Forest Policy Development in Mongolia

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Abstract

Mongolia's forests are located in the transitional zone between the great Siberian taiga and the Mongolian plateau of grassland steppe. These forests play a critical role in preventing soil erosion and land degradation, in regulating the water regime in mountain areas, maintaining permafrost distribution, and in providing habitats for wildlife and preserving biodiversity. Since the 1970s, Mongolia's government has been paying more attention to protecting forest resources from both natural and man-made negative impacts including over cutting, illegal logging, forest fires, and harmful insect distribution in certain areas. In 1990, Mongolia made a dramatic change in its political and economic system, the basic concept of which is the transition from a single-party political system to a democratic form of society. During the transition period from a centrally-planned economy to a market-oriented system, the management of forest resources was taken over by local governance systems. This situation requires development of all forestry-related legislative acts as well as national forest policy, laws, and regulations in accordance with the new system of society.

Along with the change-over from the centrally-planned system to the market-oriented economy, it has become necessary to develop a new system of laws, rules, and regulations to suit the reforms being carried out.

Keywords: Forest policy, Laws, National forest programme, Silviculture, Aimag, and Bag.

1. Background

Mongolia is a landlocked country situated in Central Asia, occupying a unique geographic location between $41^0$35' and $52^0$09' North latitudes and $87^0$44' and $119^0$56' East longitudes. Its territory comprises 156.65 million hectares (ha), and it shares borders with Russia and China.

Mongolia is a mountainous country at an average altitude of 1,580 meters (m) above sea level, with 82.2 percent of the country located above 1,000 m in altitude. The highest point, the Huuten peak is 4,374 m above MSL. Based on topographical features, the country can be divided into five regions: (1) the mountains located in the north and the west, (2) the intermontane basins where the major farming regions area located, (3) the plateau and desert belt located in eastern and southern Mongolia, and (4) rivers and lakes. In addition, four geographic regions are commonly referred to: the Altai mountain on the western border, the Khangai-Khentei mountain area in north-central Mongolia, the east Mongolian region, which coincides with the steppe region, and the Gobi region in the south and southeast.

The highest and the longest range of mountains is the westernmost, the Altai, which stretches about 1,500 kilometers (km). Most of the southern part of the country is a vast, rolling, oasis-dotted plain, forming the northern fringe of the Gobi Desert, which is predominantly stony, with sands covering only 3 percent of the terrain. The Gobi occupies about a third of Mongolia's territory. The great desert of central Asia joins in from the south.

The country has a large number of rivers and streams, some of which are seasonal, with a total length of about 67,000 km. The great divide, which separates the waters that flow into the Arctic and the Pacific oceans and into the interior basins of central Asia, runs along the crests of the Khentiyn, Hangayn, and the Altai mountains. Mongolia's greatest, but third longest river, the Selenge, drains northward towards Lake Baikal in Russia. The territory of Mongolia is thus in a confluence zone of very important watersheds in Central Asia.

2. Overview of the forests in Mongolia

Mongolia has been recorded as being a country with small forest resources, but the forest's importance is seen from the fact that the country occupies tenth place by area of forestland and first place by forest area per capita in the Asian region. In 2000, the total area of forest in the country was 18.3 million ha, including 12.9 million ha of closed forest, which covers 8.1 percent of its territory. If saxaul stands are excluded (*Haloxylon ammodendron*), all natural forests, shrubs, and willow groves cover in total 10.5 million ha, occupying 6.7 percent of the total area of the country. Statistics from the Food and Agriculture Organization of the United Nations (FAO) indicate that the country has limited forest resources. Total forest stand stock is equal to 1.4 billion cubic meters (m^3), with a total annual increment of 12.0 million m^3, and 58% of the total forest resources of the country belong to special and protected forest areas. The different land types of Mongolia are given in Table 1.

The main tree species in the forests are Siberian larch, Scotch pine, Siberian spruce, cedar, Siberian fir, birch, aspen, poplars, and willows (Table 2).

Table 1. Land classification of Mongolia by main types of land use.

No.	Type of land use	Area, in thousands of ha	Percentage, %
1.	Agriculture and pasture	13,0357.7	83.4
2.	Cities and settlements	402.7	0.26
3.	Land under roads and electricity lines	328.6	0.21
4.	Forest land	18,292.0	11.6
5.	Areas under lakes and river	1,665.0	1.06
6.	State reserve land	5,365.6	3.43
	TOTAL	**156,411.6**	**100**

Source: State of Environment, Mongolia. MNE. 2000

Table 2. Distribution of forest stand stock by tree species in Mongolia.

Name of tree species	Stand stock (000' m^3)
Siberian larch (*Larix sibirica*)	1026,860.6
Scotch pine (*Pinus silvestris*)	92,606.0
Siberian pine (*Pinus sibirica*)	163,960.4
Spruce (*Picea obovata*)	3,688.1
Fir (*Abies sibirica*)	375.7
Birch (*Betula platyphylla*)	86,162.9
Poplar (*Populus*)	2,120.6
Aspen (*Populus tremula*)	1,390.2
Willow (Salix)	544.7
TOTAL	**1379,181.7**

Source: State of Environment, MNE. Ulaanbaatar. 2002

The forests of Mongolia are under state ownership. Functionally, they are classified as strictly protected forests (8.4 million ha), protected forests (7.9 million ha), and utilisation forests (1.2 million ha). The extent of utilisation forests was progressively reduced during recent years (i.e., since 1992) by transferring areas to the category of strictly protected and protected forests.

Management of forest resources in Mongolia suffers from several weaknesses such as unregulated use, overuse, and inadequate protection.

The impacts of human interference have resulted in deforestation and forest degradation. According to a survey of human impact on ecosystem in Mongolia during the last 100 years, it is seen that some 40% of all forests in Mongolia have been impacted at some level or other; 684,000 ha have not regenerated after fire damage and 250,000 ha after clear-cutting; 1,737,000 ha of coniferous forests have been replaced by birch and poplar, 159,000 ha by *steppe* and sand/stones, and 1,230,000 ha by low-quality coniferous forests. Cold-resistant *taiga* forest has been shrinking; 16% of forest ecosystems have been replaced by non-forest eco-systems. Reports indicate that between 1974 and 2000 forest cover over an area of about 1.6 million ha were lost (Krasnoshekov et al. 1992).

The important causes of deforestation and forest degradation are fire, overgrazing, mining activity, improper commercial logging, illegal collection of wood for construction and for use as fuel, hay making in forest steppes, complacency in enforcement of forest rules and regulations, and damage by pests and diseases. Forest fires, by far, have had the most serious impact on the forests of Mongolia. Forest fires are mostly incendiary, caused by herders and collectors of antlers. Between 1990-2000 about 7.52 million ha of forest were burned by fire.

In order to replenish and compensate for the growing stock removed for various purposes (or lost due to various reasons), Mongolia's reforestation activity was started in 1971. So far, an area of about 84,000 ha has been planted. The quality of the forest plantations is

generally poor, mainly due to lack of adequate maintenance and care, and partly due to the influence of the harsh climate.

Faced with the problem of dwindling forests and its ecological consequences, the government has given emphasis to forest conservation in recent (post-1990) years, with the objectives of protecting wildlife, conserving bio-diversity, maintaining ecological balance, enhancing beneficial influences of forest, and controlling desertification. Some 17.1 million ha, about 10.9% of the Mongolian territory, have so far been declared as protected areas (of this, some 8.4 million hectares are designated forest lands).

On the production front, however, the annual volume of logging, which was about 2.2 million m^3 in the mid-1980s, fell to about 0.86 million m^3 in 1992, and the harvest in the year 2000 was only 0.5 million m^3. This fall in harvest levels is partly due to the influences of institutional and policy changes involving the privatization of production enterprises and the decentralisation of decision-making power. But partly it is also due to the supply constraint caused because of the reduction in the area of designated utilisation forests from about 5.8 million ha in 1985 to 2.4 million ha in 1990, and further to 1.19 million ha in 1996 (because of reclassification of some of the utilisation forests as protected areas). Also, the Forest Law of Mongolia prohibited clear cutting of natural forests and prescribed selective cutting in 1995.

Between 1940 and 2002, a total of 45.8 million m^3 of round wood was harvested from more than 320,000 ha, and annually about 392.5 thousand ha were affected by forest fire and 101.1 thousand ha of forest area damaged by insects and pests since 1980. Between 1996 and 1997 alone, 5.0 million ha were affected by forest fires, and within them nearly 500,000 forests were completely burnt and lost ecological function. Some statistics says that one-quarter of Mongolia's total forest land has been affected by human activities such as illegal cutting, forest fires, and harmful insects and pests.

In the period from 1995 to 2000, the Mongolian Parliament adopted the Law on Forests, the Law on Fees for Timber and Fuel Wood Harvesting, the Law on Forest Fire Prevention, and the Law on Quotas of Export Custom Tax on certain goods, but relevant laws and regulations have not succeeded due to a lack appropriate institutional restructuring and privatization of the forestry sector during the period of economic transition. In the past few years, silvicultural thinning has been reduced. The annual rate reached less than 500 ha of clear-cutting has covered annually about 1000 ha; the residual trees have been used for production of timber goods and as fuelwood for local citizens.

Since 1971, re-afforestation activity has been regulated by the State Central Plan and directive. Reforestation activities totalling 100.3 thousand ha cover only 30% of all the logged area in the country. For example, reforestation and afforestation activity implemented annually covered about 3.9 thousand ha in 1980–2000, 4.6 thousand ha in 1996–1999, and 8.2 thousand ha in 2002 (Table 3). Due to financial constraints, activities on combating desertification and soil erosion and breeding of seedlings have not met present needs.

Table 3. Reforestation area in Mongolia (ha).

Years	Area planted
1971–1980	3,085.5
1981–1990	30,380.9
1991–2000	50,576.3
2001–2002	16,275.0
TOTAL	**100,317.7**

Source: MNE 2000–2002.

Prior to the change in government, Mongolia's forest industry was dominated by state-owned companies or joint-ventures with the former COMECON trading partners (USSR, Romania, and Poland). The actual annual harvest has decreased due to the collapse in COMECON country co-operation and the economic recession in Mongolia. Several processing plants have closed due to cost overruns and shortage of materials. The majority of wood-processing companies in Mongolia are sawmills and small-scale furniture joinery or furniture factories.

At the present time, annual logging in the country has reached 700.0 thousand m^3 of timber wood, and it supplies domestic demand for wood and timber products Also, an assortment of wooden products were once exported in small quantities, but forest enterprises, timber-harvesting companies, and wood-processing factories are at a standstill due to old machinery, equipment, and inappropriate industrial processing technology. This is reflected in the fact that in 1989, products of the forestry sector were accorded around 4.7% of gross domestic product (GDP); by 1998 this rate had declined to 0.25%.

The management of forest resources in Mongolia suffers from several weaknesses, including unregulated use and overuse and inadequate protection. This situation requires the development of forest legislation and a nation-wide forest policy in order to deal with the negative manmade impacts related to deforestation.

3. Forest legislation

Along with the change over from the centrally planned to the market-oriented economy, it became necessary to develop a new system of laws, rules, and regulations to suit the reforms being carried out. Accordingly, since 1993, a large number of laws have been drafted, covering every aspect of Mongolian life and governance. It falls into four groups: land and environmental laws; laws governing natural resources (including forestry); laws on natural resource use fees (to respond to the needs of the market economy); and laws related to natural disasters. Regulatory documents to implement these laws have also been prepared by the government. In case of instances of

conflict, where multiple legislative documents are to be construed together, the following priority (or superseding order) will prevail: constitution of the country, parliamentary laws, parliamentary resolutions, cabinet resolutions, and ministerial resolutions.

There are some 27 laws (and more than 200 rules and regulations) falling under the purview of the MNE. At the central level, the Environmental Protection Agency is responsible for providing guidance in the implementation of the laws. Actual enforcement of these laws is the responsibility of the environmental units at the *aimag* level, the environmental inspectors at the *soum* level, and the rangers at the *bag* level.

Forest legislation has a long history in Mongolia. Rules on forestry in Mongolia were first adopted in 1925, which then became the Forest Law in the 1930s. The laws existing at the time of initiating economic reforms were the Forest Law of 1974, which was revised in 1995, but several of the old provisions were retained.

Since 1995, the Mongolian parliament has adopted about 25 environmental laws, covering various aspects of land use, environmental protection, air, plants, animals, forests, toxic substances, environmental impact assessment, wildlife protection, and protected areas, etc.

3.1 Mongolian Law on Forests

The Mongolian Law on Forests was adopted on 31 March 1995, and became effective in June of that same year. It is divided into seven chapters covering the possession and use of forests, the various forest types and zones, forest inventories, and protection measures and fines for the violation of the law. The Mongolian Law on Forests is intended to address the basic questions of proper forest use, management of forest protection, and regeneration of Mongolia's forests. According to the constitution of Mongolia, forest resources are the property of the state, which has the power to grant possession of them to local governments. The local governments may then grant citizens, economic entities, and organisations the right to use the forests and forest resources pursuant to contract or license. The Mongolian Law on Forests does not indicate how this "ownership" of the resource will affect the rights inherent in land lease contracts, their extensions, or other land-use laws and regulations.

The Forest Law of Mongolia, adopted in 1995, consists of seven chapters (and 33 articles): (i) general provisions, (ii) forests within special zones and protective regimes, (iii) forests within protected zones and rules for their protection and usage, (iv) industrial zone forests and their usage regimes, (v) protection and regeneration of forests, (vi) forest utilisation, and (vii) miscellaneous provisions. In the new law, the protection of forest resources and the environment has been especially emphasized, and clear cutting of forests is discouraged/disallowed. The central government specifies the annual logging quota to the aimags, and the aimags select the cutting areas. Logging companies are to plant three to five seedlings for each tree felled. Provision has been made for increasing royalties from the present levels.

The new forest law implies forest management by private entities. Development of economic relations between the forest owner (government) and forest users is an important element in the transition to a market economy. Leasing forest resources is appropriate when the state owns the forests. However, the lease period, rent, payment schedule, rights, and obligations of the lessor and the lessee have not yet been defined or determined.

3.1.1 Forest zones

The Mongolian Law on Forests divides forests into three categories: *strict, protected, and utilisation zones*. This division into three zones is similar to the system the Ministry of Forestry and Forest Industry initially established in 1972 under different names. The first two zones—strict and protected—are further divided into four sub-zones and eight forest types. The utilisation zone remains a single classification acting as a default category. All forest areas not specially included in the first two classifications are defined as utilisation zone forests. Each zone has a separate protection regime where the most protective category is the first—strict zone—followed by protected and utilisation zones. All forest zones require the implementation of fire, pest, and disease protection programmes, and all local citizens are essentially considered community firefighters.

The *strict zone forest* category is the most protective of the three. This zone consists of sub-alpine forests, pristine and conservation zone forests within strictly protected areas, and special zone forests within national conservation parks. The protection regime of the strict zone forests is shown in Table 4.

Protection zone forests is the second category. The protected zone category is much broader, consisting of four sub-zones including certain forests within special protected areas—national conservation parks, nature reserves, and monuments—as well as green zones around towns and villages, prohibited strips along riparian zones, national roads, and railways, and locally protected forests. Locally protected forests may consist of areas containing different forest types, including saxaul forests, oases, forest stands covering up to 100 hectares, forest groves, shrubs, sun-exposed forest areas, and forests on steep slopes over 30 degrees. The purpose of green zone forests is to create recreation conditions and a clean environment for the residents. Prohibited strip forests are those within 5 km of a lake, river, or stream source, 3 km of a riverbank or mineral water source, and 1 km along national roads and railways.

Box A. Chronology of forest legislation in Mongolia.

21 May 1921	State declaration of land, water and forest resources
11 August 1924	National Forest Rule
26 Sept. 1924	Establishment of Forest Division, Ministry of Economy of Mongolia
27 March 1931	Mongolian Law on Forests
03 Oct. 1934	Revision of Forest Law
14 Dec. 1940	Revision of Forest Law
14 April 1944	Rule of forest fire prevention and fighting
13 March 1957	Revision of Forest Law
06 March 1964	Establishment of forest zones and categories
10 May 1968	Establishment of Forest Fire Fighting Commission
04 July 1970	Rule of Forest Inspection and Control
25 March 1972	Establishment of Ministry of Forestry and Wood Industry
01 July 1974	New Revision of Forest Law
22 Nov. 1974	Rule of Forest Law Enforcement
26 Dec. 1974	New system of forest royalty and stumpage price
1973–1975	Forestry Strategic Plan, 1975–1990
17 Jan. 1975	Re-establishment of forest zones
31 March 1995	New revision of Forest Law
19 May 1995	Law on Fees for Forest Harvesting
28 May 1996	Law on Forest Fire Prevention
15 July 1998	National Forest Policy Statement
26 Dec. 1998	State Policy on Ecological Conservation
31 Oct. 2001	Revised National Forest Policy Statement

Sources: various.

Table 4. Protection regimes of strict zone forests.

No.	Classes of strict zone forests	Main functions of forests and protection regime
1.	Strict zone forests	To maintain the forests' natural features and environmental balance. To protect the forest from fire, harmful insects, and disease.
2.	Sub-alpine forests	To maintain environmental balance in watersheds and to prevent soil degradation. To gather fallen trees and branches through cleaning. To use non-timber forest products.
3.	Pristine and conservation zone forests in special protected areas	To preserve the original natural condition and features in certain areas. To conduct observation and investigation for the special purpose of long-term conservation.

Utilisation zone forest is the default category. All forests that do not belong to the previous two categories are classified as utilisation zone forests. These forests are designated primarily for commercial timber harvest with contracts and the payment of fees required. The first task under the law is the determination of allowable harvest volumes. This is a top-down process. First, the Ministry of Nature and Environment determines the maximum allowable harvest for each aimag and the capital city on an annual basis. Then, the aimag and capital city Khurals decide on the permissible cut, based on the recommendations of the Ministry of Nature and Environment. Finally, the Soum Khurals decide on the permissible cut within their territory based on the Aimag Khural decision.

Bids to harvest timber are to be submitted to the soum and capital city governors. Before submission of bids, decision-makers must consider (i) the economic efficiency of harvesting activity, (ii) harvesting techniques, (iii) processing technology, (iv) availability of funding for protection measures and reforestation, and (vi) the

permissible cut. After approval of bids, the timber company must enter into a contract with the certification organisation stipulating the legal basis for the harvest, species to be cut, standing volume, harvesting removals, duration of the contract, implementation period, forest management measures, border of timber felling, technology used, and relevant fees. Timber and non-timber forest products may also be harvested for household purposes within this zone, pursuant to the appropriate permit obtained from local governors. Permits for fuelwood may be obtained from the local ranger.

3.1.2 Forest management

The forest management requirements in the Mongolian Law on Forests are the legal mechanism through which Mongolia assesses the current condition of its forests. By law, management shall consist of a forest survey and inventory, the state of forest stands—including forest distribution, composition, quality, silvicultural activities, and stand treatment—and then determination of the justification for forest conservation, proper use, and restoration.

This law does not specifically discuss or require forest planning, but it does require government to prepare various documents.

3.1.3 Prohibited and conditional forest use

Under the Law on Forests, prohibited activities include (i) cutting or harming forests up to the fifth age class, (ii) cutting all species of young trees, (iii) cutting certain species of trees and shrubs, (iv) clear cutting, and (v) grazing where seedlings have been planted. Virtually all other activities described in the various provisions of the Mongolian Law on Forests are conditional uses, which may or may not be engaged in, depending upon the forest zone and the purpose of the activity.

Conditional uses include haymaking, cutting Siberian pine, spruce, or elm (Article 22, subparagraphs 2, 4, and 5), fire prevention, use of chemicals against pests and disease, and harvesting non-timber forest products.

3.2 Law on Fees for Forest Harvesting

The Mongolian Law on Fees for Forest Harvesting was adopted on 19 May 1995 and became effective on 1 July of that same year. The main purpose of this law is to regulate the fee requirements for harvest of forest timber and fuelwood by citizens, economic entities, and organisations, and incorporation of these fees into the state budget. The law on fees for forest harvesting consists of the following chapters, which cover (i) assessment of indicators, (ii) fee amounts, (iii) fee exemptions and discounts, (iv) collection of fees and reporting, (v) payment refunds, (vi) fee complaints, and (vii) control of law enforcement.

This law imposes a fee on "the cutting of any kind of tree in the forest, for any purpose." These fees are based on the following:

- volume or tonnage of the forest produce gathered
- ecological and economic assessment
- transportation distance
- tree species

Discounted fees are available when citizens, economic entities, and organisations will receive a discount in fees for harvest of forest timber and fuelwood by collecting the fallen trees, stumps, tops of trees, and branches.

3.3 Law on Forest Fire Prevention and Control

This law provides detailed requirements for the setting up of forest fire prevention and control organisations at local and central levels. In support of the state's responsibilities in the area of forest fire prevention and control, the possessors of forest land have several responsibilities:

- They are required to provide professional technicians or forest rangers to patrol and protect forests.
- They must control the use of fire within their areas.
- They must undertake fire prevention measures as required.

The law should assess civil and criminal penalties for violation of provisions in the law, or causing fires, or creating a risk of fires. These provisions and their efficient implementation are very important to the conservation of the forest environment.

4. National forestry programme

The National Forest Programme is a comprehensive policy framework towards the management, conservation, and sustainable development of all types of forests, based on a set of specific principles and strategic elements. They comprise a broad inter-sectoral approach to forest development at all stages, including the formulation of policies, strategies, and plans of action, as well as their implementation, monitoring, and evaluation. They should be implemented in the context of each country's socio-economic, cultural, political, and environmental situation.

The elements of the National Forest Programme include the following: a national forest statement, sector review, objectives and strategies, policy and legislation, institutional reforms, investment programmes, capacity building, action plans, financing strategies, monitoring and evaluation, and coordination and participatory mechanisms.

In the case of Mongolia, the National Forestry Programme could include major sub-programmes for the following:

- institutional strengthening
- afforestation
- sustainable management of natural forests
- forest waste utilisation
- forest fire management
- rehabilitation and modernization of forest based industries
- non-timber forest products
- biodiversity conservation and protected area system
- desertification control
- forestry research and technology development

- education, training, public information, and extension

In the decentralised system of governance as it exists in Mongolia, it is essential that all the component local administrations should have their own forest programmes to address specific local issues (C. Chandrasekharan 2001).

5. National forest policy

The guiding principle of the forest policy for Mongolia up until 1990 had been derived from a policy document prepared by Russian forest specialists in 1975. However, in order to keep pace with the changing times, the government of Mongolia promulgated the new Mongolian Forest Policy Statement in 1997 and revised it again in 2001. It formalised the commitment and intent of the government to ensure sustainable development of forest resources while conserving wildlife, wild plants, and forest ecosystems. The current policy recognizes the goals and objectives outlined below.

5.1 Goal of the National Forest Policy

In 2001, a new forest policy statement was re-formulated due to reflect the special requirements of forestry in Mongolia. The new National Forest Policy of Mongolia specifies five main goals: prevent deforestation and desertification, modernize wood-processing technology and meet domestic demand for forest products, maintain ecological balance, develop institutional restructuring, technology transfer, and research extension.

The main goal of forest policy is to identify a forest policy statement and produce guidelines of activities to increase national capability of forest protection, rational utilisation, and forest rehabilitation in connection with the needs of sustainable development and ecological sustainability.

5.2 Policy objectives

1. To apply modern and more effective techniques and technology for forest protection and urgently implement prevention measures to reduce negative human impact, forest fires, and harmful insects and diseases.
2. To take measures for renewing the machinery and technology of sawmills, raising utilisation effectiveness, increasing production range, improving quality, and providing for domestic demand for wood and wood products.
3. To implement activities for the creation of protection/wind-break shelterbelts, small stands, and green belts in the steppe and Gobi desert area by, at first, conducting reforestation in upstream areas of rivers, logged areas, and forest areas affected by forest fire and insects, and then, accordingly, increase tree seed harvesting and breeding of tree seedlings.
4. To refine institutional structure and management in the forestry and wood industry sector.
5. To apply modern technology and scientific achievement in practice and develop international collaboration in forestry.

5.3 Terms of policy implementation

The programme implementation phases include the following:

First phase:	until 2005
Second phase:	2006–2010
Third phase:	2011–2015

6. Strategic measures

The most significant forest policy measures at the national level were identified as follows:

6.1 Forest management

- Introduction of remote-sensing technology and geographical information systems to determine forest state and conducting forest inventory in selected areas, i.e., 20% of total inventory area by using large-scale aerial photos and revising stand indicators in sample plots.
- Provide support to forest inventory enterprises of all types of ownership; forest inventory capacity will be increased by 1.5 to 2.0 times.
- With the purpose of increasing tree growth and improving wood quality, cleaning of forests will be conducted by unemployed people and youth, relying on professional institutions and people who own the forest, on the basis of contract.
- A plan of forest fire prevention and forest fire fighting must be worked out; fire prevention expenditures shall be budgeted and financed in the local annual budget.
- Create forest fire prevention breaks and forest dividing lines in state border zones and some required areas.
- Detect fires and fight hotspots using satellite information and air guard for forest fire monitoring and fire prevention groups.
- Provide natural disaster and fire fighting units with communications means and fire liquidating equipment.
- Fight forest fires with minimal losses by affecting clouds and intentionally causing rain.
- Take measures for prevention and determine probable forecasts of insect and disease distribution and their multiplication by intensifying research work.
- Modernize laboratory research and laboratory equipment and provide qualified personnel for fighting harmful insects and disease.
- Promote biological and environmentally-friendly technology for fighting harmful insects and organise the necessary products in the country.

6.2 Forest harvesting and wood utilisation

- Determine the annual allowable cutting volume of the aimags and soums in connection with forest resource capacity.

- Improve procedures for allocation of forest resources and forest harvesting technology under current conditions to assist the forest self-generation process.
- Create a regulation to hand over forest resources to an economic entity or organisation(s) who is able to combine logging, reforestation, and protection of forests.
- Cease cutting of young and premature trees.
- Protect saxaul forests. The firewood needs of some aimags and soums of the Gobi and desert zones will be met by cleaning forests in forest zones. The transportation expenses of the above-mentioned activity will be allocated from the centralized budget. In the Gobi zones, wholesale trade centres of firewood and timber consumer goods will be established.
- Considering the importance of extending forest roads for forest protection, silvicultural management, wood utilisation, improvement of infrastructure, and the development of tourism, the government will support and participate regularly in these activities with the assistance of foreign investment.
- Encourage a wood import policy to limit the export of wood and timber products.
- Replace railway sleepers with non-wood alternative materials.
- Reduce wastage of logging, and utilise tree tops, branches of trees, sawdust, bark, low-quality wood, and off-cuts by promoting and employing mechanical and chemical treatment to get deep processing by applying foreign and domestic advanced technology.
- To be realized in stages, produce essential oils out of conifers, vitamin powder, medicine extracts, pine-tar oil, and resin out of larch and pine trees, and charcoal out of birch trees, and supply internal and external markets with the above goods.
- Encourage and support initiatives to process birch, using industrial methods, apply known technology for producing birch parquet flooring, construction of wooden parts, and timber goods by relying on previous wood-processing factories.
- Establishment of small and medium-sized wood processing factories that are able to compete on the market, by modernizing the furniture and timber goods industry, will be supported by policy, and the assortment and volume of export goods will be increased.
- Create favourable conditions for the establishment of factories to produce particleboard, single-layer board, plywood, and veneer.
- Establishment of small and medium-sized wood processing factories that combine traditional and modern technology to produce consumer timber goods for countryside herdsmen will be supported.
- The list of usable non-timber forest products as well as their resources will be determined with a location map and utilisation period by region.
- Instructions and recommendations will be compiled in a handbook and followed in order to improve the use of non-timber forest products such as pine seeds, berries, mushrooms, and medicinal plants
- Support for an increase in household income will be given by promoting non-timber forest product processing and adding to its assortments.

6.3 Forest conservation

- Organise seed collection based on genetic selection evaluation and set up seed harvesting sites in each forest vegetation zone.
- Tree seed analysis laboratories with improved facilities and equipments will be renewed.
- Start the establishment of mother seed tree plantations with selection of elite and plus trees.
- Provide financial support to the establishment of tree breeding nurseries for the greening of settlements, for reforestation, and for the creation of shelterbelts to combat desertification and soil degradation in pasture and crop lands.
- Expand reforestation work annually in 10.0 thousand ha. Mobilize the activity of local citizens, youth, and the public community in seed collection and breeding of tree seedlings.
- Organise domestic industry to produce simple hand equipment for tree seed collection and seedling breeding.
- Provide portable equipment for forest nursery and reforestation work and modernize the technology of tree planting and reforestation.
- Introduce suitable technology in the practice of natural forest regeneration succession and tree plantation activities in accordance with forest vegetation zones and regions.
- Implement regulations for conducting reforestation by project and plan, and develop their monitoring, evaluation, and procedures for financing and transferring to state forest land.
- Renew the norms of assessment and expenses of seed collection, seedling breeding, reforestation, and the standard amount of seeding and seedlings for forest rehabilitation and tree planting in accordance with the steppe and Gobi desert zones.
- World Environment Protection Day will be celebrated by planting trees for ten days annually in every aimag and settlement.
- Improve the inventory of tree planted areas by providing a continuous cycle such as tree planting, tree patching, caring for them, and transferring to state forest land.
- Actions against desertification in the form of creation of forest strips and small stands to protect crop land and pasture will be supported and encouraged.
- In cases of exception of Provision 23 of the second part of the Forest law of Mongolia, a citizen, economic entity, or organisation are able to own forest that they planted by themselves.

6.4 Institutional strengthening

- Renewal of the legal environment and implementation and monitoring of legislation by making amendments to forest legislation will be intensified.
- A unit responsible for forest and related issues will be established in every aimag and the capital to coordinate the activities of professional organisations.
- Local professional organisations of all types of ownership will be set up.
- The system of coordinating activities of forest protection, rational use of forest, and reforestation-activities that are included in the duties of the central governmental organisation responsible for nature and environment and governors of capitals and aimags will be refined, improved, and regularized.
- To protect forest, reforestation that is conducted according to the contract signed by NGOs and the central governmental organisation, local organisations at their expense or at budget will be increased. NGOs will be involved in activities such as protecting the interests of domestic manufacturers engaged in forestry, providing them with know-how, machinery, and business information, in order to assist in project implementation.
- Protection of forest resources and regeneration activities conducted by a citizen or economic entity that has voluntarily participated will be supported.

6.5 Technology transfer and forestry research

- Scientific investigations will be intensified for the development of modern technology of forest protection, forest utilisation, forest regeneration, forest ecosystem sustainability, and its change.
- Agro-technology and techniques of plantation and selection of species will be developed for use in setting up greenbelts, shelterbelts, and small stands, in order to improve agricultural yield productivity as well as to protect pasture and crop land from soil degradation and desertification in steppe and Gobi desert areas.
- Scientific outputs will be introduced for the development of special protected areas management, protection of forest biodiversity, conservation of soil, water protection, and combating desertification.
- Experimental research will be conducted in the field of creation of new materials from residuals, deep processing of raw wood materials, production of consumer furniture, and development of the forest chemistry industry.
- Measures will be taken to promote the institutional structure of research institutions of the forestry, forest harvesting, and wood-processing industry.
- An information system of forestry will be set up and its capacity will be improved.

6.6 Human resources development

- The significance of forest resources and forest-related legislation will be widely advertised and publicized.
- Local authorities will be trained and educated in the fields of forest legislation, conducting forest inventories, forest protection, forest resource use, and reforestation.
- The quality of training in national universities and colleges that train forest specialists will be updated, and their activities to educate highly qualified national experts will be supported.
- Trained experts who currently work in forestry will be enrolled in short-term and long-term training either in Mongolia or abroad.
- Forest masters and workers with qualifications to run forest industry processing will be trained and re-trained in accordance with a special plan.
- Inter-governmental agreements on fighting and prevention of transboundary forest fires will be signed with neighbouring countries.

Each management unit should have a proper management plan that covers technical, financial, economic, ecological, social, institutional, legal, and managerial aspects. The technical prescriptions for management should, apart from social and economic criteria, consider the ecological, climatic, hydrological, and other habitat factors and their potentials. Varying degrees of management intensity results from technological development; accordingly, it is necessary to review and revise plans periodically. Studies on end-uses, growth and yield, site changes, ecological changes, etc., are important for management planning. Periodic forest inventory and resource studies/bio-prospecting should be carried out as essential inputs for management planning.

The integrity of management units is often a neglected aspect, which has negative impacts. This becomes more serious in a situation of an integrated, intensive, high-input, and high-investment management scenario. Incorporating the surrounding areas into management planning, thus widening the scope of planned involvement of communities, is considered an essential aspect in future forest management. The need for an appropriate management information system and monitoring of management activities, in order to ensure efficiency, is also flagged as important.

As entities having specific characteristics, each management unit should be managed to achieve the highest level of efficiency and sustainability in respect of its main function (and the combination of functions) assigned to it. Criteria and indicators for sustainable forest management should be developed, as appropriate, and applied to assess the state of Mongolian forestry.

7. Policy reforms and recommendations

To develop and implement existing forest policy and legislation in Mongolia, it is necessary to review the policy and to identify the underlying causes of policy failures. It is suggested in this connection that forest policy is to be approached in a comprehensive manner covering institutional, social, economic, and environmental needs. In this regard, the following actions are recommended in

respect to these issues:

- Restructure and strengthen forestry institutions at central and local levels. (The feasibility of establishing an autonomous forestry board, and how it can be established and structured, is a matter for consideration.)
- Formulate an appropriately phased and structured long-term national forestry programme for Mongolia to guide the development of sustainable forestry development.
- Consider the linkage of policy, legislation, programmes, and their implementing mechanisms.
- The present system of forest land use in the country should be reviewed in connection with forest conservation, and effective and efficient participation of local community organisations in forestry development should be established through rational resource allocation and appropriate tenure arrangements.
- An appropriately developed, structured, and balanced enterprise system, financial system, social protection system, and environmental protection system should be established.
- The country's capability in the field of forestry development should be enhanced, including the need to strengthen and restructure institutions engaged in forestry research and the need to improve facilities for forestry education and training.

An analysis of the forestry situation in Mongolia indicates that the existing policy has not succeeded in achieving sustainable forest management. It is necessary to review the policy and to identify the underlying causes for policy failures. It is suggested in this connection that forest policy is approached in a comprehensive/holistic manner, covering, *inter alia,* the following:

- Forest land use and management (ownership and functional classification of forest resource base; forest resource expansion; improvement of productivity; management planning; and wide-based people's participation).
- Forest protection and land rehabilitation (protection functions of forests; tree planting for protection and land rehabilitation; and protection of forests).
- Environmental conservation (protected area system; improving the standard of environmental conservation; environmental conservation; and income generation).
- Forest products utilisation (forest harvesting; forest-based processing industries; non-wood forest products and services; trade and marketing; efficiency in forest products consumption; and demand, supply, and scarcity).
- Socio-economic contributions of forestry (basic human needs; generation of employment and income and poverty alleviation; entrepreneurship; and people's participation).
- Institutional arrangements (institutional restructuring; changes in laws, rules, and regulations; planning, monitoring, and evaluation; and investment and financial matters).
- Human resources development (forestry education and training; human resources planning, management, and enhancement).
- Forestry research (silvicultural research; forest management research; forest products research; and economic and policy research).
- Public awareness and extension (public education; forestry extension; and role of NGOs).
- Co-ordination (inter-sectoral co-ordination; internal co-ordination; and conflict resolution).
- Sate of forest resource and development (assessments and reviews; monitoring and evaluation; and periodic revision of forest resource management and development plan).

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