Development)

Irrigation system

(Drip water pipe)

After

25

3. Training and Education

• Forestry Education Center

< Lun >

< Dalanzadgad >

• Sustainable maintenance

◆ small scale farming inside the project site for forest protection
  • growing potatoes and some vegetables (400~900㎡)

4. Joint Research

National University of Mongolia Researchers from Mongolian Academy of Sciences

Tree Species Selection

Irrigation

Herbaceous plant selection

Soil Improvement

5. Public awareness and others

Outcomes

• Total plantation Area

Site		2008, ha/%	2009, ha/%	2010, ha/%	2011, ha/%	2012, ha/%	2013, ha/%	2014, ha/%	2015, ha/%	Total
Lun	Area	100	50	50	50	50	50	50	50	450
	Survival rate	75%	88%	90%	95%	97%	88,8	84,5	95,82	89
Dalan	Area	100	55	50	50	50	50	50	50	455
	Survival rate	20%	41%	93%	97%	98%	96,53	92,7	95,9	70
Saxaul	Area				10	100	200	300	400	1010
	Survival rate				79,22	70.26	67.71	97.5	94.6	81.86
	TOTAL	200	105	100	110	200	300	400	500	1915

Lun site- planted area

Growth performance of Lun soum plantation site No1-2 (after 5 year)

	2008	2009	2010	2011	2012
POP	130.7	156.2	236.6	336.6	421.5
ULM	83.1	153.8	217.4	298.9	335.1
C.Arb	91.5	124.0	136.7	142.7	162.3

	2008	2009	2010	2011	2012
POP	125.9	138.5	185.2	311.9	360.6
ULM	75.4	110.5	146.3	200.3	249.8
C.Mic	60.7	77.2	88.5	96.3	106.3

HIP

4.745 — 7.8 — 16.53 — 14.58 — 18.57
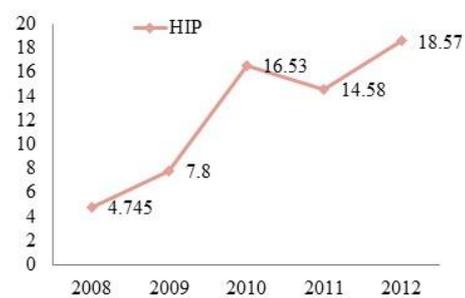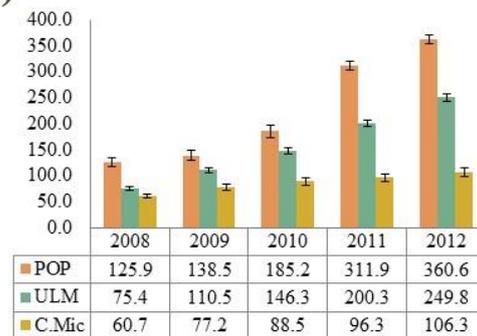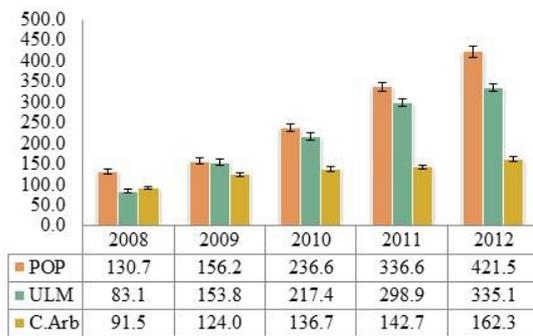
Growth performance of Lun soum plantation site No3 (after 4 year)

	2009	2010	2011	2012
POP	64.8	100.8	137.2	168.6
ULM	26.9	66.5	99.8	124.6

	2009	2010	2011	2012
ELA	3.9	9.3	17.8	27.5
ARM	3.7	18.7	9.1	14.4
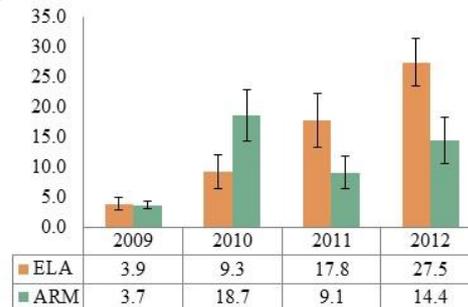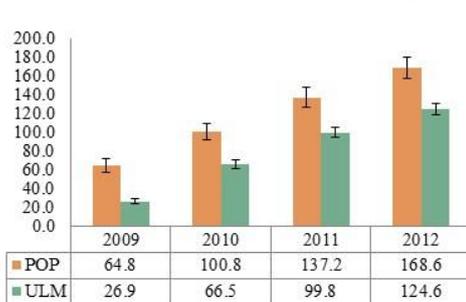
Comparative view of planted trees

Poplar trees planted in 2010

Poplar trees planted in 2012

Site No4

Elm trees planted in 2011

Poplar trees planted in 2012

Site No5

Survival rate of planted trees (Lun soum)

	Populus sibirica	Ulmus pumila	Caragana arborescens	Hippophae rhamnoides	Elaeagnus moorcroftii	Armenica sibirica	Amygdalus mongolica	Padus mill	Ribes diacantha
2012	98.1	97.6	98	98.3	92.3	90.3	89.2	62	63
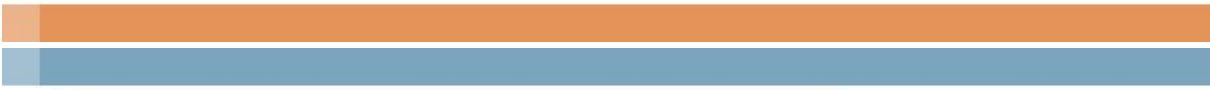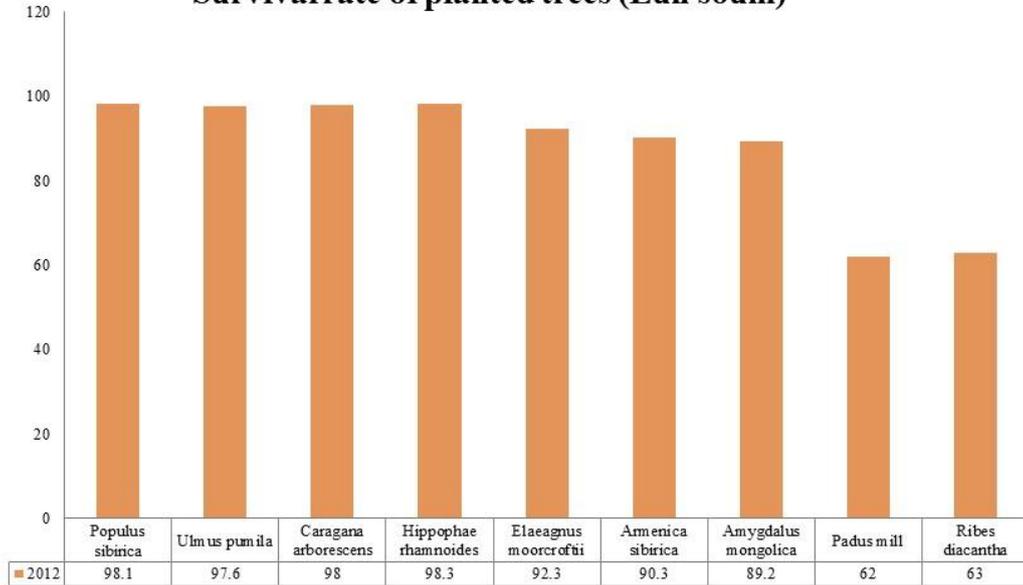
Dalanzadgad site – planted area

Survival rate of planted trees (Dalanzadgad site)

Site	Planted trees	Survived trees (2012)	Survival rate (%)
Site No1	25531	23210	91
Site 2	25653	20573	80.1
Site No3	26902	23953	89
Site No 4	27534	24415	88.67
Site No5	27853	26661	96
Total	*133473*	*118812*	*89*

ANNEX. PHOTOS

OPENING REMARK

Dr. Don Koo Lee
Endowed Professor, Yeungnam University

PRESENTATION

Dr. John Stanturf

Senior Scientist, US Forest Service/ Coordinator, IUFRO Working Group 1.06.00

PRESENTATION

Mr. Wai Myo Hla

Director, Dry Zone Greening Department of Myanmar

PRESENTATION

Dr. Nguyen Hoang Nghia

Professor,
Vietnam Academy of
Forest Science

PRESENTATION

Mr. Kwang Chun Ryu
Director, Ministry of Land Environmental Protection, DPR of Korea

PRESENTATION

Mr. Il Ha Kim

Member of National Committee for FAO, DPR of Korea

PRESENTATION

Mr. Nyam-Osor Batkhuu

Professor, National University of Mongolia

Q&A Session

Q&A Session

Group Photos

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