

Valuation of Forest Environmental Benefits with Payment of Ecosystem Services



2011. 11. 24.

DongKyun PARK / Consultant

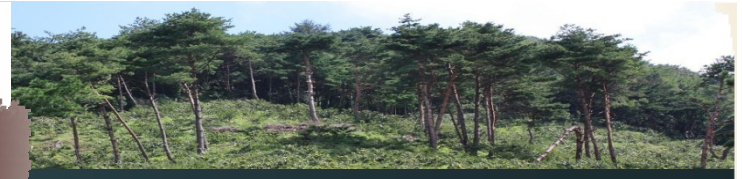
GMS – EOC/ ADB

Korea Forest Management & Policies

山林经营政策



Forest Environment / 山林环境



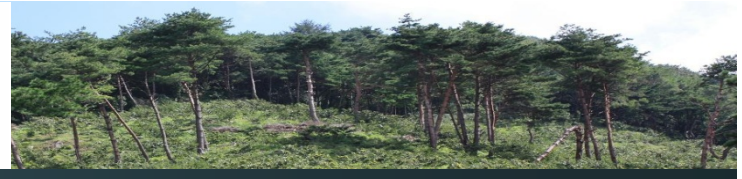
◆ Geography

- Latitude : $33^{\circ} 06'$ ~ $43^{\circ} 00'$, Longitude : $124^{\circ} 11'$ ~ $131^{\circ} 53'$
- Average Elevation : 420 m
- Land area : 221,000 km² (South Korea : 99,660 km², 45%)
- Forest area : 70% of total land area (South Korea : 65%)

◆ Climate

- Annual mean Temperature
South : $12-14^{\circ} \text{C}$, Central : $10-12^{\circ} \text{C}$, North : $5-10^{\circ} \text{C}$
- Annual mean rainfall
 $500-1,500 \text{ mm}$ → 60% of rainfall is measured during the summer

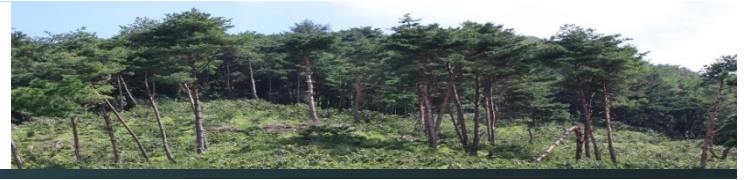




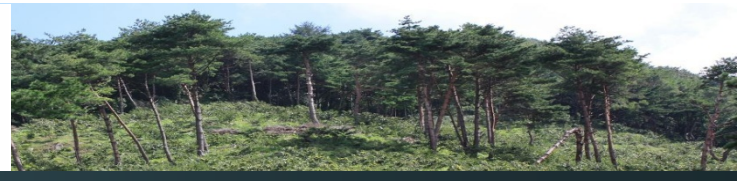
Degraded Forests / 山林荒廢



1950s Seongbuk-dong, Seoul



1950s Gupabal, Seoul



治山绿化项目成功 (1973~1987)



Soil erosion control / 砂防项目 (=水土保持项目)

- ◆ Before restoration

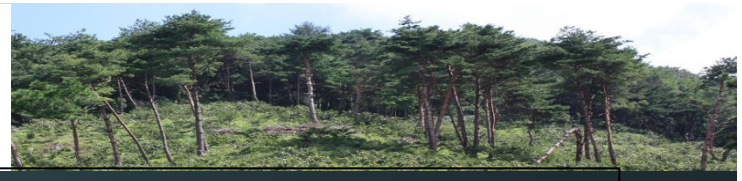


- ◆ 3 months later



- ◆ 3 years





1st & 2nd 10-year Forest Development Plan 第1次/第2次山林10年开发计划(1973 -1987)

Targets

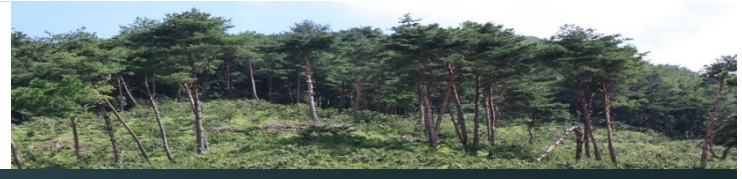
- Greening the country again
- Establishment of economic forest

Achievements

- Restoration of 0.77 million
- Reforestation of 2.16 million
- Intensive erosion control
- Formation of 80 large scale

Devastation of forests during social turbulence era in 1950-1960

- Korean War, illegal and excessive cutting practice
- Stock volume in the 1960s : 5.7m³/ha



3rd Forest Development Plan 第3次 10年开发计划(1988 -1997)

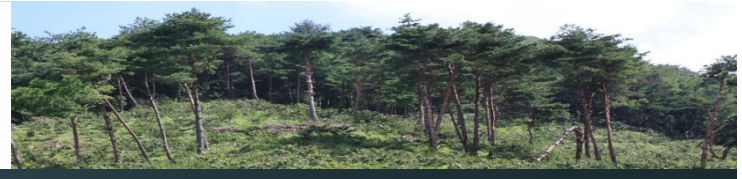
Target

- Harmonizing economic benefits with public interests



Achievements

- Commercial forest : 0.32million ha
- Tending activities : 3.03million ha
- Extension of recreation forest
- Creation of income source for mountain villages
- Reclassification of forestland use system by function and purposes



Forest Rehabilitation/山林复原

Forest Resource

2nd Rehabilitation



Harmonizing forest
income development &
public benefit functions

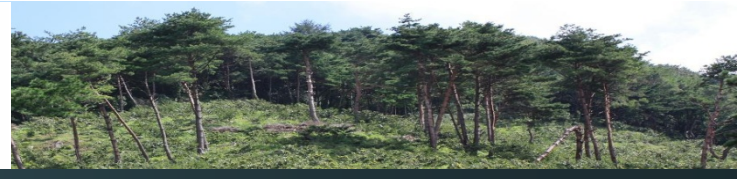
1st Rehabilitation



Establishment of
commercial forest area

Plantation of 1 million ha,
Public tree planting campaign





4th Forest Development Plan 第4次 10年开发计划(1998 -2007)

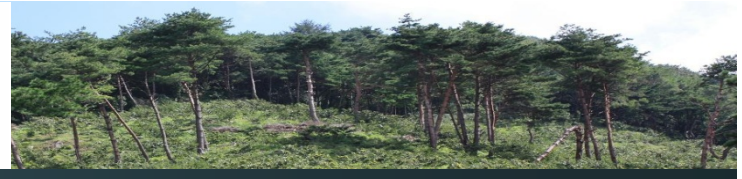
Target

- Sustainable forest management
- Growing valuable forest resources
- Fostering competitive forest industry
- Promoting healthy & pleasant forests for people to enjoy

Action

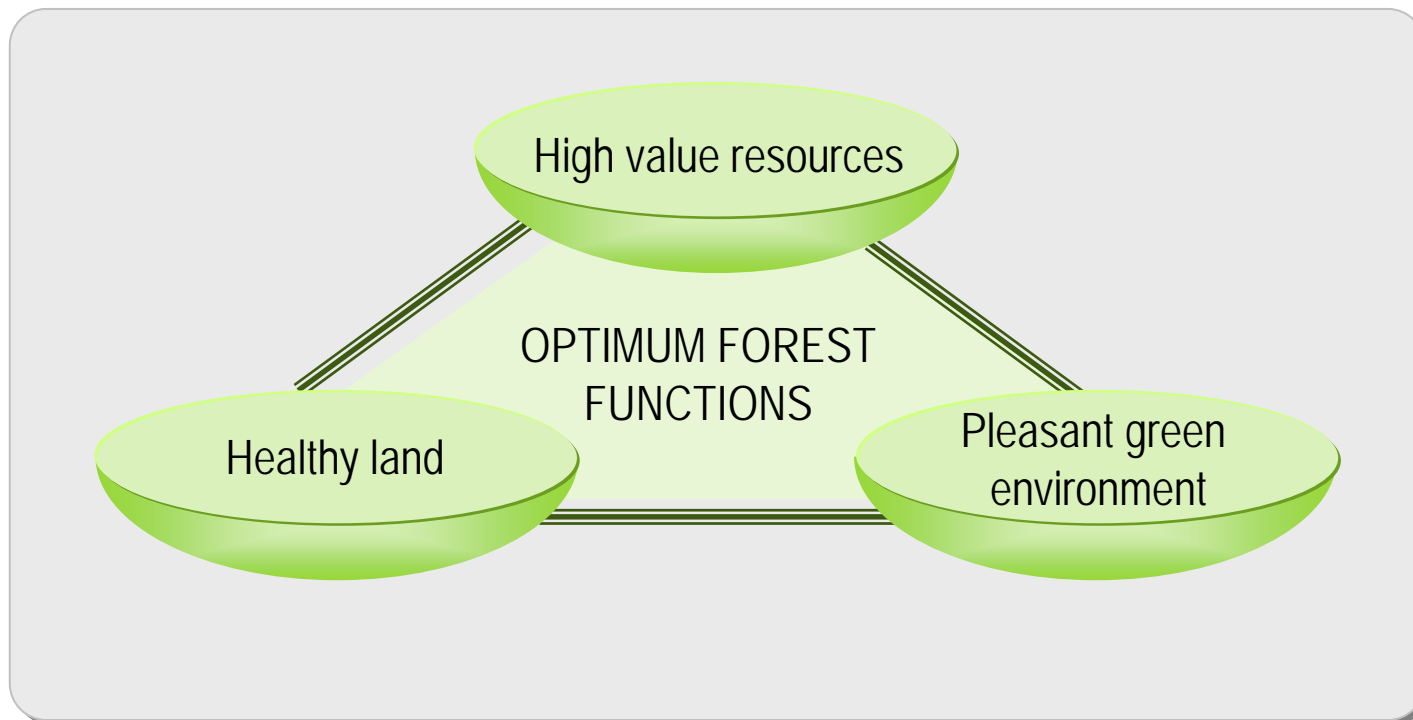
- introduction of new multiple management system
- conservation of forest ecosystem
- effective forest fire control
- urban forest management
- mountain village development
- increase of overseas plantation

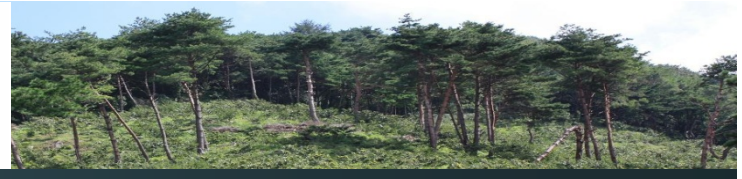
- Termination of Government-led reforestation program
- Switch into meeting diverse social and international trends



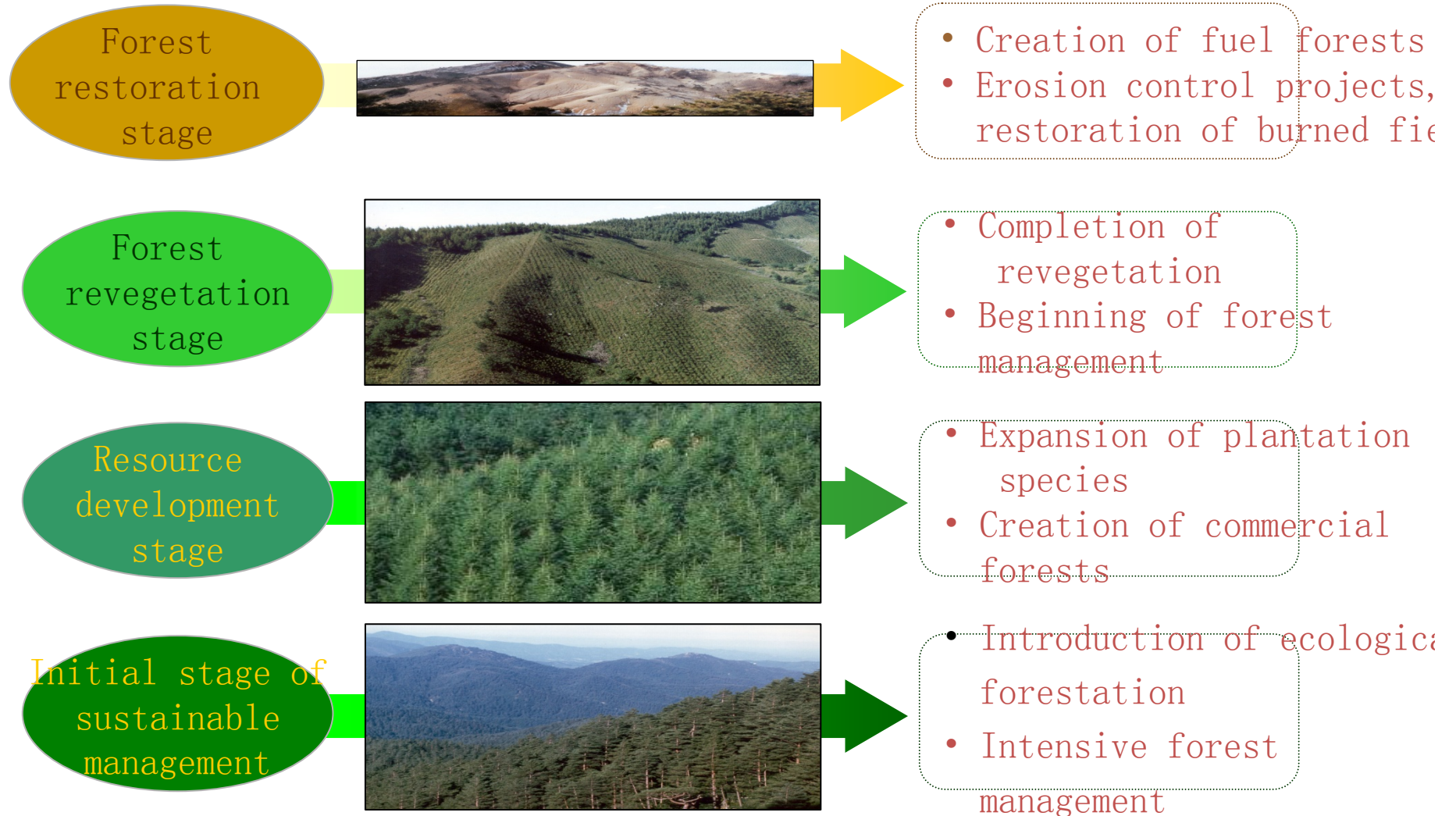
5th NForestPlan / 第5次山林计划：2008-2017

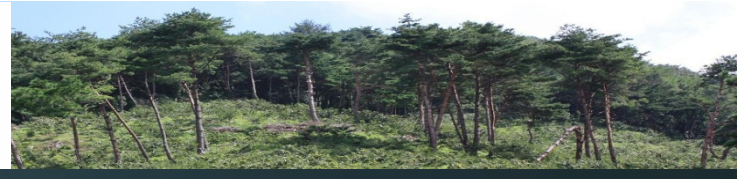
Vision: Sustainable Green Welfare Nation
- leading nation in forest management -





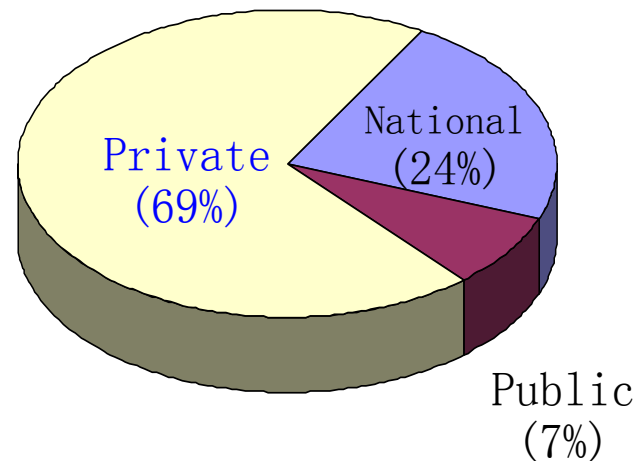
Transition in Forest Policies/山林政策变化

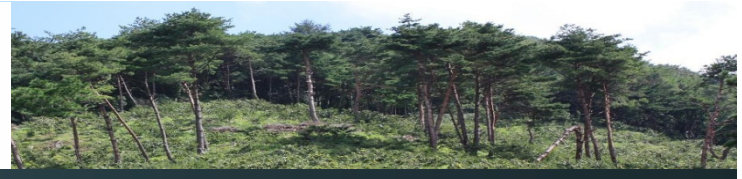




Forest Cover & Ownership/山林所有

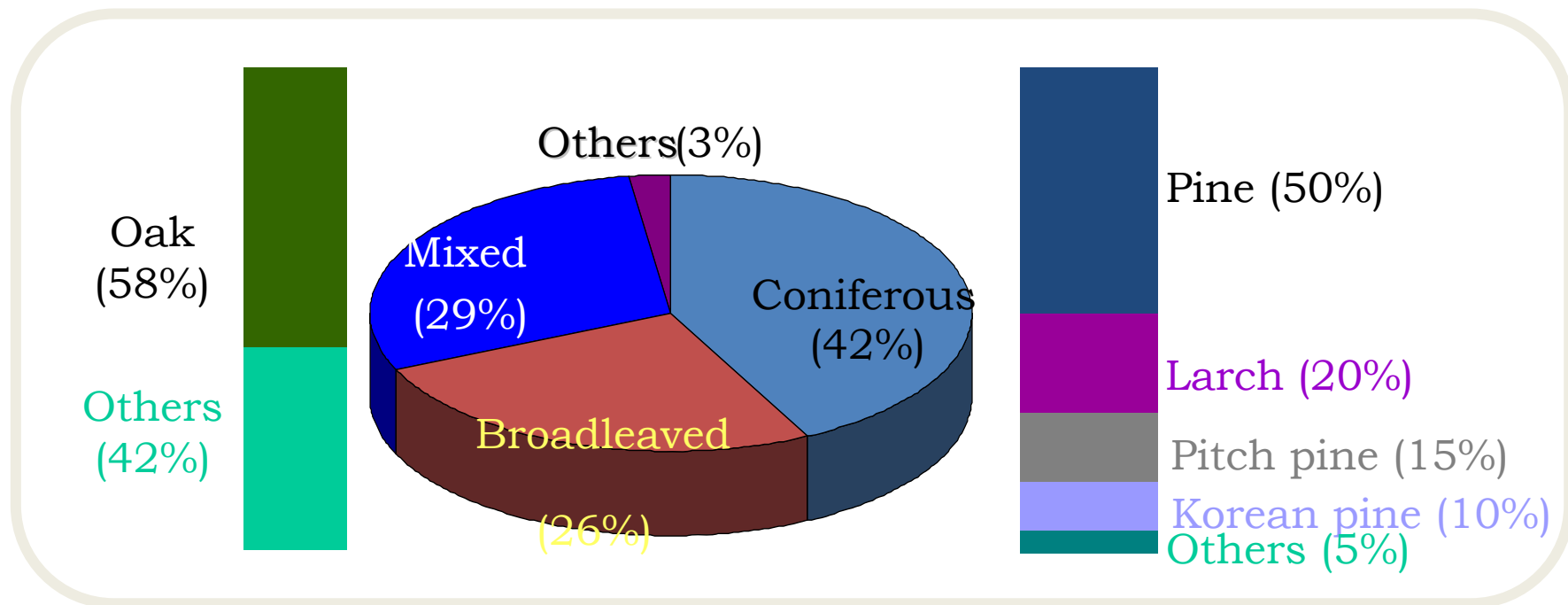
- ❖ Forests cover 64% of the total land area (6,375,000ha)
- ❖ 69% of the forests are privately owned
- ❖ Stock volume per ha is around 120m³ 2010

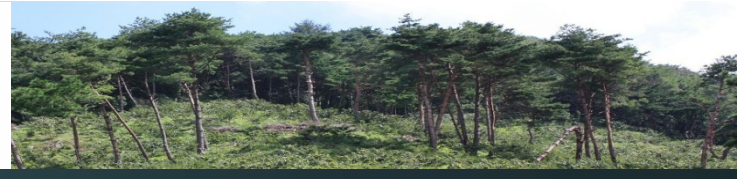




Forest Type Distribution// 树种

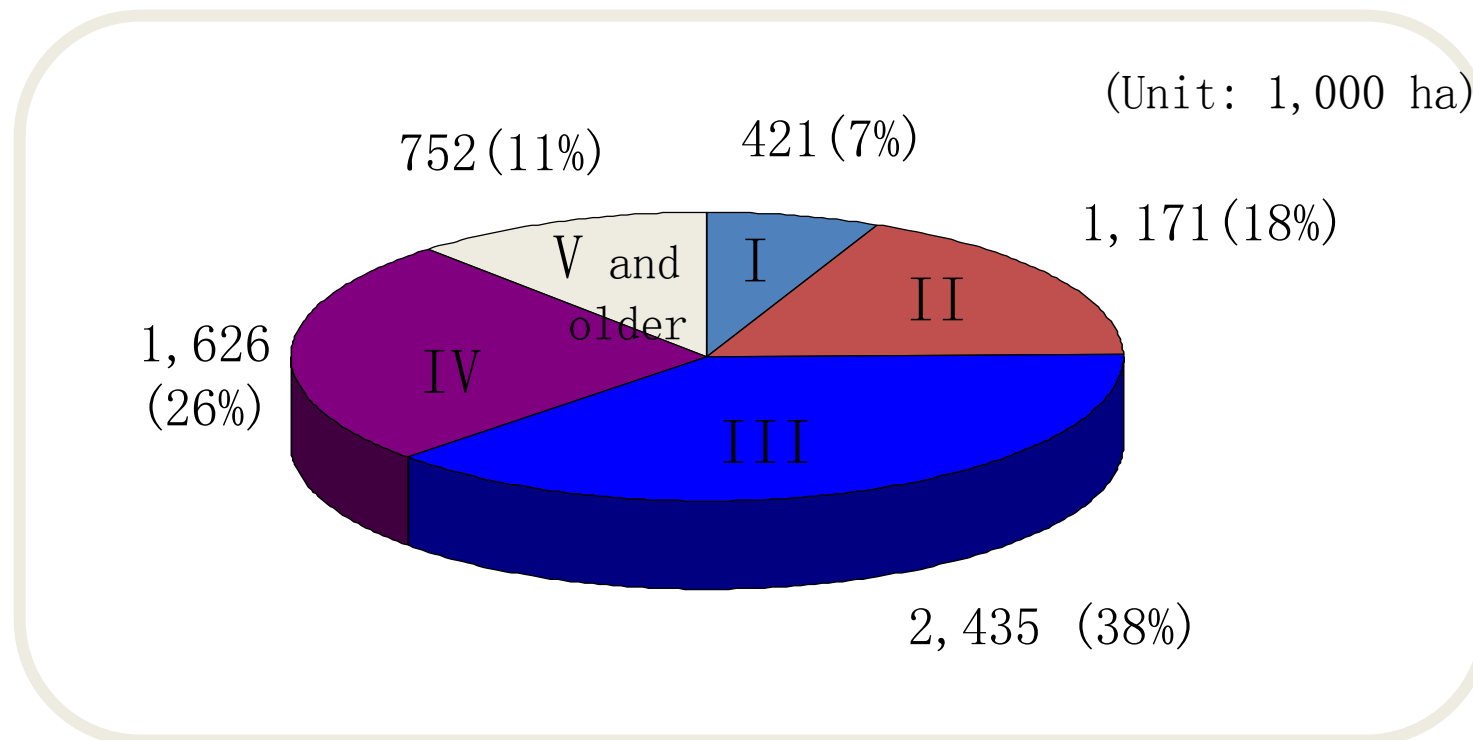
- ❖ Coniferous forests make up a large proportion
- ❖ Mainly Pine(松树) and oak(橡树) species

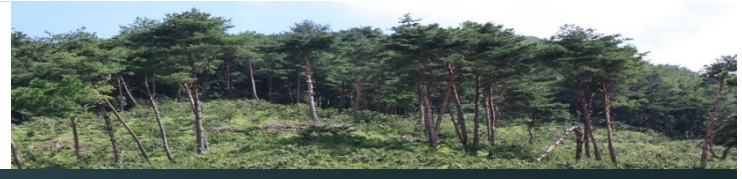




Age Class Distribution / 树龄级

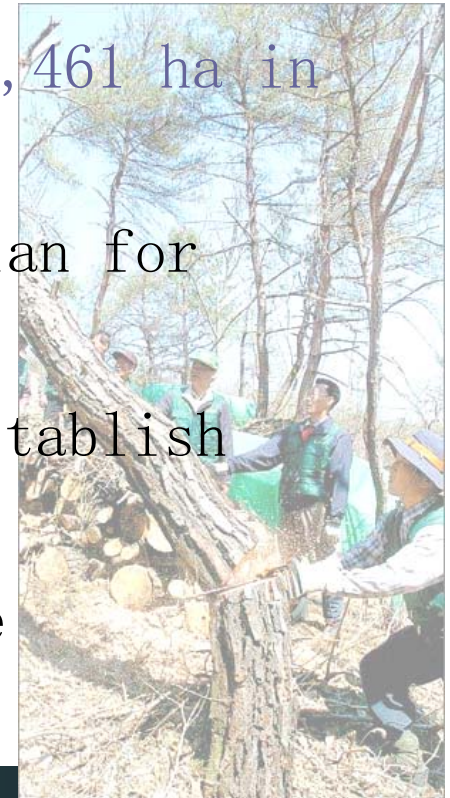
- ❖ 60% of the forests are aged less than 30 years
- ❖ Generally in the stage where extensive management is necessary

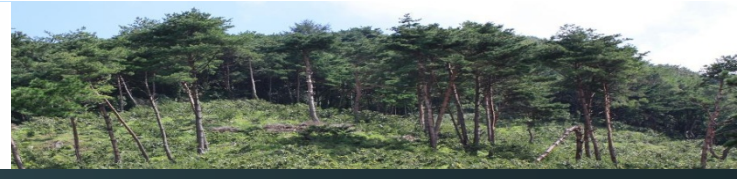




Prevention of Pine Wilt Disease/松材线虫病

- Pine wilt disease continuously spread after its first outbreak in Busan in 1988:
 - (2000) 1,667 ha in 14 areas → (2004) 3,461 ha in 38 areas
- Establishment of “Special Prevention Plan for Pine wilt Disease”
 - Set up 3 spread control boundaries, establish prevention strategies
- Enactment of the Act on Pine Wilt Disease Prevention (2005)





Expand Forest Tending / 山林无育

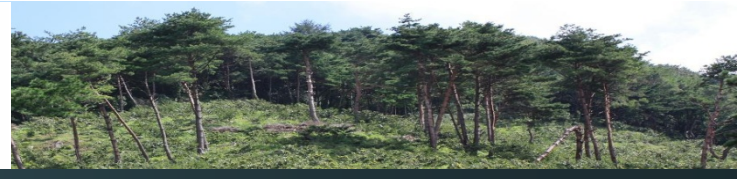
Before forest tending



After forest tending

1.5 million ha Forest tending
(2004-2008)

- Enhanced forest value
- Increased employment
- Water Storage Enhancement
- Water Quality Improvement



Expand Recreational Forests/休养林

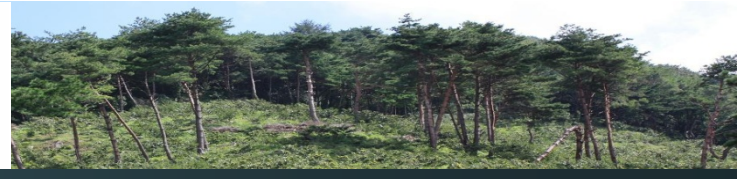
Establish recreational forests

✓ around 140 recreational forests

Increase forest experience opportunities for the public

Expansion of forest services





Reinforce of income (NTFP/非林产物短期所得强化)

Establish Infra for forest income increase

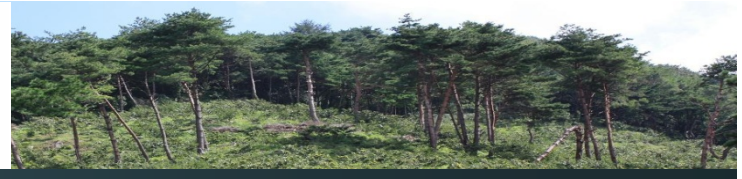
/基础设施建设

Develop potential items and expand their export /开发品目与扩大出口

Pine nuts, mushroom,
wild plants (medicine, bonsai)

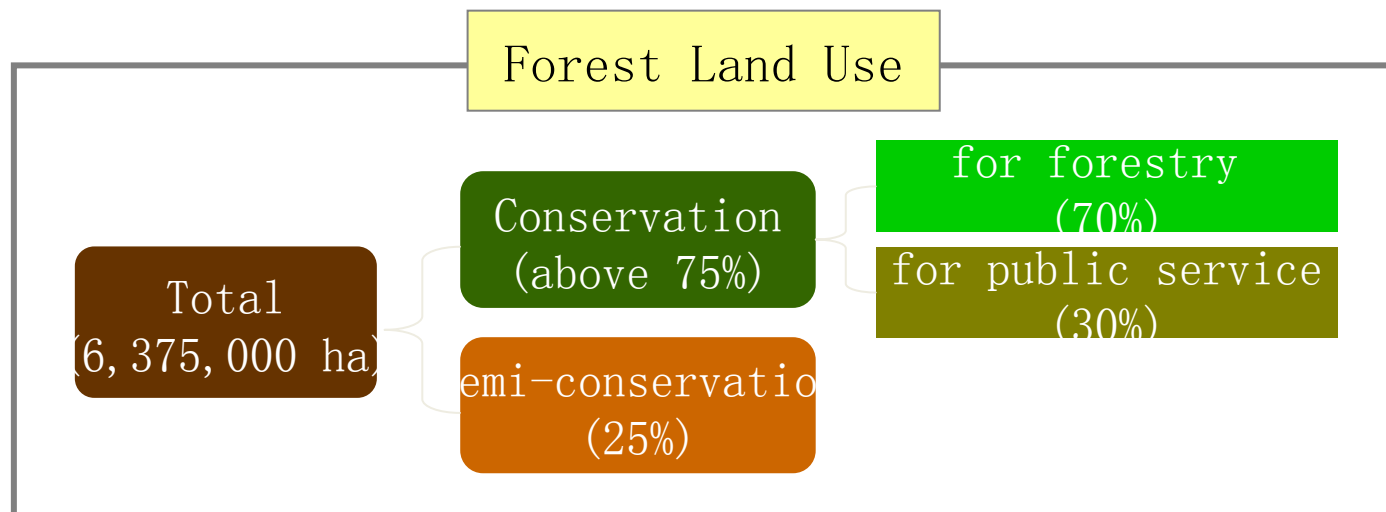
- Short-term income product farming
- Establishment of district for production of forest goods
- Packing & transportation, export facilities
- Foreign market development





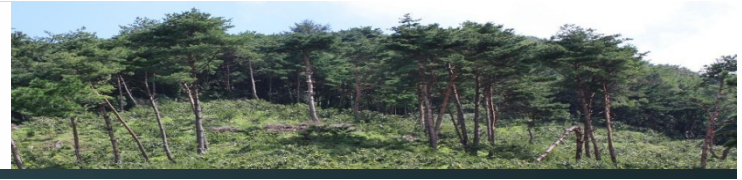
Forest Land Management / 山地利用

- Forests are classified into conservation and semi-conservation forest land
 - ✓ Conservation forests are strictly restricted from land use change
 - ✓ Semi-conservation forests are provided for development

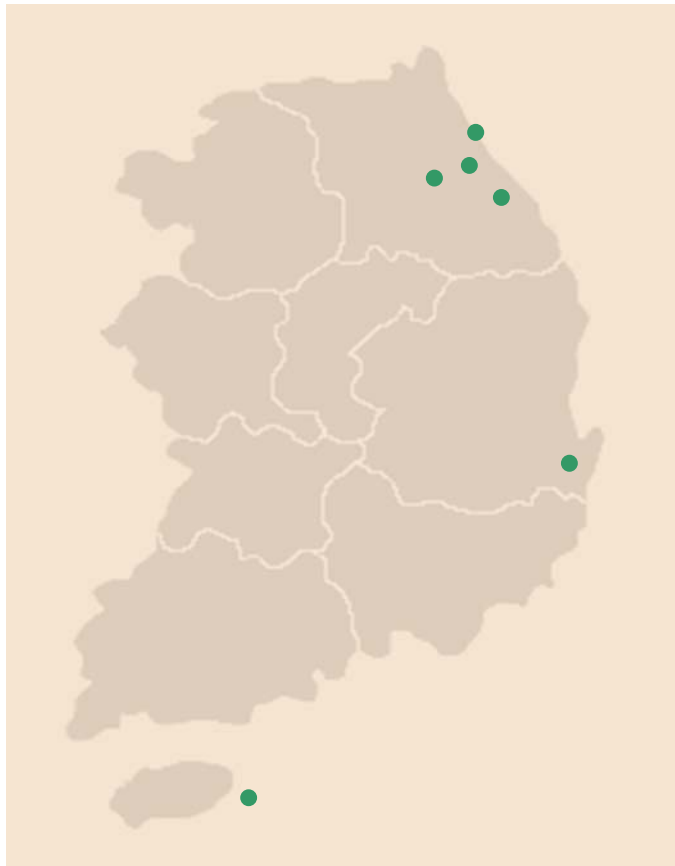




**Sustainable Forest Management
Forest Certification System
/可持续山林经营的山林认证制**



FSC Certification /FSC 山林经营认证结果



- KFRI : Jeju (2,741ha) - 济州岛
- KFS : Hongcheon (33,696ha) - 洪川郡
- KFS : Inje (35,222ha) - 麟蹄郡
- Kangwon Province (18,227 ha) - 江原道
- KFS : Pyeongchang (31,376 ha) - 平昌郡
- KFS : Uljin (80 ha) - 蔚珍郡

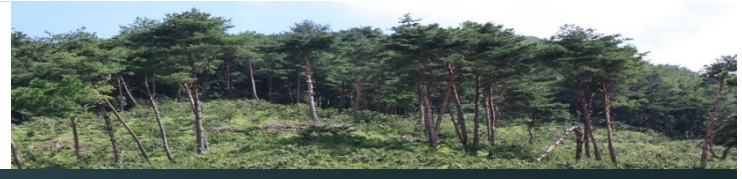
Total : more than 150,000 ha

FM level : 10

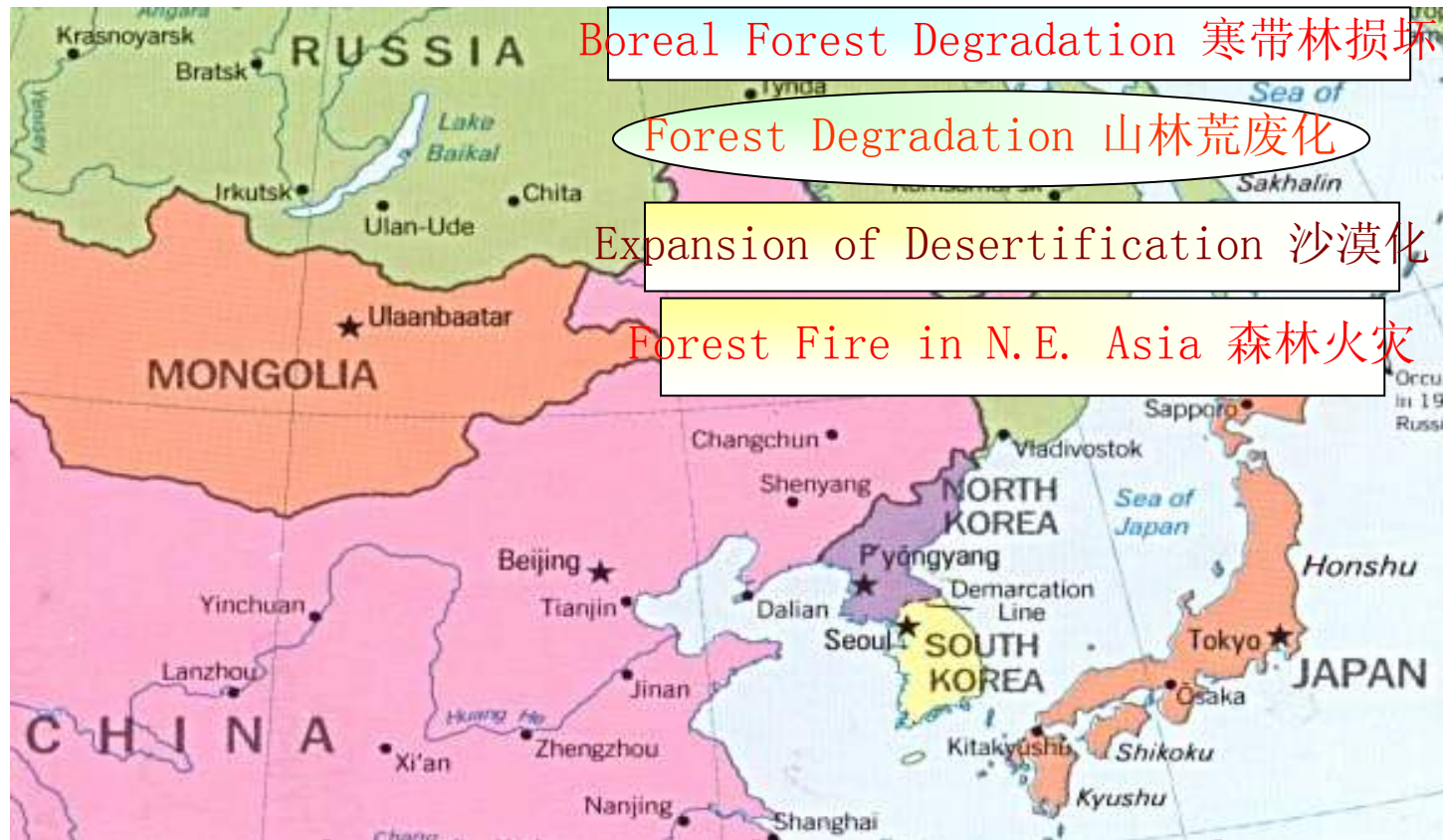


Climate Change 气候变化



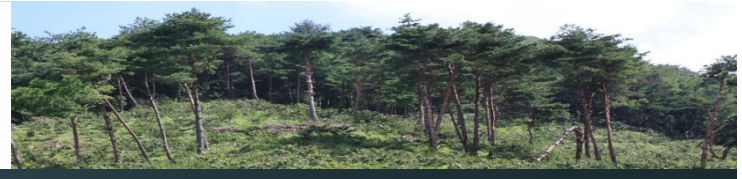


Problem in NE Asia / 东北亚森林问题

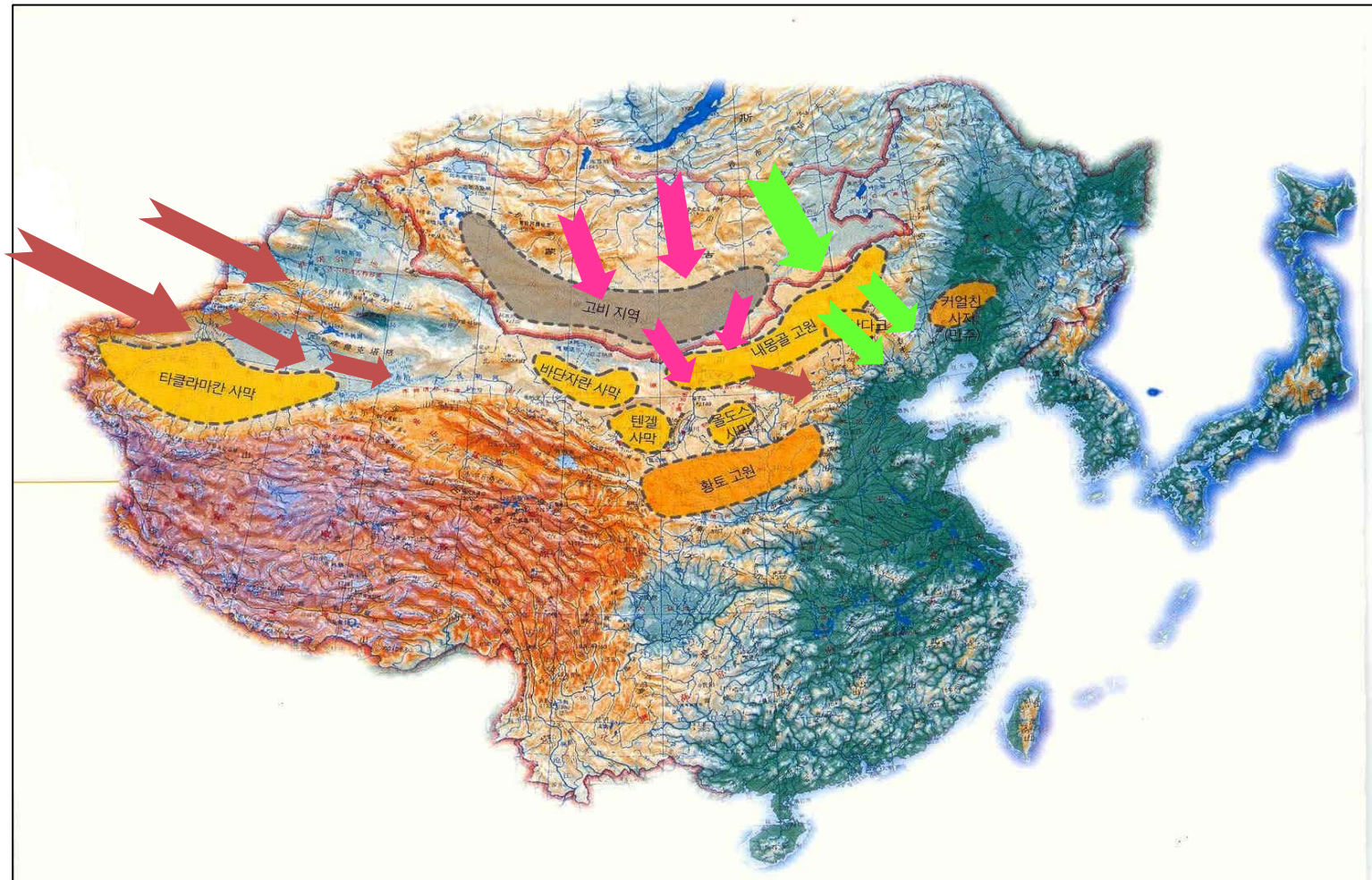


荒漠化与森林火灾 网络建设

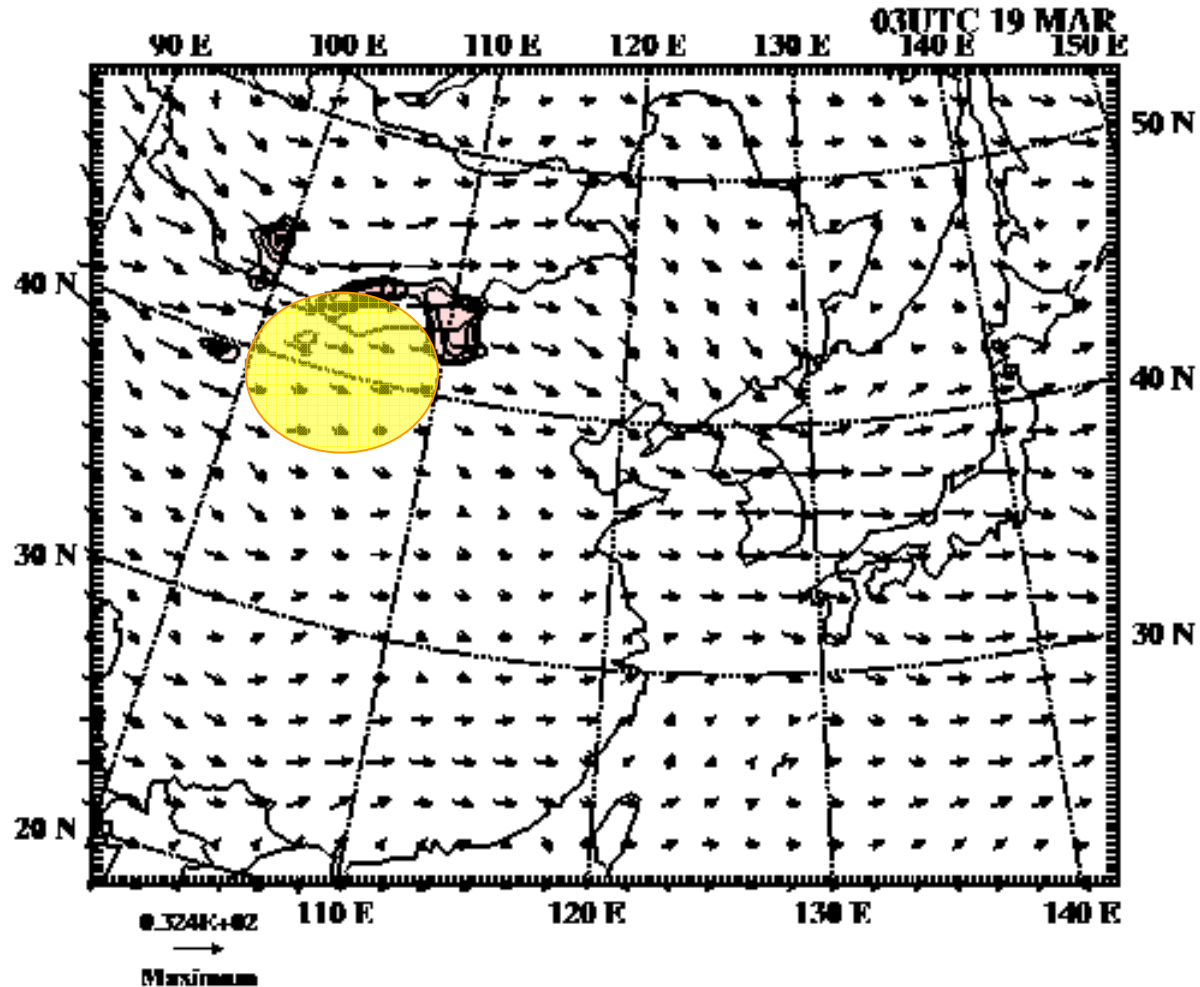
International Network for Combating Degradation and Forest Fire Fighting



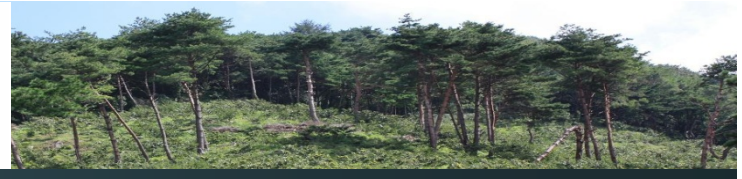
Origin of DSS(发源地)



移動/Concentration

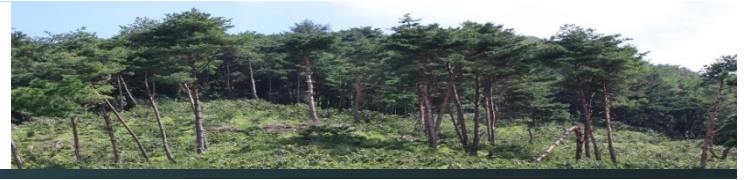


19~23 March 2002 (Dr. Chun)



Forest land use profile/ (山地利用現)

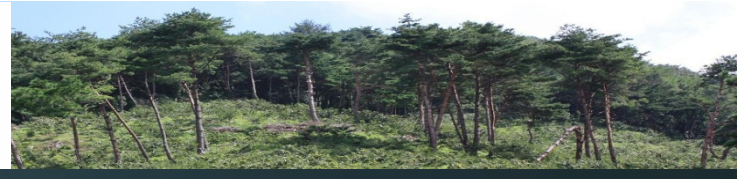
- Land area(면적) 12,159,000 ha
- Forest land(산림) 8,902,147 ha
- Wooded area 7,617,130 ha
85.0%
- Plantation (인공조림) 1,528,313 ha
17.0%
- Felled area (벌채지) 977,751 ha
10.0%
- Non-wooded area 407,260 ha



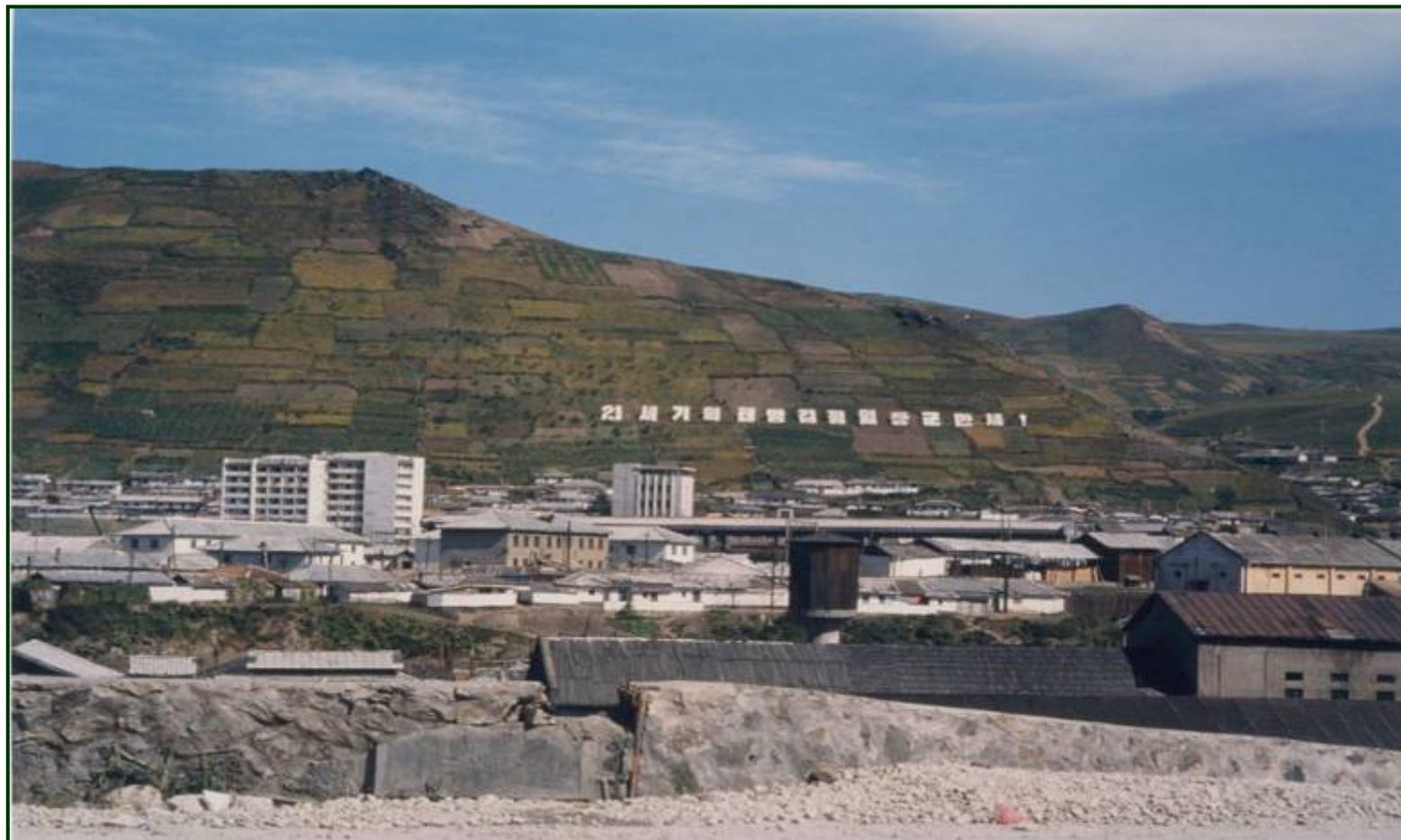
NK Forest/ 北朝鮮森林

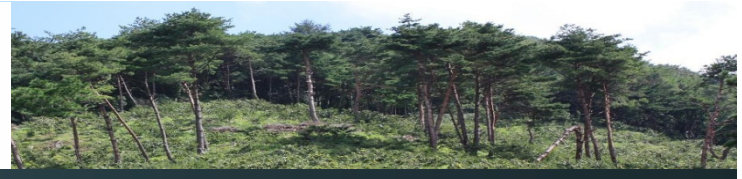
다락밭 개간으로 훼손된 함경북도 무산의 산





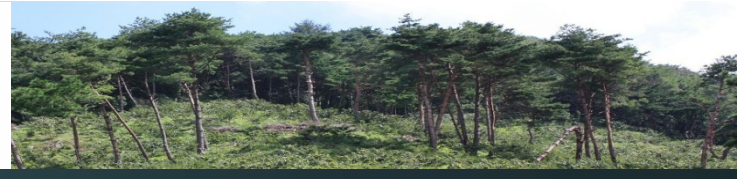
다락밭 개간으로 훼손된 함경도 혜산 인근의 산





금강산 지역도 특별 관리가 이루어지지 않는 곳의 산림은 땔감 채취로 인해 나무 한 그루 찾기 힘들 정도로 심각하게 훼손





산림 황폐화로 인한 홍수 피해로 자갈밭으로 변해버린 하천변





지난 홍수로 파괴된 강원도 통천 양묘장 전경

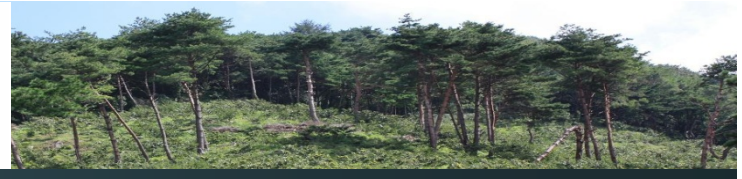


시세구르도포 매기름 시를르 극은 나무기시도 음-사강도 의산, 2004.
7

- 네팔출신의 UNV 여성 봉사자가 양묘장 복구사업을 지원하고 있음

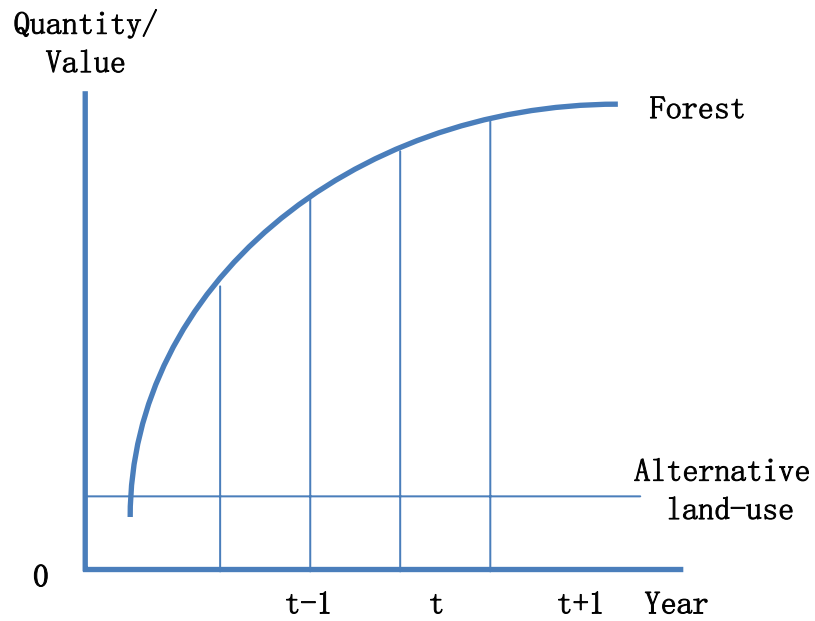


앞갈나무를 보호하기 위하여 설치된 해가림 시설 - 자강도 희천

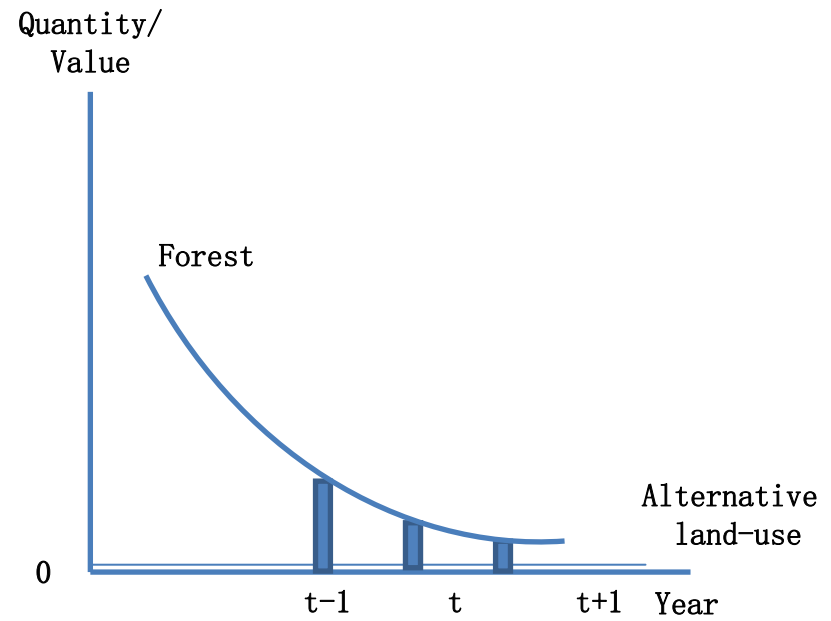


Criteria and Problems

0 Concept of forest eco-service value

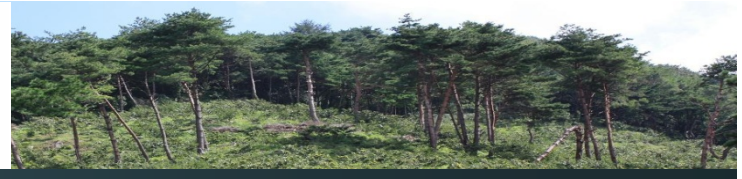


Annual Stock change



Annual Net change

- Net annual change = Net Changes in forestland
 - Net changes in other land uses
- Net annual changes = Stock in Dec 31 of year - Stock in Jan 1 of year



0 Case study

- Methodology of valuation

- Direct approach = net change in annual function x marginal benefit (cost)
- Indirect approach = no. of benefited people x marginal benefit (cost)

Function		Population	Marginal benefit(cost)
Recreation	KFRI	No. of visitors to forest area	Expenditure per person
	UK	No. of visitors to forest area	Consumer surplus per visit
Bio Diversity	KFRI	?or	?
	UK	Number of household(HH)	Marginal increase of Biodiversity by HH WTP
Carbon sequestration	KFRI	Net amount of carbon absorption	Treatment cost by unit
	UK	Net amount of carbon absorption	Marginal social cost
Pollutant absorption	KFRI	So ₂ , N ₂ O, dust / amt of absorbe	Treatment cost by unit
	UK	No. of death b air pollution	Marginal cost per person (died)