

Session 1

“Forest Protection and Afforestation”

(Session 1)

Forest Protection and Afforestation in China

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1. Main Causes of Eco-environmental Degradation

—— this spring , some serious dust storm happened in the north China. They were the consequences of climate change and eco-environmental degradation.

—— the main causes of eco-environmental degradation are deterioration and destruction of natural vegetation under the pressure of over population, over-cultivating in grassland area, over-grazing, over-cutting or defforestation, and over-utilization of water resources in arid and sub arid region.

2. Strategy and Action, which we have taken, we are taking and will take:

—— In 1998, 《 the National Plan of Eco-environmental Construction 》 was published by the State Council of China, Which set up the China's strategy of eco-environmental construction, including its target or objects, task and actions such as prevention of soil erosion, combat to desertification, natural forest conservation, afforestation, grassland rehabilitation and conservation, and natural resource conservation.

—— in next five years, the main actions of forest protection and afforestation consist of four parts,

- A. the natural forest conservation project and the steepland agricultural conversion to forest project at middle and upper reach of the Yangtz River and Yellow River.
- B. the natural forest conservation project in the inner Mongolia region and the northeast part of China.
- C. the project of control to desertification and rehabilitation of deserted

land.

D. the project of shelter-forest system construction in the “three-north” region , that is north, northwest and northeast of China, coastal area, Taihang Shan Mountain area.

Through these project, the forest coverage of China will be to 19.4% by 2010.

3. Main Problem we are taking, which Related to Forest Protection and Afforestation

—— In some arid and sub-arid region, the grassland conservation and rehabilitation is more important than afforestation. However, the local government pay little attention to grassland conservation and rehabilitation. It will destroys the weak balance between the different original natural ecosystems in that region, especially the regional water balance.

—— In implementation of the natural forest conservation project, it is very urgent how to find the new way and sources of income for the local people to substitute their previous incomes related to forestry industry.

We are trying and will give our best to solve these problems and welcome all of you to join us.

Thank you.

Responsibility of Governments and NGOs to protect Forestry in East Asia

Kim Choony
Chief of International Section
Korean Federation for Environmental Movement

1. Forest Resources in Korea

Table 1) forest resources in the Korean peninsular (as of 1999)

	ha	percentage of the land (%)	average stock volume
South Korea	6,430,000 ha	65%	60.30 m ³ /ha
DPR Korea	9,130,000 ha	68.1%	34 m ³ /ha

Table 2) stocked & unstocked forest land (as of 1999)

	ha	%
unstocked forest land	168,000 ha	3%
stocked forest land	6,262,000 ha	97%

Table 3) natural & artificial forest (as of 1999)

	ha	%
natural forest	4,308,000 ha	69%
artificial forest	2,122,000 ha	33%

Table 4) Coniferous & Non-Coniferous (as of 1999)

	ha	%
Coniferous	2,727,000 ha	43%
non-Coniferous	1,676,000 ha	26%
Mixed forest	1,851,000 ha	27%
Bamboo	80,000 ha	4%

2. Forest Ownership

Forest lands are classified by ownership into national, public and private forests and are also classified according to utilization into reserve and semi-reserve forests.

2-1. National Forest

22% of the total forest land is national forests and most forests are managed by the Regional Forest Management Office. The national forests can be subdivided into two categories, permanent and disposable forests. Most national forests are permanent forests, and they are managed for land conservation, forest management, scientific research, development of forestry techniques, preservation of both historical relics and tangible cultural heritage, and other public benefits. The remaining national forests are disposable forests, and may be converted to other uses. To efficiently manage the national forests, the Forestry Administration has enhanced its capabilities in various ways; first, enlargement and grouping of the national forest lands; second,

improvement of the public functions of forests; and third, improvement of basic forest management infrastructure.

2-2. Public Forest

Forests owned by local governments and public organizations such as schools are classified as public forest, and these forests comprise about 7% of the total forest land. Public forests contain only 7% of the total stock volume, and their average stock volume per ha is low compared to the national forests.

2-3. Private Forest

The private forests constitute 71% of the total forest lands. Private individuals and organizations, such as peoples' parties, families, and cooperative groups, own them. Private forest owners number about two million persons. However, 96% of the owners own less than 10 ha of forest. To support these small-scale owners, the Forestry Administration developed a model program called the Private Forest Cooperative Management Program with assistance from the Korean-German Forest Management Project begun in 1975. After 1984, the program was introduced to private forest owners and to date, the response has been good.

Table 5) forest ownership (as of 1999)

	ha	%
national forest	1,426,000 ha	21%
public forest	487,000 ha	8%
private forest	4,517,000 ha	71%

table 6) growing stock in volume of forest ownership (unit : 1,000 m³)

(as of 1999)

	ha	%
national forest	121,284 m ³	31%
public forest	29,639 m ³	7.6%
private forest	236,835 m ³	61%

3. Re-forestation Planning

3-1. Background and successful history

In the 19th century, Korean forests were rich old-growth forests. However, these forests were totally destroyed by over-cutting and illegal cutting for construction materials and fuel throughout the turbulent periods of the Japanese occupation (1910-1945) and of the Korean War (1950-1953). The average stock volume per ha in 1960 was only 10.6 m³. The Forest Law of 1961 requires the Forestry Administration to set up a national forest plan every 10 years in order to establish and manage the forest resources. Local governments should set up local forest plans on the basis of the direction of the national forest plan. A turning point in Korean forestry was witnessed in 1973 with the initiation of the First 10-year Forest Development Plan, which targeted the reforestation of denuded forest lands. One million ha was to be planted within 10 years under the following objectives: to implement the national tree planting movement through the participation of all people in various reforestation projects; second, to develop new economic zones of forest lands directly connecting the goals of land conservation and income enlargement, reforestation and forest production; and third, to achieve rapid reforestation of denuded forest land through the planting of fast-growing tree species. During this period, remarkable progress was made in emphasizing forest protection by minimizing man-made damage to forests,

restricting access to mountains, and the formation of rural fuel wood forests. Through the implementation of this movement the reforestation target of one million ha originally planned to for 1978, was reached in only 6 years, with the reforestation of 1.8 million ha.

3-2. Limitations

- Planted tree species were not diverse because of poor quality soil. This resulted in low economic value of trees.
- The monoculture planting of Coniferous species makes the forest more vulnerable to diseases and fire. In fact, there was a large-scale forest fire in 2000.
- The production target and usage of trees has now been well planned [DO YOU MEAN NOT WELL PLANNED OR NOW WELL PLANNED?] and post management work such as thinning and pruning has not occurred.

3-3. Effects

- The recovery of the denuded forest has improved wildlife habitat and increased of the wildlife populations.
- Forests help retain water resources (green dam)
- Increased recreational function for public.

Table 7) Increasing of wildlife populations (populations per 100ha)

	'79	'81	'91	'96	reasonable populations
Phasianus colchicus	9.4	15.0	18.9	25.7	20
Streptopelia orientalis	9.9	20.8	23.8	31.5	30
Passer montanus	22.2	428.1	382.0	357.5	250
Lepus sinensis	2.7	5.8	7.2	9.3	20
Hydropotes inermis argyropus	0.4	1.7	3.7	4.2	5
Sus Scrofa		1.3	4.3	5.3	5

Table 9) Public service with the forest (as of 1999, 2000)

	'87	'98	'99 or '00
Number of Recreational Forest	0	67	83(as of '00)
Number of Green Shower place	0	15	41(as of '99)

4. NGO activities on forest protection in Korea

There are 20 national parks in Korea. The Ministry of Environment announced an increase in the total area of national parks from 6,473km² to 6,719km² on 30 June 2000. This is a 3.8% increase. At the same time, 33% of the forests in Seoul were cut in 10 years. About 500 species are cut each year. In 1999, 150 tree-covered mountains were removed for their stones and soil for use on the Saemangeum reclamation project.

Over 1,000 environmental NGOs in Korea have acted to raise public awareness on a range of environment issues including air pollution, water quality, large-scale construction projects, nuclear power plants. Citizens' movements are also concerned about a number of forestry issues.

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4-1. Protection of Mt. Songak on Jeju Island

Jeju local government issued a permit to build a golf course, hotel, sea park, and condominium on Mt. Songak, which is a double crater environmentally valuable site. Civic groups in Jeju Island, including Jeju KFEM and 11 plaintiffs, filed two law suits in the Jeju District Court on 29 March 2000 calling for the project to be cancelled. Jeju District Court issued a judgment accepting the plaintiff's request for a halt to construction, but the Jeju local government filed an appeal to a higher court. Construction, which was scheduled to start on June 5, has not yet started. The lawsuit calling for cancellation of the project has now gone to trial three times. Unfortunately, only 1 of the original 11 plaintiffs is still involved in the case, as pro-construction interests at the local level have convinced ten of the plaintiffs not to participate in the lawsuit.

The Public Center for Environmental Law, an affiliated organization of the Korean Federation for Environmental Movement, also filed a lawsuit against the project in the Prime Minister's Administrative Judgment Committee on 29 March 2000. The committee will issue an opinion, forwarding it to the Ministry of Construction and Transportation, and the Ministry will make a final decision. The final decision must be made within 90 days. As of July 18, the Ministry had not made a final decision.

4-2. Forest for life

Massive unemployment occurred during the IMF crisis that started in late 1997 in Korea. Civic groups including KFEM (Korean Federation for Environmental Movement) and CCEJ (Citizens Coalition for Economic Justice), as well as academics and the Forestry Administration (a government agency) launched a committee to find work for some of the unemployed. In April 1998, the unemployed began work in forest management jobs such as pruning and thinning trees. This work has resulted in many positive outcomes such as employment and better forest management.

Table 8) Impact analysis of the 'forest for life' campaign

	employment	environmental impact	environmental agriculture
'98	1,490,000 employed	42,000 ha forest for life	38,000 m ³ organic fertilizer production
'99	4,830,000 employed	129,000 ha forest for life	200,000 m ³ organic fertilizer production system

4-3. National Trust

Civic groups in Korea that have not been successful in their opposition to the government's 1999 plan to dismantle the Greenbelt Zone, with the government failing to recognize that these valuable natural asset sites are needed to enhance the quality of the people's lives. So, Citizens' Coalition for Environmental Justice launched the National Trust on 25 January 2000, with experts and academics. The purpose of this organization is to protect at-risk natural and cultural assets for the good of all the people, to pursue equitable usage of them among all classes of people, and to preserve them for future generations.

4-4. Mt. Mudeung Trust Movement

A plan to build a resort by the metropolitan Gwangju government, adjacent local governments, and local companies was initiated in 1994. Civic groups created a committee in 1994 to oppose the plan, which will cause environmental destruction. The Citizens' Committee to protect Mt. Mudeung has raised public awareness of the issue and created a citizens fund to buy the mountain.

4-5. Cancellation of the Haein golf course on Gaya Mountain

This campaign began in July 1996, when plans for a golf course in Gaya national park became known. The campaign against construction of the golf course was carried out in conjunction with the monks of Haein temple and local residents. After legal action and a campaign in which one million people signed a petition against the proposed golf course, the National Park Authority rescinded approval for the project in January 2000. Efforts to preserve Gaya Mountain and Haein temple had borne fruit.

4-6. National park, Mt. Dukyu destruction

The government planned to build the Muju resort in the heart of Mt. Dukyu National Park. Korean environmental organizations opposed this plan, along with academics and the university students. The forest where the Muju resort is a national park and public forest. This area is home to at least 16 endangered species. The land was sold to a development company. Construction was launched in 1989 following a weak environmental assessment. Academics and environmental organizations continuously issued information about the project and the Ministry of Environment recognized the problem in August 1990. Unfortunately, the small number of environmental NGOs in the late 1980s and early 1990s could not give this project the attention it deserved. Therefore, the project continued without much resistance from the environmental NGOs. In 1997, environmental NGOs protested about this project jointly with international organizations, but it was too late to protect the Dukyu National park.

4-7. Research and campaign on destructive Siberia forest caused by Hyundai

A joint research and campaign between KFEM and Greenpeace was launched in 1994. Greenpeace revealed in 1992 that Hyundai and the government in the far eastern region of Russia contracted to cut the trees for 30 years. Greenpeace made a strong protest along with local residents at that time. The purpose of the joint research and campaign was to stop the cutting of trees in the ecologically sensitive area. Hyundai was using clear felling techniques, not selective cutting. KFEM, Greenpeace, and local people initiated a strong campaign tying campaigners to the bulldozers with iron chains. This campaign had an impact internationally on timber trading by the companies involved, but the issue did not receive much coverage in Korea.

5. Conclusion

Even though environmental NGOs in each country are actively campaigning to protect their forestry, lots of deforestation is proceeding worldwide. East Asian countries have different backgrounds economically and environmentally - from Russia to Japan. That is why we have had difficulty in resolving the environmental problems in our region. We have environmental problems such as Yellow Sea pollution, trans-boundary air pollution between China and Korea, and huge ecologically destructive projects.

5-1. I would urge governments in East Asian countries

- To have a strict policy to protect old growth forests and natural forest. We need set aside these forests for future generations.
- To regulate development of the mountains and to encourage local governments' to have an environmental consciousness. Local governments' development policies are a major reason that valuable environmental resources are being devastated.
- To reduce road construction because road construction in forests is one of the ways in which forest destruction starts.

-To establish a fund for environmental protection.

-To reduce the importation of wood from overseas.

5-2. I would urge the Citizens organizations

- To research and monitor the timber trade by multinational companies. Timber harvests should avoid slow growth species. Consumers should avoid purchasing this type of wood. Timber companies are searching for new places to cut trees, for example timber companies in Russia and the USA were moving from their exhausted areas to the far eastern areas of Russia as the forests in other regions were destroyed.

- To pay attention to established networks on forest conservation such as AANE (Atmospheric Action Network in East Asia) and NNAF (No Nuke Asia Forum), to participate in cooperative programs such as international conferences, to educate the people and government on forest protection.

- To create greater public awareness to change citizens' wood consumption patterns.

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RE-AFFORESTATION ACTIVITIES IN MONGOLIA

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1. Introduction

Mongolia has comparatively not very rich forest resource which covers an area of 17,5 million hectares on the southernmost fringe of the Great Siberian forest and some mountain ranges in the western and north western part of the territory. Mongolia is the seventh largest country in Asia and among the biggest of the land locked ones. But forest takes only 8,1% of the territory. Location and growth of forest greatly varies throughout Mongolia. Population increase with the ever increasing demand for forest products, logging, forest fire, pests have progressively depleted the forest cover. The forest cover of Mongolia consists of coniferous and deciduous forests and Saxaul (*Haloxylon ammodendron*) forests. And 92,1 percent or 16,1 million hectares of the total original forested area is currently growing trees, while 7,9 percent or 1,382,570 hectares is not. The area covered by coniferous and deciduous forests (excluding saxaul forests). The most common tree species in these forests is larch.

The coniferous forests play very important role in protection of soil, water and regulation of its flow, maintaining of ecological balance. Lately, forestry situation of Mongolia has been getting more complicated

because of exporting timber products and sow material to China at very low price. But in 1999 the government imposed rather high tax on wood export and it aimed to develop national industry and to improve domestic supply of wood.

Mongolian Forest Law adopted in 1995 allows the private sector and communities to establish and maintain plantations on state lands with the approval of the government.

In the more arid areas the sparse woodlands are used for firewood, and there is reportedly no management as well. Woodlands around settlements have been cleared and ever-increasing circles of deforestation have occurred.

In the northern forests commercial logging is practiced. Unfortunately, clear cutting of all trees is the standard practice.

In areas of such a harsh climate, clearcutting may lead to greatly reduced regrowth and productivity. In many areas there is no regrowth and replanting is the only way to try to regain the wood resources. A regime of inventory and assessment was established but progress has been relatively slow, and only a small part of the forest has been covered each year. There are foresters at the key aimag centers, but reportedly much cutting is done without any formal management (Mongolian Environmental Action Plan, 1995).

2. Forest area, forest types and it's natural regeneration

In 1994, the Forest Survey Expedition of Mongolia, Ministry for Nature and Environment, released the document: "Commonwealth Forest Review 1994" which provided an official version of the forest cover and some aspects of forestry development in the country. The following extracts are taken from this important document. The total forest area of Mongolia is 17516,200 hectares, including 12711,670 hectares of closed forest or 8,1 percent of the total land area.

In the June 1995 the country passed new forest law protecting forests, the proper utilization and regeneration of Mongolian forests. According to this law, forests in Mongolia are divided into three zones: **special, protected and industrial zones**- with a different management scheme applied to each zone. Due to the mountainous character of Mongolia, their operation is performed in accordance with their protection and recreational qualities. According to their basic functions the forests are subdivided into:

1. **Special forests** - about 6,0 % of the forestland which include the forestland in the upper forest boundaries which is named "sub-alpine forests" and protected area within National Conservation Parks.

2. **Protection forests** - 48 % of the total forest land. To this category belongs the forests of the green zone, prohibited strips, saxaul forests, oasis, small forest areas covering up to 100 hectares and forests at slopes greater than 30 degrees.

3. **Industrial forests** - 46 % of the forestland. These, above all, are forests used mainly for production of wood and timber.

Estimates for Mongolia's total forest standing volume is about 1335,9 million cubic meter. The most forest volume are in the north and central part of mountain regions in the country. The average standing density of timber in the northern, commercially important forests is about 109 cub.m/ha with a mean annual increment of about 1.4 cub.m/ha. The sustainable yield per annum from these forest resources is 5.5 million cub.m.

The current forest land classification of Mongolia is shown in table 1.

Table 1. Distribution of forestland of Mongolia ('000 ha)

Forest covered land	Open forestland	Non-forestland	Total forestland
12711,6	3421,9	1382,5	17516,1

The total forest covered land is distributed by tree species as follows:

N°	Species of trees	Forest area,ha
1	Siberian larch (<i>Larix sibirica.</i>)	7728 300
2.	Scotch pine (<i>Pinus silvestris</i>)	503 300
3.	Siberian pine (<i>Pinus sibirica</i>)	1986 000
4.	Spruce (<i>Picea obovata</i>)	27 800
5.	Fir (<i>Abies sibirica</i>)	2 300
6.	Birch (<i>Betula platyphylla</i>)	930 500
7.	Poplar (<i>Populus</i>)	35 400
8.	Willow (<i>Salix</i>)	8 500
9.	Saxaul (<i>Haloxylon ammodendron</i>)	2028 800
10	Total	12711 600

Natural regeneration process in high mountain forests depends on location, stand structure, soil condition and forest type. Depending on forest location elevation and sensitiveness in human activities, forests in Mongolia are classified as **forest-steppe; sub-taiga; taiga; pseudo-taiga and sub-alpine forest.**

Natural regeneration practices are followed in areas with young trees and seedlings to encourage them to grow into mature and old forest stands. Intensive tending operations such as cleaning, improvement felling are the essential cultural operations for this option to be successful. In naturally regenerated areas with at least 0.5 relative stock density, thinning and tending are carried out to promote growth of best trees. In the some gaps, enrichment planting with coniferous species should be carried out to improve species composition.

In addition to the above methods, the other effective way of achieving successful natural regeneration is to assist it when mature trees flower, by tending and cultural methods, so that growth ensures movement of recruits into the upper story of the high forest stands.

There are generally two and three strata in the profile of the mountain taiga forests. The lowest is the dominated stratum. The dominant stratum is the tallest and is the thickest layer occupied

by tree crowns of the dominant class trees. The predominant stratum is intermediate between the other two and has scattered tree crowns generally of the species in the dominant stratum.

Above mentioned fact is main picture of stand structure of uneven-aged stands of Mongolian taiga forest. According to this peculiarities of stand structure of Mongolian high mountain forest suitable management skills are needed to be taken for each one.

3. Main Causes of Deforestation

There are three main factors that cause deforestation:

- Increasing of livestock numbers
- Increasing of fuel and industrial wood demand
- Forest fire impact

Increasing of livestock numbers

The vastness of the country's pasture land, its climate and its limited population naturally favor extensive animal husbandry. The current 33.3 million head of livestock comprise 15 million sheep, 11 million goats, 3.8 million cattle, 3.2 million horses, 0.3 million camels. The stress on land resources observed in crop farming has also emerged in the extensive livestock subsector, especially in the forest-steppe zones. A careful assessment of the scope for further increase of the livestock subsector in these areas and its environmental repercussions is urgently needed.

The grazing and browsing in forest area are most destructive to plantations and tree growth, causing deformities and stunting growth. Natural regeneration is destroyed through trampling. livestock breeding causes major destructive impact on remnant forest growth.

Increasing of fuel and industrial wood demand

In present, production and supply of saw timber boards on domestic market, no consideration is being given to the quantity. And the real forest products demand and supply is not estimated or registered in present by the statistics, because of insufficient data collecting methods used now.

The main reason for it should be summarized as; all logging, sawmilling, other forest product trade and production data not reported and registered and/or collected, because of unmanaged, uncontrolled contacts by the private people and private entities to the forests.

Consumption of industrial forest products per capita in Mongolia is very low. Current consumption of Sawnwood, which is the main industrial forest product, was 0.04 cubic meter per capita in 1994 while the average consumption in Europe is 0,2 cubic meter per capita. The consumption of other products such as plywood or particleboard is also low.

Besides of sawnwood and panel products there are also some demand for mining poles, transmission poles and railway sleepers, but no figure are available about the consumption volumes.

By 1996, Mongolian forest industry had total sales amount of 2,3 billion tugrigs (national currency) which is 13 percent more than comparing with the 1995.

In past, in the central planned economy 4-6000 cubic meter plywood, 10-12000 cubic meter particle board being produced per year in Mongolia, but the demand have been supplied never, and the shortage was satisfied by import. Hardboard was fully imported for domestic market demand.

The production of the forest main products are shown in the table 2.

Table 2.
Production of main forest industry products during 1990 - 1996
'000 cub.m

No	Type of product	1990	1991	1992	1993	1994	1995	1996
1	Logging	950,0	720,0	500,0	450,0	325,0	263,0	275,0
2	Logs	670,0	465,0	360,0	250,0	185,0	-	-
3	TIMBER BOARD,	509,0	270,0	124,5	84,5	50,3	61,2	70,2
4	Ger wooden articles mln.tug	-	-	20,7	23,1	67,3	101,5	265,9
5	Plywood	,4	1,9	1,0	0,2	-	-	-
6	Particle board	5,5	1,1	0,8	-	-	-	-
7	Door, window '000.m2	39,8	39,8	20,6	14,7	8,1	7,4	7,8
8	Furniture	31,0	33,0	45,2	42,3	113,0	542,5	156,4

	mln.tug							
9	Small wood article mln.tug	-	-	-	-	18,2	143,4	45,9
10	Match mln.box	26	29	17,6	22,3	17,1	19,6	12,4

The wood based products in Mongolia are represented as : railway sleepers, window and doors, wooden boxes for packing, school and office furniture. Besides, there are products made for Mongol "Ger" frame and inside specific furniture.

The wood based products are not so various in kind as other industries related to forest and wood resources. Even these are limited to some kinds and can not cover the shortage in the market.

Forest fire impact

During 1992-1995 the fire occurrence in forest areas increased, because of number of people, who go to forest and steppe areas to cut trees, pick up berries, nuts, firewood and deer horns, and hunting purposes are sharply increased. About 29 per cent of total fire causes were not identified.

60-70 per cents of total fire causes respectively were not identified as shown in the graphic of 1996, 1997 fire causes. Reason is that many fires have started at the same time and there was a lack of human resources to investigate causes. Also mismanagement and carelessness of relevant authorities contributed to this situation. It is necessary to take strong measures in order to identify social and economic causes of fire outbreaks.

The main fire causes in Mongolia which have led to an increasing occurrence of forest fires are :

Escaped campfires (Open fire) - Campfires are common in forest or steppe for cooking and warming (day temperatures of +10 to 25°C drop at night to 0 to -10°C). Many additional escaped campfires are caused alongside roads by people affected by transport breakdowns and car accidents.

Military Units - Nowadays the Mongolian army units cause extensive fires by military activities (field exercises, artillery, mining, tanks pipes, open fire, smoking).

Transport - Agricultural machinery and equipment, particularly tractors with chain are mostly used in the agricultural and animal

husbandry sectors.

Cleaning (Plantation) - After the harvest, all residues (straw, stalk) are gathered and burned. Fires often escape if these burns are not controlled sufficiently.

Spark from Ger chimneys (or chimneys)- Most of Mongolian rural people use chimneys from which spark can be transported to the surrounding dry grassland.

Children - If they are not accompanied by adults in the field and they cause forest fire occasionally.

Stove ash - Nomadic families in the steppe pasture lands live in Ger (Traditional dwelling) and use common stoves and dried cattle dung (argal) is burned. Glowing embers are a major source of steppe fire ignitions.

Power lines - Extremely high wind speed in Mongolia often damage power lines and cause ignition by electric sparks.

Antler collectors - The high demand on deer antlers (both naturally shed "bone" antlers and live antlers taking from hunted animals are expensive raw material for medicine) on the Chinese and South East Asian markets drives illegal antler collectors and hunters into the forests. These people are a major source of starting wildfires (campfires, smoking).

Lightning - Lightning storms of 40-60 hours per year were recorded in Central and Northern Mongolia and represent a source of natural ignition.

Damages and losses caused by wildfire in Mongolia during last five years shown in table 3.

Table 3

DAMAGES AND LOSSES CAUSED BY WILDFIRE IN MONGOLIA
BETWEEN 1995-1999

No	Indicators	1995	1996	1997	1998	1999	Total	Average of 5 years
1	Number of Aimags and Sums, where fire occurred	12/32	16/120	14/98	15/69	15/44	72/363	14/72
2	The number of forest-steppe fire	120	417	239	132	67	1065	213
3	Total burnt land (ha):	1,7	10,2	12,4	5,2	3,125	32,628	6,525

	forest steppe	0,03 1,7	2,4 7,8	2,7 9,7	0,7 4,5			1,2 5,7
4	The number of died peoples		25	3	1		29	6
5	The number of scalded people	9	61	5	2	1	78	16
6	The number of burn Livestock	600	7726	1628	2363	380	1269 7	2539
7	Burnt in Fire	Nomadic tent Livestock Machinery	175 7,726	14 1628	29 2363		218 11717 12	
8	Ecological and economical damages (mln.tug)	37	1128,4	486,7	370	611,3	2633,4	526
9	Property damages (mln.tug)	28,2	589,7	140,5	94,1	15,2	867,7	173,5
10	Expenses for suspenssion activities (mln.tug)	44	372	127,5	93,9	98,2	735,1	147
11	Total losses (mln.tug)	109,2	2090,1	754,7	558	724,7	4236,7	847,3

4. Reforestation and tree plantation

Mongolia has not long history of tree plantation and reforestation. It started with trans-plantations removing young saplings from forested areas.

Since 1970 forestry and timber harvesting companies have been instructed by the five year's State plan to harvest wild seeds, breeding seedlings and conduct re-forestation activity.

Main tree species used in plantations

Species - site (environmental conditions included) matching is most important in plantation establishment. The following are the factors to be included in the choice of species for the reforestation.

- adaptable to the climate condition
- ability to stand moisture stress
- fast growth after plantation
- use of seedlings of uniform size
- high survival rate for the local condition

The choice of species has to be decided based on how species requirements match with the local conditions and whether they are indigenous. The main species used in the reforestation and plantation : *Larix sibirica*; *Pinus silvestris*; *Picea obovata*; *Populus laurifolia* and *Haloxylon ammodendron* etc.,

Some achievements of reforestation

A major issue relating to forest management in Mongolia is afforestation due mainly to the difficult site conditions. In the situation existing in Mongolia, after logging operation and/or fire incidence, natural regeneration of desired species such as pine and larch cannot often be achieved. Under such a situation artificial planting or sowing with desired species will be necessary, to supplement the natural forest regeneration.

The area planted over a period of some 30 years is very small compared to the deforestation which has taken place during the last years and the degradation level of the remaining accessible forests. Even if only the area harvested during the period is considered, the reforestation rate still is lower than 15%.

In 1980-1990, on nation wide level, in over 40 permanent nurseries over 20 million standard seedling were planted and supplied the reforestation work. At that time the scope of reforestation expanded. At the beginning of 1970-s about 50 ha was re-afforested annually, in 1990 about 5000 ha was re-afforested annually.

Results of the last year's reforestation, its expenditure, survival rates by the reforestation type and tree species are shown in the table 4.

5. Problems, constraints and shortcomings

The reforestation and tree plantation techniques and methods adopted in Mongolia are labour intensive and time consuming. Insufficient skilled labour and chronically limited financial allotments are the main constraints to reforestation activities.

The incomparably low wages of forestry enterprises compared to the prevailing local wages is a great handicap to plantation works. Hence the unavailability of workers. Moreover the reforestation season coincides with giving off-spring and crops planting, reducing labour availability.

Another problem is that adequate quantities of proven quality seed is not available for large planting programme. This is due to the lack of seed orchards genetically proven seed sources.

Plantation policy is yet to be formulated with the definitive objectives of the end uses and with rotations for different category of plantation.

Lack of land use policy and well defined forest landuse plan constrain the re-forestation process. A lack of vision in ad hoc re-forestation programmes must be corrected. Even though there are prescriptions for cultural and tending operations, lack of funds prevented them being carried out on time or as prescribed. This is a major issue which will reflect heavily on plantation quality in the future. Lack of staff motivation is another constraint in re-forestation programmes.

Research activities related to re-forestation are partly academic in approach. Research institutes must devote more time to applied research on plantations.

Established plantations are almost never monitored and evaluated, except for survival counts at the end of the first year. Plantation Registers must be re-commenced and accurate information recorded.

Animal damage in young plantations, losses caused by people in commercial plantations and inadequate tending all contribute to failed plantations. Repeated re-planting of some areas is often the case with plantations in area which borders with pasture land.

Forestry extension is still in its nascent stage, with little or no planning or financial support. An efficient extension service is needed to promote and disseminate the message to grass roots levels on community and participatory practices.

6. Suggestions and Solutions

Suggestions for problem resolutions:

- Provide incentive mechanisms and revise the prescribed norms to realistically match prevailing labour wages and allocate adequate funds to successfully and effectively deliver the work programme.
- A national integrated landuse policy should be in place with criteria and standards for different forest landuse categories, and definitive plantation policy, formulated in harmony with it.
- Seed orchards and seed production stands should be established with genetically proven quality trees
- Forest Research Institutes should conduct more experiments on-site species matching and distribute findings to local forest enterprises. Research plots should be established in plantation areas and growth measured regularly on all species and provenance.

- Institute mechanism for regular monitoring and inventory of all plantations. Plantation Registers are to be well kept with all relevant information. A plantation management information system is needed to collect, collate and analyze data.
- Because of limited finances, cost effective plantation procedures need to be developed. Economics of plantation establishment, ecological impacts and social benefits and costs must be taken into account.
- The Forestry Bureau must be strengthened in staff members and resources to plan, implement and monitor forestry extension.
- Adopt programmes to motivate peoples' involvement in community forestry

7. CONCLUSIONS

Maintenance of environmental stability by preserving permanent forest estates, and conserving species and ecosystem diversity, are some of the main principles of the national forest policy. In addition, establishment of plantations on degraded and denuded lands advocated as a policy imperative.

Re-afforestation should be strictly carried out to ensure an effective outputs. Norms and funding constraints have been disproportionately low for plantations and unless corrected, poor and failed plantations will result with few benefits and substantial costs.

It is the sole responsibility of the Forestry Bureau to give proper attention to cultural operations and measures to improve and maintain plantations.

Table 4.

Forest plantation and its expenditure by type between 1997-1999

No	Name of aimag	1997 year				1998 year				1999 year			
		Area, ha	survival rate, %	Expenditure, Mtug/ha	Gross expenditure, Mtug	Area, ha	Survival rate, %	Expenditure, Mtug/ha	Gross expenditure, Mtug	Area, ha	Survival rate, %	Expenditure, Mtug/ha	Gross expenditure, Mtug
Reforestation by pine seedlings													
1	Selenge	939	91	29.4	27594.8	1055	90	47.1	49687.1	750	85	52.0	39000.0
2	Khentii	290	71	33.4	9677.4	330	63	43.3	14299.9	420	73	50.0	21000.0
3	Bulgan	371	87	33.5	1243.8	436	74	40.0	17440.0	381	85	42.0	16002.0
4	Dornod	205	68	33.5	6867.5	203	61	40.2	8169.5	160	72	45.0	7200.0
5	Darkhan Uul	107	63	33.5	1597.6	114	81	40.0	4580.0	150.8	80	50.0	7540.0
6	Tuv	209	67	29.1	6105.9	283	62	40.7	11521.7	334	88	45.0	15030.0
7	Orkhon	100	66	33.5	3350.1	115	65	50.0	5750.0	130	76	45.2	5876.0
Reforestation by larch seedlings													
8	Arkhangai	799	73	33.5	26766.0	570	81	44.0	25428.0	595	75	40.0	23800.0
9	Uverkhngai	230	67	34.8	8004.0	100	63	50.0	5000.0	145	60	52.0	7540.0
10	Khuvsgul	393	76	33.4	13126.0	455	66	48.8	22198.0	448	85	40.0	17920.0
11	Dzavkhan	441	80	33.5	14773.0	531	84	43.1	22888.9	429	85	45.0	19305.0
12	Uvs	270	66	31.9	8613.0	365	70	43.4	15837.3	300	68	40.0	12000.0
13	Ulaanbaatar	100	64	31.3	3130.0	125	64	42.7	5348.6	150	64	45.0	6750.0
14	BayanUlgii	108	65	35.5	3834.0	95.6	72	45.4	4336.0	85	69	45.0	3825.0
Re-afforestation by saxaul seed and seedlings, deciduous seedlings													
15	Dundgobi	50	65	35.5	1775.0	50	70.0	43.0	2150.0	60	65.0	52.0	2900.0
16	Umnogobi	40	55	35.5	1420.0	40	56.0	41.5	1660.0	40	55.0	41.5	1660.0
17	Gobi-Altai	60	75	31.7	1900.0	75	57.1	43.5	3262.5	-	-	-	-
18	Bayankhongo	36	56	35.5	1278.0	40	58.0	44.7	1790.0	30	51.5	35.0	1050.0
19	Khovd	90	66	35.5	3195.0	100	53.1	40.0	4000.0	120	67	38.1	4575.0
20	Sukhbaatar	100	63	33.5	3350.0	100	60.1	52.0	5200.0	94.5	55.0	52.0	4914.0
21	Dornogobi					6	53.5	61.0	366.0	15	52.0	61.0	915.0
22	Gobisumber					10	56.5	61.0	610.0	10	57.0	61.0	610.0
23	Uverkhngai					100	75.5	35.0	3500.0	-	-	-	-
	Total	5100			120649	5299			170992	5065			180000

(Session 1)

Forest Fire Impact to Permafrost Degradation and Regeneration of Forest
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Eastern Eurasia is widely covered with Boreal forest, "Taiga", which is the largest forest area in the world. The development of Taiga is closely related to the existence of underlying permafrost. The annual precipitation at the entire

Siberian Taiga regions stands around 250-400 mm/year. Underlying permafrost is non permeable to percolating surface water, and this character of permafrost permits to grow Taiga with small amount of precipitation. Once permafrost tends to thaw, then surface soil layer becomes too dry to grow Taiga. Permafrost in eastern Siberia extended its vertical and horizontal distribution in Last Glacial Period, and tends to be unstable under the global warming condition. Coverage with Taiga in early Holocene over Permafrost region impedes the propagation of warming wave into permafrost.

The disturbance of surface vegetation condition induced by forest fire leads to unbalance of heat budget of permafrost and tends to thawing permafrost.

Southern part of Siberian permafrost, the coexistence relationship between Taiga and permafrost performs under the present climate condition. Once severe burn of Taiga impacts the damage of surface boundary condition, then permafrost degrades its distribution. In the area severely impacted by forest fire, permafrost disappears in rather short time period, and Taiga does not regenerate due to dry soil condition.

The degree of forest fire severity is key to regenerate Taiga in southern Siberian permafrost region. In 1996 there occurred one of severest forest fire in Mongolian Taiga region, and permafrost is retreating its vertical and horizontal distribution in the affected region. Ground temperature monitoring at the affected area may indicate quick response of permafrost degradation. Careful monitoring of soil characteristics is requested to conduct for successful replanting on burned area. For example in Yakutia region severely burned area in Taiga changed to grass land called Alas. Top layer of soil profile accumulates salt-rich layer and impedes regeneration of Taiga.

The total system of management for protection of severe forest fire occurrence will be established based on the application of remote sensing analysis and ground truth monitoring on site.

Forest Fire Impact to Permafrost Degradation and Regeneration of Forest

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Protection of Taiga Forest

→ Local

Global Warming Influence

→ Global

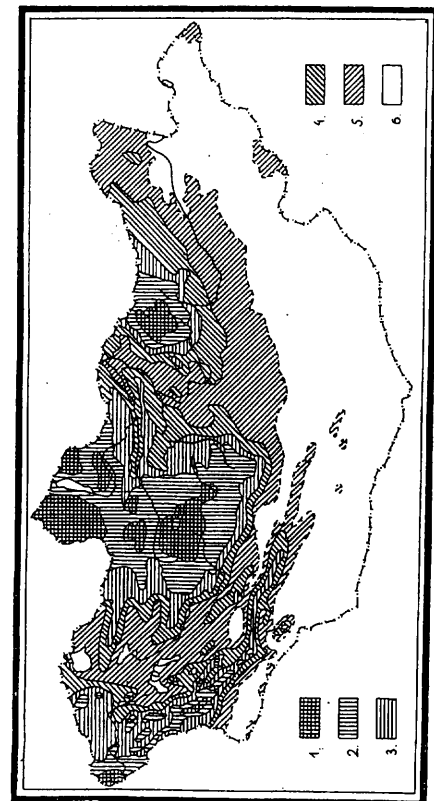
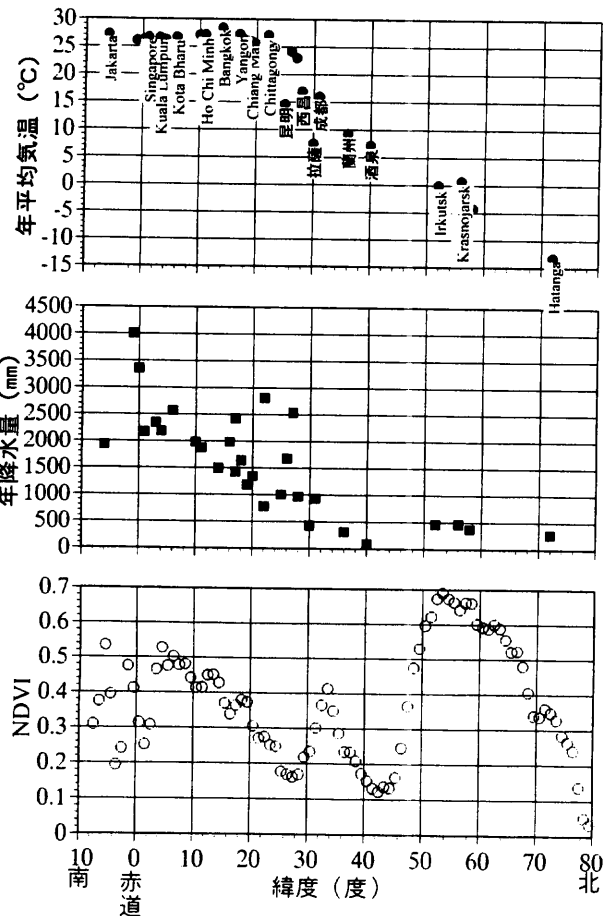
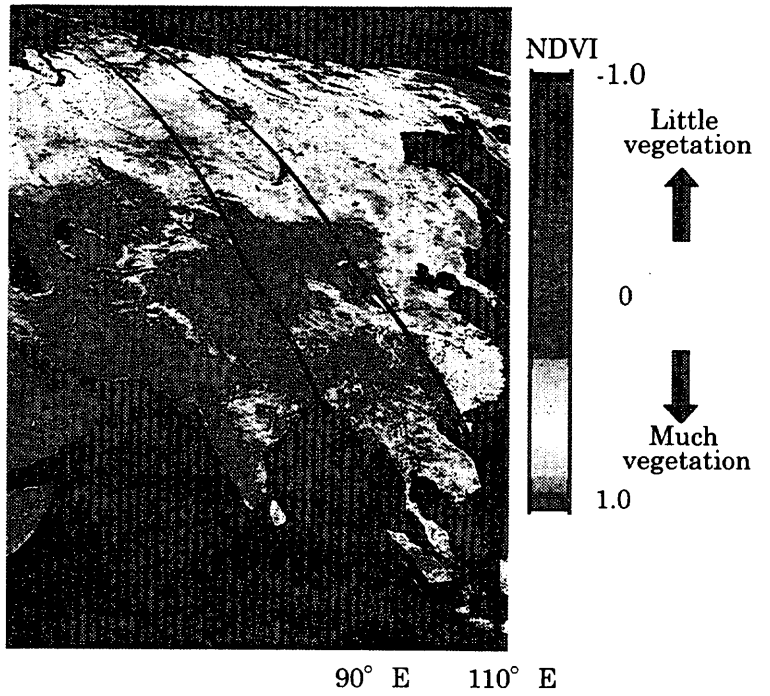
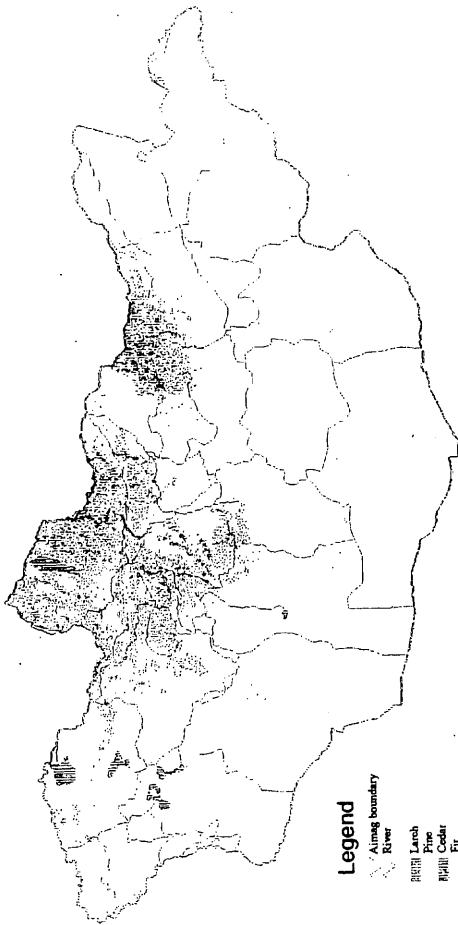


Fig. Map of permafrost regionalization in Mongolia. (N.Sharkhuu, 1989).
1. Continuous (85-100%), 2. discontinuous (50-85%), 3. widespread island (10-50%), 4. rare island (1-10%) and 5. sporadic (0-1%) permafrost areas, 6. only seasonal frost area.

Map of forests in Mongolia



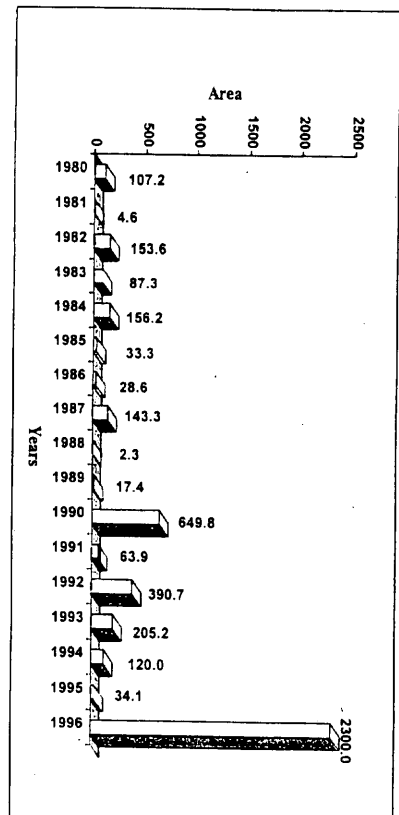
COEXISTENCE of PERMAFROST and TAIGA



YAKUTSK Annual mean Temp. -10°C Precipitation 236 mm

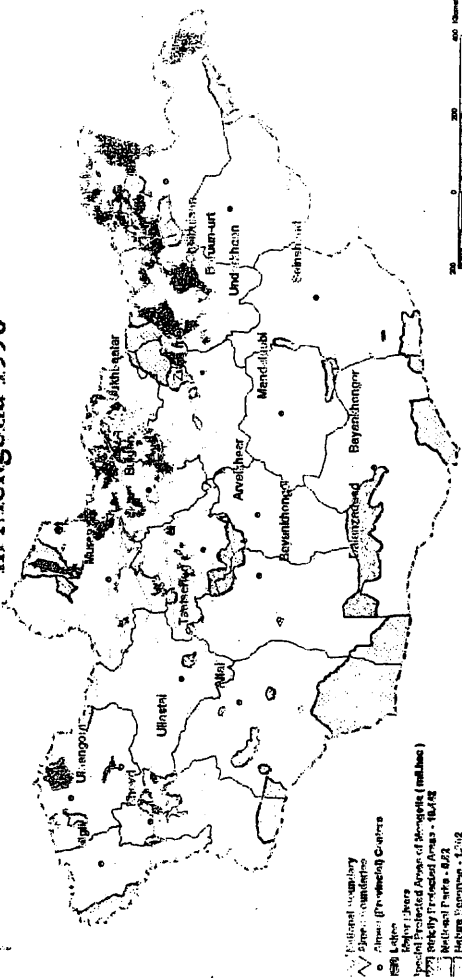


Lanzhou China Annual mean temp. $+7.2^{\circ}\text{C}$ Precipitation 316mm



Forested areas damaged by fire (per 1 000 ha)

Composite Fire Coverage and Protected Areas in Mongolia 1996



National boundary
 Province boundaries
 Towns and Cities
 Special Protected Areas of Mongolia (red line)
 Total Protected Areas - 16,472
 National Parks - 2,22
 Nature Reserves - 1,002
 Biosphere Reserves - 4,272
 Total burned area in 1996
 - 1,256
 National Parks - 22
 Nature Reserves - 2,22
 Biosphere Reserves - 4,272

**Total Burned Protected Area over in 1996:
949,000 Hectares**



National Level Fire Impact Analysis
 for the Burned Protected Areas
 and the GIZ Integrated Fire Management Project
 GIZ
 German Technical Cooperation

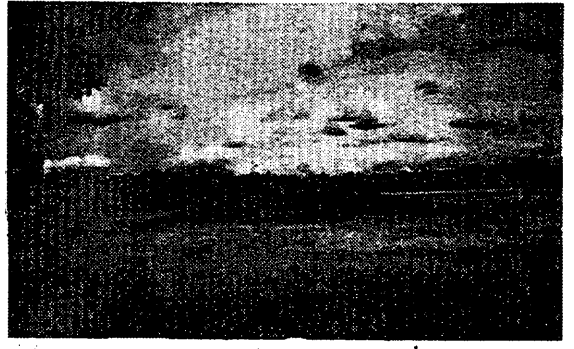
Data Provider: Information and Computer Center, Ministry of Nature and Environment
 Ulaanbaatar, Mongolia. For more information, please contact the ICG at tel. 9761-320569
 email: info@icg.mn



Disturbance caused by forest fire



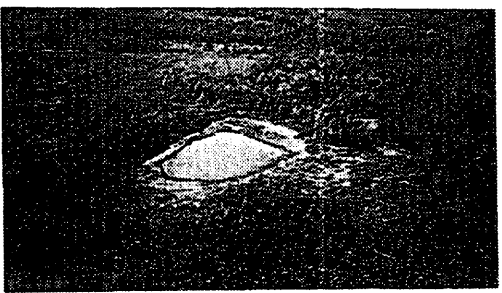
火災直後
(地表面熱収支)



Alas and Pingo (Central Yakutsk)



Alas, Thermokarst Depression



Alas formatic
(near Yakutsk)

(アラス)

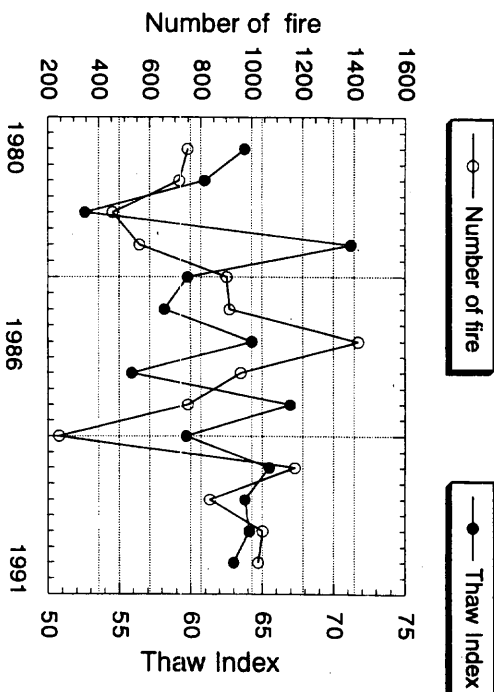
モンゴル北部 ヒンタイ山地の植生 推定年平均気温 -5~-6 °C
 年降水量 400mm

北向き斜面にタイガが成立
 永久凍土の存在

南向き斜面は草原化
 永久凍土融解



この地域の推定永久凍土
 深さ 40-50m



森林火災発生分布図

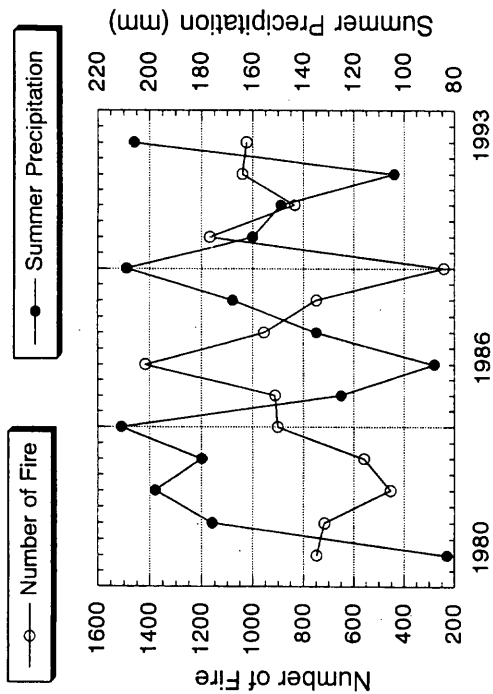
12/20

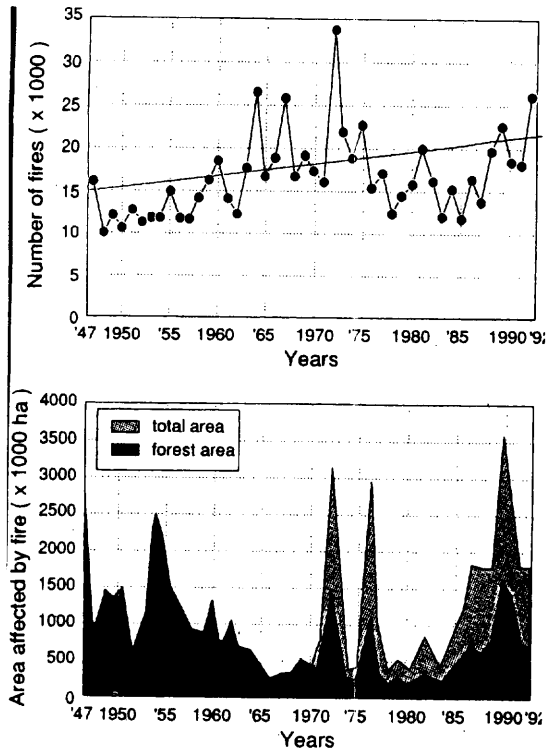


7月21日~7月31日

1月1日~7月4日

東北大学大型計算機センター





Forecast of possible Fire Occurrence
Based on Weather Records

Preservation of Fire Occurrence

Detection of Fire Occurrence
by Satellite Images

Early Extinguishment

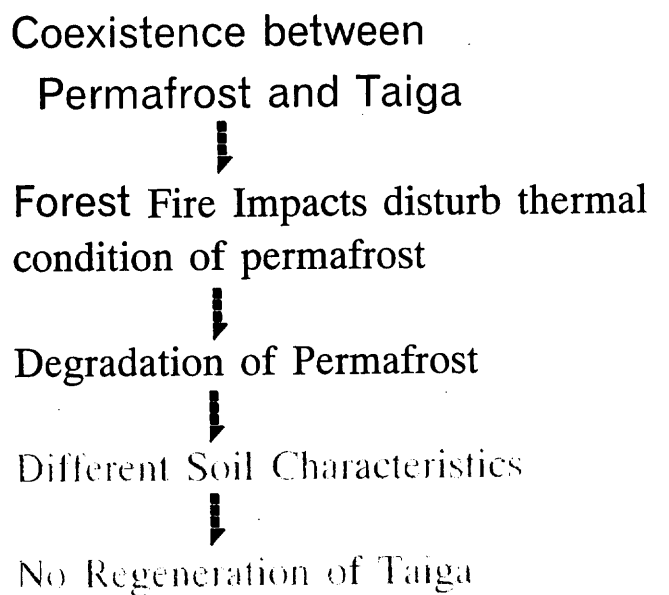
Replanting planning at burned sites

Soil characteristics

Soil water condition



Conclusions



Once fire occurs, how we
extinguish effectively?

Decrease of fire occurrence

(Session 1)

Ministry of Protection of the Environment and Natural Resources Russian Federation



All-Russian Research Institute for Nature Protection

9th Northeast Asian Conference on Environmental Cooperation

July 26-28, 2000

Ulaanbaatar, Mongolia

Session 1: Forest Protection and Afforestation

Background

Forests represent the most prevalent, the most highly organized and significant for the biosphere eco-systems on our planet. They synthesize almost half of the total organic mass of the Earth and play a decisive role in the life of humankind as a renewable source of energy resources; they are the most important regulator for large-scale natural processes; they perform erosion-preventive, water-protective and water-regulatory functions; they are of primary importance for the conservation of biological diversity. Forests are rightly thought of as a territory's environmental framework, whose condition in many ways determines the environmental situation both on the whole planet and in individual regions, especially those that are rich in forests.

The basic condition for ensuring environmental security of the planet today is conservation and recovery of eco-systems, including forest ones, in their natural surroundings.

The recognition of the global economic importance of forests and the necessity to preserve them have been reflected in a number of international conventions and agreements (the UN Convention on the Climate Change, the UN Convention on Biological Diversity, the AGENDA 21, the Statement on Principles for Global Consensus on Proper Management, Conservation and Development of Forest, and others), as well as in a number of national concepts and strategies on sustainable development.

The conservation and the sustainable management of all types of forests is recognized as a critical factor of social and economic development, protection of the environment and the system of life support on the whole planet. All countries — members of UN are recommended to develop coordinated approaches to the conservation of forests and sustainability in the forest management.

Russia is to play a significant role in the solution of the above issues, as it possesses almost one fourth of the planet's forest resources. Our country has the largest in the world area of forests and forested territories undisturbed by economic activity. They are of major importance for conserving biological diversity at the level of species and eco-systems. Russia's forests represent the largest carbon reservoir. The annual carbon deposition in forest vegetation is estimated as 262 MT C year⁻¹, which is nearly 1/2 of its annual power engineering and industrial emissions in the country. As a result of reforestation and afforestation steps, the annual carbon deposition in forest vegetation can be increased by 140-150 MT C year⁻¹.

In the last three decades, the area of forested lands in Russia has enlarged by 61.2 million hectares, or by 9.3%. However, along with growing areas of forested lands, a number of negative changes in the country's forest fund have been observed, which reduce the environmental potential of forests: degradation of breed composition and productivity of forests, replacement of primary forests by secondary ones possessing a lower environmental potential, pollution of forests resulting from industrial emissions, accidents of oil pipelines, economic development of Siberian and Far-Eastern regions rich in forests.

Today reliable quantitative information about the ecological state of forests is virtually unavailable. Materials of state forest accounts mostly reflect the forests' resource potential and are practically inaccessible due to the cessation of publication of reference books on the forest fund. The reported statistical data provided by the Federal Forestry Department and other agencies dealing with forests are very incomplete and controversial.

Negative factors having a destructive impact on Russian forests

Forest fires. The total area of burned-out forests and destroyed stands is 24.9 million hectares, which is 5 times as much as the total non-afforested cutting-area. The enhancement of the destructive effect of spontaneous fires on Russian forests in recent years stems from the dramatic reduction of expenses on their protection, as well as from the significant weakening of forest fire-control departments,

Primary and intermediate utilization cuttings. The drastic reduction of the volumes of forest industrial production in recent years has led to a considerably lower effect of logging activities on forests. At the same time, however, a 3-4-fold decrease in the area of primary utilization cuttings was accompanied by a dramatic diminution of tree planting and seeding, and a reduced number of measures promoting natural afforestation. Along with unsystematic logging and multiple violations of the rules for primary utilization cuttings, intermediate utilization cuttings damage forests as well.

Injurious insects and forest diseases. Every year loci of mass breeding of injurious insects and forest diseases are registered. They cause annual stand destruction on tens and hundreds of thousands of hectares.

Industrial emissions. The total area of forests destroyed by industrial emissions is nearly 1 million hectares, while the area of weakened by industrial emissions forests is 1.0 to 1.5 million hectares. For the time being, the impact of industrial pollution on forests retains its local significance. About 3.5 million hectares of Russian forests have been subjected to considerable anthropogenic radioactive contamination. In addition to serious problems in the protection, utilization and regeneration of forests in these areas, there is a risk of secondary contamination as a result of radioactive emissions caused by forest fires.

Economic activity relating to development of forest areas with the purpose to develop the infrastructure.

One of the causes of negative changes in Russian forests is the inadequacy of existing forest and environmental legislation. The burden of expenses on fire control, protection from injurious insects and diseases and hence the burden of responsibility for the conservation of forests is imposed on the federal budget and federal forest authorities. In compliance with the current normative acts, the level of protection throughout the entire actively protected

territory is the same irrespective of the role and value of the forest, the extent of economic development of the area and the intensity of economic activity in the forestry.

There are yet a number of drawbacks, among them poor encouragement for the improvement of quality and preservation of forests, growing profit-making capacity, optimization of woodiness and formation of a forest macrostructure depending on the forest's priority, functional and purpose-oriented designation, as well as on the economic (tax) system of the forest sector.

Poor mechanisms for encouragement and realization of forest management in a forest fund possessing a considerable wood potential could lead not only to the improper utilization of forest resources, but also to the degradation of forests' age structure and to the reduction of their protective and ecological functions.

Integrated forest management has not been properly attended to in the forest policy and practice and therefore it is realized only where economic actors take the initiative in doing this. The non-ligneous resource potential of forests is utilized at a level of 3-5% only.

There is a serious drawback in the sphere of state oversight of forests. The vicious practice of combining administrative functions of nature management and economic activity still persists. The latter is carried out on favorable conditions, which makes the things still worse. The situation on the whole is aggravated by the monopolization of the state oversight functions in this sphere.

This can have especially negative consequences in the execution of forest management, in particular in performing remediation cuttings by the forestry administration with an evident commercial purpose.

Positive trends

In recent years, positive changes have surfaced in the Russian Federation relating to the ecologization of nature management and in particular of forest management. This was favored by the adoption of legislative acts, among them the Forest Code of the Russian Federation. The Forest Code retained the fundamental ecological principles of classical forest science and the sustain-ability of forest management that were for the first time complemented by state-of-the-art principles of sustainable forest management and the conservation of biological diversity. An important aspect was the wording: "the owner shall bear the burden of outlays on the conservation, protection, regeneration and organization of proper management for any forest lands belonging to the owner". This significantly raised legal and economic responsibility of forest land owners pretending to the ownership of the forest fund.

The convergence of forestry and environmental requirements observed in recent years has made it possible to finalize the revision of rated cuttings (norms of forest use), to establish their optimal size, to further specify and approve them virtually for all enterprises — owners of the forest fund. Today the legal steps prohibiting forest use above the standards and oversight over the size of cuttings and volumes of logging allow us to state that the practice of excessive cuttings has stopped.

The cutting regulations and other normative acts regulating forest use, reforestation and protection of forests have been revised towards tightening of forestry and environmental requirements. Work is proceeding on the reduction of use and the prohibition of application

of equipment and technology that fail to meet the state-of-the-art requirements.

The focus of the value of forests is being shifted from the purely wood resource potential to other no less important utilities of forests, such as environmental, social, economic, or ones associated with an integrated use of non-ligneous products. This is reflected in the reclassification of forests in order to transfer them to categories of more stringent regimes of forest management that would enable their preservation.

Problems

Environmental problems of Russian boreal forests are closely related to a complex of institutional, economic and social issues of the forest sector, the state and the tendency of the development of forest eco-systems. The large size of the forest fund in the Russian Federation (1180 million hectares) evens the negative effects on forests due to the imperfect forest policy and practice. At the regional and local levels, however, these effects have really tangible environmental consequences.

Assessing the dynamics of the environmental state of Russian forests on the whole, it should be admitted that the environmental situation has stabilized, while for some parameters there is a tendency towards improvement. However, in a number of cases this has happened not owing to environmental steps but rather as a result of decreased volumes of industrial production (in particular, logging has dropped by three times as compared to 1998), reduced harmful emissions and discharges into the natural environment (on the average, by 20%).

The priority problems in the conservation of forests in Russia:

First, we should specify the notion of "conservation of forests in Russia". By this, people most often understand banning various types of cuttings and expanding special protected areas. In reality, the problem of conservation of forests is much more complicated. The main objective of foresters is ensuring a sustainable multipurpose forest management with reasonable preservation of forest's resource and environmental functions.

It is not a secret that today Russia's forestry is in a difficult situation. The perpetual financial deficit prevents foresters from taking necessary economic steps in full measure. In searching for requisite means, the forestry authorities resorted to commercial cutting of wood thus becoming lumberers. This is probably one of the most dramatic problems of today.

A significant problem in the improvement of the state of Russian forests is the availability of huge stocks of mature and overmature wood of soft-leaved breeds. The various restrictions on the exploitation of forests in plantations of higher protection category, introduced from good intentions, have resulted in the formation of low-grade overmature stands on vast territories. Reconstruction of such forests without losing their resource and environmental potential would require considerable financial investments and high expertise of foresters.

What should be done for conserving forests in the first turn?

The requisite condition for maintaining the role of Russian forests in ensuring environmental security is preservation of forests and prevention of their degradation. This objective can be solved through improving forest laws, developing and implementing the national strategy on sustainable forest management and improving the existing system for forestry financing.

It is extremely important to establish a legal status of a forestry as an essential link of economic forest activity. If forestries are viewed as enterprises carrying out commercial activity to gain profit and to mobilize their own resources, then they must have a status of public authorities. If however they are considered to be management bodies, then their own funds should not be replenished at the expense of profits from woodcutting. Any type of cutting resulting in wood of commercial value must be done by non-budgetary organizations only.

A fundamental revision is required for normative acts regulating industrial activity in the forest in order to create favorable conditions for the development of the forest complex. It is not a secret that the standards established in recent years, promote supersession of businesses of the forest industry by forestries for which the standards are actually created. Another most important forestry's objective is the organization of fire protection for forests. In this respect, proposals to transfer fire protection departments to direct financing are worthy of notice. This would ensure concrete responsibility for the extent of dramatic effects caused by fire.

What could be done by public organizations?

Public organizations must play a significant role in the improvement of Russia's forest management. Their activity should not be reduced to revealing drawbacks but it should be manifested through constructive participation in the realization of production process, as well as in the execution of supervisory functions in the system of public "green patrol".

Public movements should demonstrate high civil responsibility and carry out their actions backing on the professionalism and competence of experts realizing the essence of arising problems. It is not a secret that under the influence of NGO quite a big part of population is against any wood cutting at all. But the forest as a sophisticated living organism grows, matures, becomes old and dies. The objective of public organizations is to help the forest authorities disseminate silvicultural information, to participate in the shaping of public opinion aimed at the conservation of forest environmental and resource functions, to take part in the work of forest protection commissions, and to demand maximum open access to information about Russian forests. All programs relating to the strategy of forest management, exploitation of forest resources should undergo a stage of public discussion and be implemented with active involvement of representatives of the green movement.

Afforestation

The use of forest is closely connected to reforestation. Reforestation as the main step ensuring not only the regeneration of withdrawn forest resources, but also the formation of full-fledged forest eco-systems in forest-free areas, needs more attention and responsibility from the forestry authorities, adjustment of its current policy and practice, and higher efficiency.

Today, due to the inadequacy of Article 108 of the R.F. Forest Code, reforestation is artificially broken up technologically and financially making doubtful that it is practicable to identify realistically the required volume of regenerated forests and to implement the corresponding federal and regional programs.

The Russian Forests federal program providing for reforestation steps has been funded by less than 30% of the scheduled volume that would ensure maintenance of the balance of forest areas. The main strategic objective of a large-scale reduction of forest-free areas in the forest fund in essence has not been gained.

One of the lines of the new approach to resolving this problem could be a scientifically justified definition of a territory's optimal woodiness followed by approving this environmental standard by corresponding authorities and using it as a basic standard in developing and implementing reforestation programs and other programs in the forest sector, and as a criterion for justification and decision-making with regard to transferring forest lands to non-forest ones.

Improving nature management capacities to promote sustainable development

The environmental project ROLL (Replication of Lessons Learned), supported by the USAID (US Agency for International Development), has been implemented in Russia since 1996. The ROLL'S strategic objective — improving nature management capacities to promote sustainable development and economic growth — is realized in particular through better managing natural resources and conserving biodiversity.

Active work on ROLL'S "green" projects is carried out in the south of the Far East and in Baikal region. In Khasan District of Primorsk Territory, experts from the Pacific Institute of Geography have conducted integrated assessment of natural resources and developed functional zoning of this district. In doing so, they identified areas with especially valuable natural complexes for which it is needed to establish and maintain an environmental regime. The Administration of Khasan District has commenced practical implementation of the project's materials.

A program on conservation of forests in connection with the problem of global change of climate is another ROLL project. In the territories of Primorsk, Khabarovsk and Krasnoyarsk, as well as in Irkutsk Oblast projects on the improvement of forest policy, prevention of forest fires, forest pest control and reforestation are in progress. In particular, in the Artyomov forestry of Primorsk Territory a greenhouse has been built in which nursery Korean cedars are grown and a selection center is organized.