MONGOLIA'S FOURTH NATIONAL REPORT

ON IMPLEMENTATION OF CONVENTION OF BIOLOGICAL DIVERSITY

Ulaanbaatar 2009

MINISTRY OF NATURE, ENVIRONMENT AND TOURISM OF MONGOLIA

GLOBAL ENVIRONMENTAL FACILITY

UNITED NATIONS DEVELOPMENT PROGRAMME IN MONGOLIA

CONVENTION ON BIOLOGICAL DIVERSITY

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FOREWORD

Protecting biodiversity, ensuring sustainable utilization of natural resources and limiting the loss of habitat in the face of global climate change and negative anthropogenic impacts is a critical challenge for Mongolia, which has an environment with a harsh continental climate and fragile ecosystems.

Today, it is globally recognized that a sustainable development strategy should be harmonized with the environment and in that respect the international community is creating international conventions and agreements that deal with environmental issues.

In 1993, Mongolia joined the International Convention on Biological Diversity which was ratified by UN assembly. Mongolia subsequently approved a National Action Plan (NAP) on Biodiversity Conservation in 1996. Within the NAP implementation, measures like improving legal frameworks, strengthening biodiversity conservation management, increasing research activities on flora and fauna and its extinction, minimizing negative impacts toward biodiversity, restricting utilization, promoting public participation in environmental protection activities and expanding cooperation with the international community were carried out.

It is my great pleasure to present the Fourth National Report on the implementation of the UN Convention on Biodiversity Conservation, developed in collaboration with the Mongolian Nature and Environment Consortium. This national report was produced following the set of guidelines developed by the CBD Secretariat. Invaluable contributions from relevant line Ministries, non-government organisations and scientists and researchers from various professional and research institutions played a fundamental role in generating this report.

The Fourth National Report stipulates measures that the country has undertaken to fulfil the provisions of the Convention. The Report provides information on the experience of implementing national biodiversity strategies and action plans, and identifies obstacles and impediments in meeting the objectives of this Convention.

We believe this report will serve as good reference material for policy makers in the environment and other sectors, non-governmental organisations, private sectors and students.

I would like to take this opportunity to extend my appreciation to the Global Environmental Facility for the financial and technical support provided in producing this report.

Member of Parliament, Member of Government,
Minister of Nature, Environment and Tourism  L.GANSUKH

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ABBREVIATIONS

ADB	ASIAN DEVELOPMENT BANK
CITES	CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED
DSS	DUST AND SANDSTORM
EBA	ENDEMIC BIRD AREAS
FAO	FOOD AND AGRICULTURE ORGANIZATION
GTZ	GERMAN TECHNICAL ASSISTANCE
GEF	GLOBAL ENVIRONMENT FACILITY
GIS	GEOGRAPHIC INFORMATION SYSTEM
IUCN	INTERNATIONAL UNION FOR CONSERVATION OF NATUR
IBAs	IMPORTANT BIRD AREAS
JICA	JAPAN INTERNATIONAL COOPERATION ORGANIZATION
MNET	MINISTRY OF NATURE, ENVIRONMENT AND TOURISM
MAS	MONGOLIAN ACADEMY OF SCIENCE
MALI	MINISTRY OF AGRICULTURE AND LIGTH INDUSTRY
MOSTEC	MINISTRY OF SCIENCE AND TECHNOLOGY AND CULTURE
MAP	MONGOLIAN ACTION PLAN
MSUE	MONGOLIAN STATE UNIVERCITY OF EDUCATION
NUM	NATIONAL UNIVERSITY OF MONGOLIA
NGO	NON GOVERNMENT ORAGANIZATION
PRC	PEOPLE'S REPUBLIC OF CHINA
PAA	PROTECTED AREA ADMINISTRATION
TDA	TRANSBOUNDARY DIAGNOSTIC ANALYSIS
SDC	SWISS DEVELOPMENT AND COOPERATION AGENCY
SAP	STRATIC ACTION PLAN
SPIA	STATE PROFFESIONAL INSPECTION AGENCY
SPA	SPECIAL PROTECTED AREA
UB	ULAANBAATAR
UNEP	UNITED NATION ENVIRONMENT PROGRAM
UNCCD	CONVENTION ON COMBATING DESERTIFICATION
UNDP	UNITED NATIONAL DEVELOPMENT PROGRAM
WB	WORLD BANK
WWF	WORLD WIDE FUND
ZSL	ZOOLOGICAL SOCIETY OF LONDON

EXECUTIVE SUMMARY

Mongolia, with an area 1.567 million sq.km, lies in a transitional zone at 42° to 52° N, between the boreal forests of Siberia and the Gobi desert, spanning the southernmost border of the permafrost and the northernmost deserts of Central Asia. The country is far from the sea and has an extreme continental climate with marked ranges of seasonal and diurnal temperatures, and low precipitation. Altitude ranges from 560m in the far East to 4374m in the Altai mountains. Mongolia's wide range of relatively intact ecosystems provides habitat for a variety of plant and animal species, some of which are globally endangered. Mongolia belongs to one of the few countries which is still considered relatively untouched regarding air, water, plant and animal species in the world.

This national report is consists executive summury, four chapter, conclusion and annexes.

In first chapter provides results of the status and trends of, and major threats to, various components of biodiversity in Mongolia. It includes an overview of the Mongolia's biodiversity in terms of ecosystems, habitats, species and status and trends of important biodiversity components, using any indicators that exist.

Human influence on the country has been relatively light, the taiga, steppe and desert ecosystems have been less affected by man than in neighboring countries. The eastern steppe ecosystem is still the home to hundreds of thousands of migratory Mongolian gazelles.

There have been 128 plant species registered as endangered and threatened in the second edition of Mongolian red book (1997). This group lncludes 75 medicinal species, 11 for food, 16 species used in industry, 55 decorative species and 15 species used in the soil fixing process and in controlling pests.

More than 100 species of plants are currently used for medicinal purposes and more than 200 species are used for pharmaceutical purposes. Additionally, 200 species are used for tea, 50 species for food and over 100 species are important for livestock feed. It must be emphasized, however, that because of the intensive use of more than 80 species for food and other purposes, the numbers and resources of species like Sausurrea involucrate, Allium altaicum, Sophora alopecuroides, Glycyrrhiza uralensis, Gentian algida, Cynomorium soongaricum, Allium oblicium and many others are decreasing rapidly today in Mongolia. For example, since 1998, the biological resource of Glycyrrhiza uralensis has been decreased by a factor of 6.6and the industrial resource by 7.2. Saposhnokovia divaricata is an important medicinal plant distributed in the eastern parts of Mongolia, with a 17.8 tonne biological resource and a 110.7 tonne industrial resourse, however, now some 5=6 tonnes is being prepared annually for foreign export.

According to inventory of 2007, the total forest fund is 19002.2 thousand ha, including closed forest area occupies 13397.1 thous.ha. Area of forest fund occupies 12.1 percent of Mongolian total land area. Closed forest area (country's percentage of forest land) occupies 8.56 percent of the total land area. Coniferous and deciduous forests are occupied 75.6 percent of our country forest fund and saxaul forest 24.6 percent occupy.

Forest of the country consists of 140 species tree, shrub and larch, pine, cedar, spruce, fir are conifer, birch, aspen, poplar, elm, willow, shrub are deciduous. Dominant main tree is a larch.

Today, 19 insect species (which includes 11 species of butterflies and moths, 4 species of wasps, 2 species of beetles, 1 species of dragonfly and 1 species of fly) are conserved by legal protection. However, information about their population approaches and the detailed factors influencing rates of population decline are still poor. Despite this, in recent years some species with membranous wings and aquatic insects' population approaches in Mongolia have been discovered through studies on biology and ecology of those animals and the base line of information is slowly accumulating. For example, an open population of butterfly and moth species: *Leptidea morsei* F.*, Nymphalis vau-album* (Dennis & Schiff)*., Euphydryas intermedia* (Menet)*., Triphysa phryne* (Pall)*., Coenonympha glycerion* (Bork)*., Lycaena helle* (Dennis & Schiff)*., Coenonympha oedippus* (Fab)*., Coenonympha hero* (L)*., Cupido minimus* (Fues)*., Nymphalis polychloros* (L)., whose status is categorized "extinct" and "critically endangered" in most European countries, has been recorded as occupying forest steppe in Mongolia.

The Mongolian water system is based on the following watersheds: Khalkh gol, Kherlen gol, Onon,

Shishhed, Bulgan gol, Selenge, Tes, Great lake depression and the Southern lakes valley, and Mongolia itself geographically belongs to the three main water catchments in the region, being the Pacific Drainage Basin, Arctic Ocean Drainage Basin and the Central Asian Inland Basin (Figure 1). There are 76 species of fish belonging to 46 genera and 14 families reported in these watersheds. In the Arctic Ocean Drainage Basin there are 29 species, while in the Pacific Drainage – 43 species, and 10 in the Central Asian Inland Basin.

There are 6 species of amphibians in Mongolia belonging to 4 families of 2 orders, and 21 species of reptiles in Mongolia belongs to 13 genera, 6 families of 2 suborders. Mongolia's diversity is low, compared to that of Middle Asia, Northeast Asia and Central Asian herpetoligical species, primarily due to the harsh continental climate of Mongolia.

Currently, about 472 bird species have been recorded in Mongolia, belonging to 61 families and 19 orders. There are 81 species of resident birds and 391 species of migratory birds. In addition, 254 species of migratory birds breed in Mongolia, 10 species are winter visitors from Siberia, 8 species are summer visitors and 64 species are vagrants.

Four major global migratory routes have been recognized in Mongolia: the East Asia-Australasia flyway; the Central Asia flyway; the West Pacific flyway; and the Africa-Eurasia flyway. Of these, the former two account for the majority of bird migration.

Mongolia has 138 species of mammals, which belongs to 73 genus and 23 families, 8 orders; which includes 13 species of insectivores; 12 species of chiropters; 6 species of lagomorphs; 69 species of rodents; 24 species of carnivores; 2 species of perissodactyls; 1 species of tylopoda; and 11 species of artiodactyls.

The major threats facing biological diversity of Mongolia include climate change, water shortage, changes occuring in land use and as consequence, the progression of desertification processes.

In second chapter provides an overview of the implementation of national biodiversity action plan, developed and adopted to implement the Convention in line with the requirements of Article 6 (a) of the Convention. Mongolia's Biodiversity Conservation Action Plan (NBAP) was prepared by the Ministry of Nature, Environment and Tourism with the assistance of GEF and UNDP.

There was included relevant activities implemented by all stakeholders and at all levels of government. Also, there was included the results of 2 success stories on implementation of NBSAP.

In third chapter described the Government's efforts to integrate biodiversity conservation and sustainable use into relevant sectoral and cross-sectoral plans, programmes and policies as required by Article 6 (b) of the Convention. In this chapter includes the results of integration of biodiversity conservation into sectors such as agriculture, education, health, rural development, forestry, mining and sub-national strategies and programmes, including National Plans for Achieving Millennium Development Goals, National Sustainable Development Plans, National Action Programmes .

In chapter four presented the progress towards the 2010 target. Progress toward 2010 target in the framework of fulfillment decision biodiversity components projection.

Conclusions. Most of the planned activities of the NBAP for Article 7 -20 of convention have been implemented, others are ongoing. The NBAP is widely admired and accepted, completion of the plan was followed up by government. Also, the Government made enough policy response in implementation of the NBAP. The NBAP has been integrated in other sectors and in some important economic and social development strategies of the country. As result of the above policy response of the Government, the NBAP has carried out successfully.

CHAPTER I - OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS CURRENT STATUS OF BIOLOGICAL DIVERSITY, CHANGES AND TRENDS

CLIMATE CHANGE

The results of continuous study on Mongolia's climate reveal that on average the surface air temperature from 1940 to 2007 has become warmer by **2.1˚C** throughout the whole territory; by **1.9-2.3˚C** in the mountainous regions; and **1.6˚ C-1.7˚C** in the Gobi and steppe regions. The warmer climate was observed in all seasons; however, the colder seasons of the year had temperature increases of **3.6˚C**, spring and fall seasons had temperature increases of **1.8˚-1.9˚C**. In summer season, the temperature increase was **1.1˚C** (P.Gomboluudev, 2007).

Rapid increases in the air temperature in warmer seasons coupled with no significant increases in the level of precipitation are the main reasons for dryness and drought in Mongolia.

In the past 68 years, Mongolia's annual total precipitation has dropped by 7% or 16mm. If we look at the regions, precipitation has dropped by **8.7-12.5**% in the central and Gobi regions, and rose by **3.5-9.3**% in the eastern and western regions.

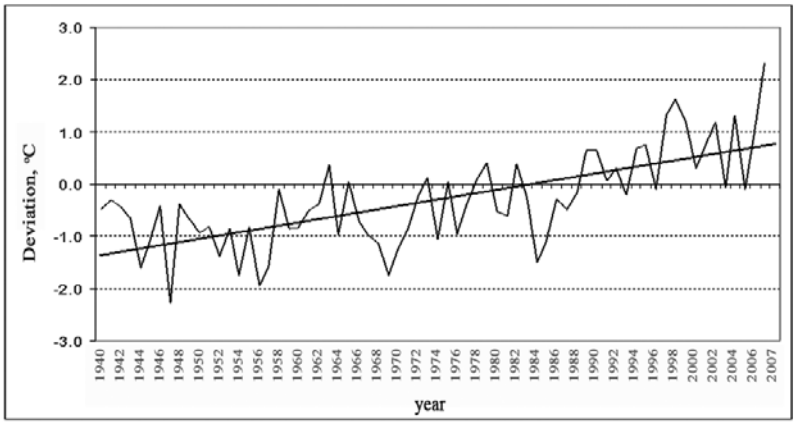


Fig. 1.1. Mean annual temperature trend in Mongolia

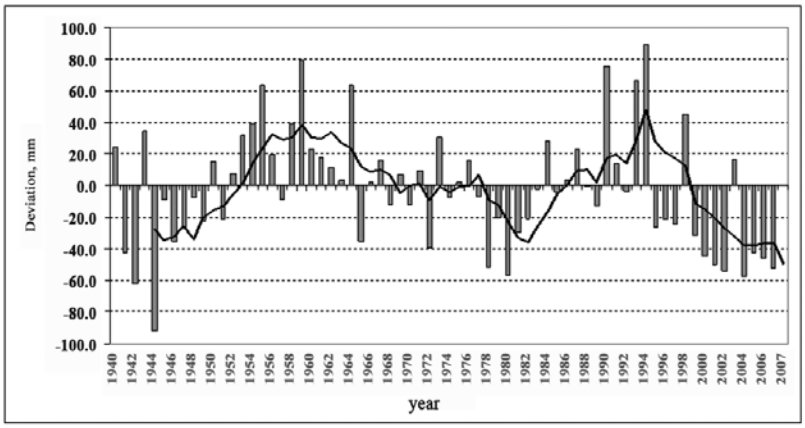


Fig. 1.2. Deviation from annual total precipitation in Mongolia

These changes have led to a decline in conditions, causing decreases in plant and wildlife species composition and populations over the territory. Moreover, to adapt to increased extreme conditions, herders tend to move and use land where the resources are available, resulting in increased movement of wildlife as their habitats are disturbed. Climate change may influence wildlife behaviour. Unfortunately, research on behavioural changes have not yet been conducted in Mongolia, which is critical to developing, adopting and implementing a suitable and comprehensive strategy for saving biological diversity.

Mongolia's mean air temperature is expected to increase on average by **1.4-1.5^{0}C** in 2010-2039, by **2.4-2.8^{0}C** in 2040-2069, and by **3.5-5.0^{0}C** in 2070-2099. The total annual precipitation is estimated to be reduced

by **4.0%** in **2010-2039,** and increase by **17.5-22.8**% in the periods 2040-2069 and 2070-2099. These figures indicate the potential risks to Mongolian biological diversity, as well as the potential threats to ecosystem services. Temperature increases may negatively influence water regulating and substance cycling regimes within ecosystems.

WATER SHORTAGE

Mongolia has limited water resources, with an estimated 34.6km^3 of surface water and a long term average of 6.1 million m^3 of ground water. Of the surface water, 83.7% is in lakes, 10.5% glaciers and river water accounts for 5.8% of the total resource.

Since 2003, the Mongolian Government has conducted water censuses throughout the country. In 2003, it was found that surface water consists of: 5,565 rivers, 9,600 springs, 347 mineral water springs and 760 lakes. An additional 683 dried up rivers, 1,484 springs, 10 mineral water springs and 760 lakes have also been recorded.

In 2007, at was estimated that there are 5,128 rivers, 9,306 springs, 3,747 lakes and salt marshes, and 429 mineral water springs. Of these, 852 rivers, 2,277 springs, 60 mineral water springs and 1,181 lakes and salt marshes were dry [Water census 2007].

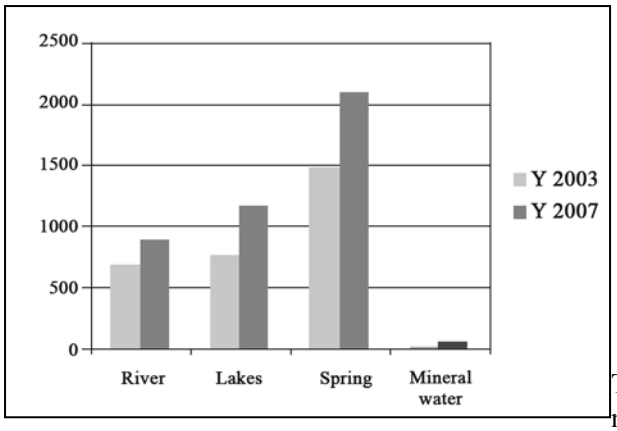


Fig. 1.3 Changes in number of dried rivers, lakes, springs and mineral water springs between in 2003 and 2007

These dried rivers and lakes are evidence that aquatic and marshy ecosystems are deteriorating. The deterioration of water environments and water shortages in turn influences many biological species, especially the bird species that rely on Mongolian lakes as a part of their migratory cycle.

Mongolia's total river discharge was 63% of that predicted by the probability curve (or 24.1km^3) in 2004 and 75% (or 24.9km^3) in 2005. In these years the discharge was less than the long term average by 30.3% and 27.9% in 2004 and 2005, respectively. These two years are examples of a longer-term low flow period which has continued for the past 9 or 10 years. Dried surface waters from previous years have been unable to recover due to this extended dry period. Mongolia's total river discharge increased slowly from 1978, reaching a maximum of 78.4km^3 in 1993. Between 1978 and 2000, flows then slowly decreased with consecutive years recording low flows, for example 19km^3 /year in 2000. In 2001 the discharge then increased by 7km^3/year, before drying again in 2002 and 2003. Low flow years with a probability of one in four or five years occurred in both 2004 and 2005.

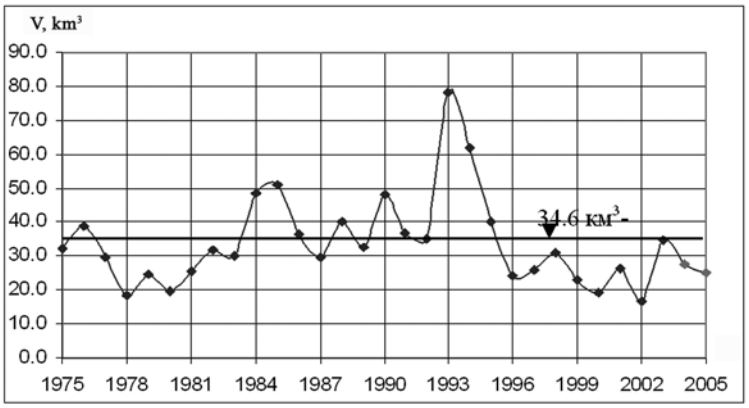


Fig. 1.4. Mongolian river discharge fluctuations (km^3/year)

Due to the severe climatic conditions of Mongolia, there are often consecutive low flow years. For 17 years, from end of the 1960s until the beginning of the 1980s, there was a low flow period and many rivers, including the Ulaan Tsutgalan waterfall, ceased to flow. During this time, five lakes in the Gobi region dried up: the

Orog, Taatsiin Tsagaan, Adgiin Tsagaan, Haya and Ulaan. Another dry period began in 1996 and has continued for 13 years until the present: of the lakes of the Gobi valley, Taatsiin Tsagaan, Adgiin Tsagaan, and Ulaan are still dry, and Orog dried up in 2005. This dry period is more severe that of the 1960s, 70s and 80s.

Normalized vegetation indices and recorded deviations have been calculated for many river basins and used to identify changes in plant cover. These changes clearly illustrate that forest and plant cover in the majority of the country's river basins has deteriorated. This affects river water resources and regimes.

Surface water volumes originating from glacial melt have continued to increase and are feeding many lakes and rivers which dried during previous dry periods. Data from 1940 to 2002 shows that the total area of glaciers decreased by an average of 30%, and specifically, the Harhiraa glacier area decreased by 37.5% and the Turgen by 21.4%. Moreover the Tsambagarav mountain glacial area decreased by 13.4% in 1992, 28.8% in 2000 and 31.9% in 2002, compared to the area recorded in 1940 [G.Davaa et. al. 2005].

Related to this, some lake water levels have been increased through glacial discharge into rivers. There are urgent issues to be addressed and implemented by basin councils and through public participation, requiring the development of scientific basis for integrated basin management policy and planning in future. Changes in the water regime resulting from new climate changes and anthropogenic influences in River Basins also require consideration.

LAND USE AND DESERTIFICATION

At the end of 2006, the Land Fund of Mongolia comprised of:

* 116,037.7 thousand ha or 74.2% of agricultural land,
* 489.8 thousand ha or 0.31% of land for towns, villages and other urban settlements,
* 359.2 thousand ha or 0.23 % of land under roads and networks,
* 14,299.5 thousand ha or 9.14% of land with forest resources,
* 666.1 thousand ha or 0.42% of land with water resources,
* 24,559.3 thousand ha or 15.7% of land for state special purposes.

The majority of land is used for livestock breeding, i.e. rangelands and grasslands. As at 2006, a total of 74.2% of land was occupied by rangelands. Pasture degradation as consequence of climate change and changes occurred during socio-economic development post-1990 became a major threat in biodiversity of grasslands. In 2007, a total of 12.3ha of land is degraded. The privatization of livestock during 1990s caused increased interest in using as much land as possible for livestock breeding. This caused not only a decline in species composition of grasslands, but also the invasion of allien species. According to research conducted in Bulgan Soum of Omnogobi, the biomass of species such as Stipa mongolia and Cleistogenes species have decreased by 30-50 % over past decade and the natural regeneration accounts for only 1-1.5% [Undarmaa et al. 2006]. In Bayan-Onjuul soum (in the central part of Mongolia), invasion of Ephedra species resulted in unfavorable conditions for livestock breeding and degradation of soil structure (Gunin, Baja et al., 2008).

At the national level, 350.1ha of cultivated land was damaged, out of which 82,020.3ha was damaged by wind, 12,284ha by water, 78,642.1ha with degraded productivity, 16,5371.1ha destroyed by rodents and pests, 210ha with degraded soil, 5,600ha affected by the most hazardous weeds, and land affected by other causes is 6,019.6ha. Compared to 2006, damage to cultivated land increased by 8,300ha.

The rapid development of the mining sector has had a negative impact on land quality, especially in mountainous areas and drylands. According to research, exploration activities resulted in significant impacts on territory in aimags including Arkhangai, Bayankhongor, Ovorkhangai, Tuv and Selenge. Mining results in not only changes to relief and soil cover, but also in distribution of macroinvertibrates in major rivers. For instance, Selenge river basin is the habitat for 8 species of insects and 1 specie of mollusk listed in the Red Book of Mongolia. However, due to the operation of gold mining activities in Zaamar region, distribution of seven species has been significantly impacted (http://www.iwrm-momo.de).

All those factors influence desertification process. Desertification became a significant issue and research in this field started from 1980s. According to recent research, 71.8% of the total territory are more or less desertified (Mandakh, Dash, 2007). Much of the Mongolian grassland and rangeland are desertified, suggesting a high risk of abandonment of the land.

ECOSYSTEMS

Steppe ecosystem

(a) State of biodiversity: Steppe ecosystems of Mongolia are famous around the world for their wilderness qualities and as large extent of grassland untouched by human activities. This is habitat for a large population of small and large mammals and migratory birds which exist in other similar ecoregions but are endangered or extinct. Species such as gazelle, gray wolf, a variety of crane species and the Mongolian marmot are considered rare, endangered and under threat of extinction.

Dominant species in steppe ecosystems include drought-resistant grasses (*Stipa gobica, S. breviflora,* and *S. glareosa*), forbs (*Reaumuria soongolica, Hippolytia trifida,* and *Ajania fruticosa*), and small, spiny shrubs that are well-adapted to arid conditions (*Caragana microphylla, Ephedra equisetina,* and *E sinica*). Other plant communities include: *Kalidium gracile* in areas of saline soils, and salt marshes dominated by *Scirpus rufus, S. planifolium, Ranunculus cymbalaria,* and *Phragmites communis*.

(b) Trends: Grasslands are under extensive use and their ecosystem integrity and sustainability is degrading. Moreover, the influence of climate change, especially increasing impact of drought, poses a potential risk to steppe ecosystems including a reduction in their size.

(c) Threats: The main threat to steppe ecosystems is livestock breeding, especially unregulated increase of livestock numbers and flock composition. Other threats are defined by climate warming, mining industry activities and socio-economic changes in use of natural resources.

Dryland ecosystems

(a) State of biodiversity: The dryland region in Mongolia is called the Gobi, which is comprises desert steppe, steppe-desert, semi-desert and desert ecosystems. The Mongolian Gobi is a unique relic ecosystem of Asia where species such as Nitraria app., Zygophillum xantoxylon, Halimodendro ammodendron, Gymnocarpos Przewalskii maxim, khoirgo and ulaan tulam are distributed. Within the larger Gobi ecoregion, Zygophillum species and Gymnocarpos przewalski occur in the Alshaa Gobi and piedmonts of Ordos mountains, while Ephedra przewalski and Nitraria spp. are widely distributed in the Southern Altai Gobi and Alashaa Gobi, which are independent formations.

Another unique feature of the Gobi is its oases, which form a favorable habitat for dryland wildlife and relic formation, which has also ensured conservation of specific plant species. Thus, these oases should protected with specific focus on the ecological services they provide (L. Chimidregzen, 1998). The Gobi provides habitat for wildlife including the mongolian wild ass, bacterian camel, mazaalai bear, jerboa and Phrynocephalus versicolor, and in mountainous areas, the wild sheep, wild goat and snow leopard, which are listed as rare and endangered species.

(b) Trends: The vegetation cover of the Gobi is mainly influenced by human induced factors, such as overgrazing, mining and illegal collection of plants. Habitats of plants are fragmenting under the influence of these factors, as well as the contribution of climate change impacts. As for wildlife, the decrease in populations in this part of the country are considered natural process (Great Gobi project, 2001-2007).

(c) Threats: The main threat for the Gobi ecosystem comes from warming processes and drought (as mentioned above), occurring across the vast area.

VEGETATION AND PLANTS

The vastness and spaciousness of Mongolian territory together with its high mountain ranges, sudden depressions, rolling steppes and Gobi Desert, as well as, its extreme continental climate, are factors influencing the country's vegetation cover.

The gradual transitional changes from the high mountain taiga through to the mountain forest steppe and flat grassy plains on to the semi-desert and true desert areas, represent the specific features of the world's three basic vegetation regions. This variety is also reflected in the change in precipitation and distribution of plants, starting from the foot hills to the top of the mountain ranges, in vertical belts. So, on the basis of such contrast in nature, Mongolia has been divided into the 6 natural belts and zones, comprising high mountain alpine belt, mountain taiga belt, mountain forest steppe, rolling steppe, semi-desert and desert zones (Table 1.1).

Table 1.1 Vegetation belts and zones, area percentages

№	Vegetation belts and zones	Square км ^{2}	percentages
1	High mountain (alpine) belt	56394,0	3,6
2	mountain taiga belt	70492,5	4,5
3	mountain forest steppe	238108,0	15,2
4	Steppe zone	535743,0	34,2
5	Semidesert zone	366561,0	23,4
6	Desert zone	299201,5	19,1
	Total	**1566500,0**	**100,0**

High Mountain (Alpine) Belt. The High Mountain Belt is divided into four sub-belts: summits, lower summits, alpine and sub-alpine. The summits consist of perpetual snow-capped peaks (some their crevices filled with ice), barren rocks and gravel. The sub-alpine belt is an area conducive to growing crustome, lichen, moss, yernic (low birch), Dryas tundra, cryophytic *Kobresia, Carex-Kobresia* and moss-Sega meadows, along with the tundra plant communities. In addition, there are some scarce Pines (*Pinus sibirica)* and Larches (*Larix sibirica).* These are the general features of the vegetation of the high peaks of the Mongolian Altai, Khangai, Khuvsgul, Khentii and some parts of the Govi-Altai mountains.

Eight percent of high mountain alpine belt is distributed in the Huvsgul mountains, 0.9% in the Khangai mountains and 1.9% percent in the Altai mountains.

Mountain Taiga Belt. The alpine and sub-alpine belts are dominated by Pines *Pinus sibirica* and Larches *Larix sibirica* combined with bunch grasses, dwarf shrubs and steppe grasses. The general term for these belts is "Taiga". This zone includes the Khangai and Khentii mountains which belonged to the great Trans Baigal mountain taiga region and it is occupies 4.5%of Mongolian territory,% is distributed in Huvsugul and 1.5% in Khentii mountains. The climate is wet and cold, the annual precipitation is 400-500 mm and due to warmth deficiency, the plant growing season is short. The forest is dominated by Pinus sibirica and Larix sibirica.

Mountain Forest-Steppe. This belt comprises the convergence of high mountain, taiga and steppe plants, including *Poa, Koeleria* and their "cushion" communities. This belt is dominated by *Rhodicoccum, Carex, Koberisia,* Larches *Larix sibirica* and Birch species and the plants of steppe meadows and river banks.

This zone has unique, rare vegetation including Adonis mongolica and Saussurea involucrata plant species.

Steppe Zone. This zone is divided into 3 subzones: meadow steppe, typical steppe and dry steppe. The steppe zone occupies a far greater area than another zones, covering 34.2% of Mongolia. Of this 4.3% is meadow steppe, 10.1% is typical steppe, 14.3% dry steppe and 5.5% IS mountain steppe.

The Mongolian steppe has some species of Caragana and Artemisia frigida as xerophytes shrubs.

Semi-desert steppe zone. This zone has dry steppe plants, including *Artemisa frigida* and *Caragana*. At the same time, it also includes the plant species of transitional zones which are influenced by the Central Asian desert vegetation cover.

The climate is dry and arid, annual precipitation 100-200 mm, soil cover is thin and Caragana bungei exist as relict plant species.

Desert Zone. This zone is divided into three sub-zones: semi desert steppe, typical desert and extreme (arid) desert. *Allium polyrrhizum, Stipa gobica* and some semi-dwarf shrubs grow throughout these sub-zones, especially along the boundaries of the steppe zone. The vegetation cover of the desert steppe is dominated by semi-dwarf and dwarf shrubs.

This zone occupies 19.1% of the Mongolian territory, and of this 6.2% belongs to the semi desert steppe, 9.2% to the typical desert and 3.7% to the arid desert. The climate is an extreme continental climate with annual precipitation of 50-100 mm. Vegetation is dominated by rare and endemic plant species including: Populus diversifolia, Incarvillea potaninii, Ammopiptantus mongolicus and Halimodendron halodendron.

Vegetation of areas not belonging to any belts or zones. These are mainly hollows and valleys abutting rivers, streams, ponds and oases, meadows with woody shrubs (which are usually found in valleys), *Betida*

platyphylla and *Populus* groves, and *Achnatherum splendens.* These landscape varieties occur in all belts and zones except in the alpine mountain belt.

Geographical Vegetation Regionalization. Mongolian territory is divided into 16 regions on the basis of physiography, soil and climate. The number of species and the types of vegetation differ greatly across regions. The composition of the vegetation cover of the Mongolian Altai, Khangai, Khentii, Khuvsgul and Mongol Daguurian regions is comparatively richer than other regions (Table 1.2).

Table 1.2 Vegetation regions, area percentages and number of species

Region	Area percentage	**Number** species
Khuvsgul Mountain Taiga	4.96	886
Khentii Mountain Taiga	3.05	977
Khangai Mountain Forest Steppe	17.59	1214
Daguur Mountain Forest Steppe	6.6	946
Khovd Mountain Steppe	1.98	657
Mongolian Altai Mountain Steppe	7.02	1020
Khangai Mountain Steppe	0.87	465
Middle Khalkha Steppe	11.54	509
Eastern Mongolian Steppe	3.94	539
Desert Steppe of Depression of Great Lakes	6.11	666
Desert Steppe of Valley of Lakes	3.18	346
Desert Steppe of Gobi-Altai mountains	5.02	710
Desert Steppe of Eastern Gobi	9.35	327
Alashaa Gobi	6.43	183
Trans-Altai Gobi	5.72	326
Jungarian Gobi	1.62	483

1. Khentii Mountain Taiga region. This region contains the Khentii-Daurian mountain areas and it is covered by mixed forests of Pine: Pinus silvestris, Larch: Larix sibirica, secondary Birch and Aspen. In this region there are 977 vascular plant species, of which 844 are various grass species and 133 woody and shrub-like plants. This region occupies 3.05% of the Mongolian territory.
2. Khuvsgul Mountain Taiga region. To This region belonged the areas around Khuvsgul lake, average elevation of main mountains is 2500-3200 m. Vegetation cover of this region is dominated by Larches: Larix sibirica and Pines: Pinus sylvestris. Additionally, there are mixed forests of Birch: Betula rotundifolia and Pine: Pinus sibirica. This region occupies 4.96 % of Mongolian territory and contains 886 species of vascular plants, of which 768 are grass species, and 118 woody and shrub-like species.
3. Khangai Mountain Forest Steppe region. This region contains the Khangai mountain area and includes a combination of plant species from the Great Siberian Taiga in the north, the Eastern Mongolian Steppe and the Daguurian mountain steppe in the south. There are 1214 vascular plant species, of which 151 are various types of grass and 1063 species of woody and shrub-like plants.
4. Mongol Daguurian Mountain Forest Steppe region. The vegetation cover in this area contains a variety of grasses, Larches: Larix sibirica, and Pines such as Pinus sibirica and Pinus silvestris. The region, however, is dominated by plant species originating from the mountain steppe. There have been 946 plant species found here, of which 831 are different types of grasses and 115 woody and shrub-like species.
5. Khovd Desert Steppe region. The Mongolian-Altai and Siilkhem mountain areas are found in this region, which is dominated by the grasses of the arid steppe. At present, there are 657 vascular plant species registered; and of these, 559 are various kinds of grasses and 98 woody and shrub-like plant species. This region occupies 1.98% of the Mongolian territory and it is flora consists of a combination of psychrophytes and xerophytes plants of the Altai-Sayan and some plant species of Gobi-desert.
6. Mongolian Altai Mountain Steppe region. This region has a combination of vegetation from the high Altai mountains and northern forests, from Gobi (desert, desert steppe) areas, Kazakhstan's (Dgungarian-Turanian) deserts and steppes. It occupies 7.02% of the Mongolian territory and contains1020 vascular plant species. Of these, 889 species are grasses, and 131 species are woody and shrub-like plants. The vegetation cover of this region is dominated by Koberica, Carix, Stipa, Poa, Festuca, Larches: Larix sibirica and Pines: Pinus silvestris.
7. Khyangan Mountain meadow-steppe region. This region includes the branch mountains areas of Great Khyangan mountains, with their average elevation of 1000m. Tthe flora of this region is dominated by

elements of Manchurian flora and subdominated elements of Daurian Mongolian steppe and Eastern Sibirian taiga flora.

8. Middle Khalkha's steppe region. This region includes the eastern parts of the Khangai mountains and central Mongolian rolling steppe areas in the south of Ulaanbaatar. The average elevation of the central mountains is in the range of 1349-2180m. This region occupies 11.54% of the Mongolian territory. Most parts of this region are dominated by Stipa baicalensis- Cleistogenes squarrosa, Stipa baicalensis-Artemisia frigida, Stipa baicalensis-Carex duriuscula, Stipa krylovii-leymus chinensis, Stipa krylovii-Allium polyrrhizum, Caragana-Artemisia frigida plant communities. This region has 509 vascular plants with 446 kinds of grass and 63 woody and shrub-like plant species.
9. Eastern Mongolian Arid-Steppe region. To this region belongs the Eastern Mongolian rolling steppe, where the vegetation cover consists mainly of communities of Stipa krylovii- Koeleria cristata, Stipa krylovii-Filifolium sibircum, Filifolium sibiricum-Stipa grandis. This region is influenced by the Daguurian species from the north, Mongolian desert steppe species from the south, and Manchurian species from the east. The flora of this region consists of 539 vascular plants with 479 kinds of grass and 60 woody and shrub-like species
10. Desert Steppe region of the Depression of Great Lakes. The region is situated on the plain between the Mongolian Altai, Khangai and Tagna mountains. The length of the Depression is 600-650m, and the width is 200-250 km in the north and 50-100 km at the southern end. Vegetation cover of this region is characterized by the deserts and desert-steppe plants. For instance, the hollow of Uvs Nuur sub-region is mainly covered by such communities of plants belonging to the Djungar- Turanian deserts of Kazakhstan (for example, Nanophyton, Ceratocarpus species, Artemisia leucophylla, Artemisia schrenkiana, Salsola passerina and Stipa gobica). The central part of the region includes Stipa gobica-Anabaisi brevifolia, Stipa gobica-Artemisia frigida, Reamuria spesies, and on the periphery, the plant communities of Stipa gobica-Cleistogenes squarrosa, Stipa gobisa-Allium pollyrrhizum, Stipa gobisa Artemisia frigida gobica- Allium polyrrhizum. In this region, 666 vascular plant species have been registered with 570 kinds of grass and 96 woody and shrub-like species.
11. Desert-Steppe Region of the Valley of Lakes. This region is situated on the plains in the relief between the Khangai, Mongolian Altai and Gobi-Altai mountains. The average elevation is 1000-1400 m, the length of the valley is over 500km with a width of 150km. The dominant species are Stipa, Gleistogenes and Caragana genus. At present, 346 species of vascular plants have been found with 296 kinds of grass and 50 woody and shrub-like species. The special feature of this region is, that it has plant species from the desert, steppe and Khangai mountain, adapted to the dry climate.
12. Desert Steppe Region of the Gobi-Altai Mountains. This region has plant communities originating from the desert-steppe and the meadows are dominated by the Festuca and Koberisia, Carex species. However, the region is mainly dominated by plant species from the Gobi desert, with their connections to the Baikal-Daguurian flora from the Ice Age, especially in its mountain ranges. Accordingly, the higher sub-belts in the region have some elements which belong to the Altai-Sayan mountains and Tibetan High Land flora. In total, 710 vascular plants including 596 kinds of grass and 114 woody and shrub-like species have been registered in this area.
13. Desert-Steppe Region of Eastern Gobi. This region is located in the far east of the Gobi, an area of rolling steppe at the eastern edge of the Gobi-Altai mountain range, to the east of Valley of Lakes. The average elevation is 1100-1200m. Vegetation is at maturity and dominated by Stipa gobica, Stipa gobica-Cleistogenes soongarica, Stipa gobica - Allium polyrrhizum desert steppe communities. The sub-region, called Baynzag Holloi, includes almost all of the elements characterizing the Mongolian desert-steppe zone. In this region, 327 vascular plants including 259 kinds of grass and 68 woody and shrub-like plant species have been found.
14. Desert Region of Alashaa Gobi. Common plant species in this region are Salsola passer ina, Anabasis, Potaninia, Zydophyllum, Iijinia, Ajania, Reaumuria, Haloxylon and Nitraria. It is also the site of an ancient desert characterized by Salsola laricifolia originating from the Paleocene and Miocene periods. A total of 183 vascular plants with 130 kinds of grass and 53 woody and shrub-like species have been registered here.
15. Desert Region of Trans-Altai Gobi. In this region, 326 vascular plants including 259 kinds of grass and 67 woody and shrub-like plant species have been found. There is desert community of Gamad.
16. Jungarian Gobi Desert Region. This region includes a mixture of plant species from the Gobi Desert, Northern Turanian, Jungarian and Mongolian Altai –Gobi, Mongolian Altai-Djungarian flora. Altogether, 483 vascular plants including 402 types of grass and 81 woody and shrub-like species have been discovered (Fig. 2).

Mongolian vegetation presents those special features which have developed through time because of local landscape forms, the organic environment and extreme continental climate. Therefore Mongolian flora characterized by a mixture of elements of Central Asian, Mongolian Daguurian, Manchurian, Tuva-Mongolian, Central Kazakstan-South Altai-Dungarian and Dungarian desert plants.

Mongolian flora was first studied by a Mongolian-Russian biological expedition and as a result, there have been 2950 vascular plant species belonging to 680 genera and 38 families registered in Mongolia. Compared with study results from 1998, the number of vascular plant flora has increased by 10 families, 20 genera and 130 species (Table.1.3).

Table. 1.3 Comparative study in Mongolian vascular plants

Classification name	1998	2005	2008
Family	128	134	134
Genera	662	666	680
Species	2823	2900	2950

Table. 1.4 Species number of new registered vascular plants in Mongolia.(1998-2008)

№	Family name	Genera name, number	Species name, number
1	Pteridiaceae	1	3
2	Rosaceae	1	1
3	Pyrolaceae	Myosotis (1)	Myosotis caespitosa (1)
4	Asteraceae	3	60 гаруй зүйл
5	Liliaceae	Veratrum (1)	1
6	Iridaceae	Iris (1)	Iris sibirica (1)
7	Cyperaceae	Carex (4)	4
8	Poaceae	Poa (1)	6
9	Other		Over 50
	Total 10	***20***	***130***

The priority families by species number in Mongolian flora are Asterasea (407 species), Fabaceae (312), Poaceae (250), Rosaceae (140), Brassicaceae (135) and their species number with compared to the 1998 flora study has increased as follows: Asteraceae by 104 species, Fabaceae by 80 species, Poaceae by 45, Rosaceae by 39 and Brassicaceae by 18 species.

Table 1.5 The Priority Families in Mongolian flora, species number and percentage

	B.I.GRubov (1982)		N. Ulziikhutag (1989)		I.A.Gubanov (1996)	
Families	Species number	Per cent	Species number	Per cent	Species number	Per cent
Asteraceae	303	I	338	I	407	I
Fabaceae	232	II	252	II	312	II
Poaceae	205	III	226	III	250	III
Rosaceae	101	VI	113	VI	140	IV
Brassicaceae	117	IV	119	IV	135	V
Cyperaceae	109	V	118	V	127	VI
Ranunculaceae	93	VII	106	VII	119	VII
Chenopodiaceae	86	VIII	89	VIII	90	VIII
Lamiaceae	67	XI	72	XI	86	IX
Caryophyllaceae	74	IX	75	IX	83	X
Scrophulariaceae	68	X	73	X	77	XI
Polygonaceae	54	XIII	56	XIII	67	XII
Apiaceae	55	XII	59	XII	66	XIII

Mosses. Mosses were first studied in Mongolia at the beginning of the 1970s. Mosses have been studied in much greater depth in the northern Khangai, Khuvsgul and Khentii mountain regions than in the southern steppe, desert steppe and desert zones.

At present, there are 445 species of moss belonging to 191 genera and 59 families in Mongolia. Of these, 53 species in 33 genera and 21 families belong to a group of moss called liverworts, and the other 392 species

in 135 genera and 38 families belong to moss. It is evident that these figures will change in the future, after new field research on unknown moss regions of the country is conducted. This part of the report contains data only on the moss species which have been studied in detail.

Table 1.6 Species and large families of Moss

Family	Number of Genera	Number of species	Percen-tage	Genera	Number of species	Percen tage
Dicranaceae	15	38	10.0	Tortula	20	5.2
Pottiaceae	9	37	9.7	Sphagnum	17	4.5
Amblystegiaceae	10	36	9.4	Grimmia	17	4.5
Trichostomaceae	14	34	9.1	Bryum	16	4.2
Bryaceae	8	33	8.8	Dicranum	15	3.9
Grimmiaceae	6	29	7.6	Barbula	14	3.6
Hypnaceae	6	17	4.5	Mnium	13	3.3
Sphagnaceae	1	17	4.5	Pohlia	12	3.0
Brachytheciaceae	6	15	3.9	Hypnum	11	2.7
Mniaceae	2	14	3.6	Drepanocladus	9	2.4
Polytrichaceae	2	11	2.9	Polytrichum	9	2.4
Thuidiaceae	5	11	2.9	Brachythecium	9	2.4
	7	11	2.9			
Total	91	303	79.5	Total	162	42.5

The species composition of the large families show the same distribution pattern which characterizes moss communities in the cool Holarctic Taiga region, but the presence of the *Pottaceae, Trichostomaceae* and *Grimmaceae* families suggest a strong influence of the dry climate on this flora. Notably, while the *Amblystegiaceae, Sphagnaceae, Hypnaceae* and *Bryaceae* families exhibit taiga features, the *Pottaceae, Trichostomaceae, Orthotriachaceae* families express similarities with the moss classes of the primordial sea region. The *Mniaceae, Thuidiaceae* and *Brachytaceae* families reflect links with the moss families of Eastern Asia, and the *Grimmiaceae* family resembles moss cummunities in the mountainous areas. The composition of the more prevalent species show more clearly mixed features.

The main taiga species: *Tortnla* and *Barbula,* from arid areas; *Mnium, Brachytecium* and *Hypnum,* the deciduous forest species; and *Dicranum, Drepanocladus* and *Polytrichum* species from the cool taiga, are the most prevalent moss species in the flora. Such mixed species composition which characterizes plant groups in the transient areas between the North-Asian taiga and the Central Asian desert and steppe, can be observed not only among higher plants, but even more clearly among moss groups.

In the steppe and Gobi desert zones, moss species are comparatively scarce. However, in the mountainous regions of Khangai, Khentii, Mongolian Altai and Khuvsgul, moss species are common; as with other plant groups, moss communities also exhibit specific features according to the zones and belts in which they exist. Moss species are most abundant and common in the forested mountain belts where more than 80% of all kinds of moss grow. Moss are forest generalists but they can be divided into ecological groups like top soil, epicsil and epilite species. The composition of the epicsil, etiphite and epilite moss species in the forest gradually change from the lowest level upwards, but the lower parts of the mountainous forest steppe or forests in the subtaiga contain more rock, epicsil and tree bottom moss species. From the middle parts of the mountain forest steppe belt upwards, the climate becomes cooler and more humid. In the forests, grass plants become sparse and moss species cover the ground. The number of some epicsil and tree bottom moss species decreases in these areas. The forests in the lower parts of the subtaiga in the forest belt contain a variety of grass but fewer moss species. The total number of plant species, however, is relatively high in the lower parts of the forest belt. In the taiga forests of the upper part of the mountainous taiga forest steppe, the moss cover increases up to 80 to 100 per cent, while the number of species increases and the species composition becomes more versatile.

Lichens. Out of more than 16 000 species of lichen known in the world, 999 lichen species belonging to 191 genera and 53 families have been discovered in Mongolia. Only the largest of these families have been included in Table 1.7.

Table 1.7 Species composition of largest families of Lichens

№	Family name	Number of genera	Number of species	Percentage of lichen population
1	Parmeliaceae	20	127	13.7
2	Physciaceae	11	81	8.7
3	Lecanoraceae	10	64	6.9
4	Acarosporaceae	6	60	6.5
5	Verrucariaceae	11	57	6.1
6	Hymeneliaceae	5	55	5.9
7	Cladoniaceae	1	53	5.7
8	Collemataceae	2	50	5.4
9	Teloschictaceae	4	45	4.8
10	Umbilicariaceae	2	31	3.3
11	Bacidiaceae	6	31	3.3
12	Peltigeraceae	3	28	3.0
13	Lichenaceae	13	24	2.6
14	Alectoriaceae	2	18	1.9
15	Phizocarpaceae	2	18	1.9
16	Pertusareaceae	2	17	1.8
	Total	100	659	

A total of 70.9% of Mongolian lichen belongs to 39 large genera, such as *Parmela, Cladonia, Aspicilia and Lecanora*. These large families include 659 species.

Mongolian lichen has the characteristics of Holarctic, Ancient Mediterranean and East Asian flora. Such families like *Physciaceae, Cladoniaceae, Peltigeraceae* and *Usneaceae* are Holarctic and some species belonging to the *Lecanoraceae, Acarosporaceae, Verrucariaceae, Collemataceae* and *Teloschictaceae* families have the characteristics of the ancient Mediterranean Sea lichen.

The species belonging to the family *Umbilicaria* and *Paltigeria* are distributed only in Mongolia. Such species like Toninia gobica and Peltula zaboeotnoji are endemic, Endopyrenum minutum, E.mongolicum, Psarotichia dispersa are subendemics and are distributed in desert, desert steppe and steppe zones. However, endemic species Aspicilia changaica, and subendemic species Rhizoplaca baronowii, Acarospara fulva, A. sarcogynoides and Aspicilia miknoi, are distributed only in the forest steppe zones of Mongolia.

Algae. The diversity of Algae and their distribution and abundance is of great ecological and economic importance because they are primary producers of food and fertilizers, which in turn sustain all life on Earth. One of the main objectives of science today is to try to find new protein sources. Algae are rich in protein, vitamins, microelements and aminoacids. Many countries like, for example, Malaysia and Philippines cultivate *Chlorella* for food. Both of these countries harvest around 500 tonnes, and Taiwan, around 1500 tonnes of *Chlorella,* annually. *Chlorella* is a rich vitamin source.

Chlorella algae are cultivated and used as food and industrial raw materials in Japan, Canada, USA, France and Korea. The soil algae play an important role in maintaining environmental balance and protecting the soil from erosion and loss of moisture by absorbing mineral elements. In addition, their slimy shells promote soil density.

The bluish-green Algae absorb nitrogen from the air and contain phosphorus and potassium. They are used as fertilizers; for example, in Mexico, 3000 tonnes *of Spirilla* are cultivated for fertilizing rice plantations, annually, and they can also be used as food.

There are several valuable species of Algae in Mongolia like *Nematonostoc, flagelliforme, Chlorella,* and *Nostoc commune*, and Spirulina and Calothrix which are used as food.

Species composition and distribution. Based on field research conducted in Mongolia in the 1970s, 1288 species and sub species belonging to 10 classes and 293 genera have been recorded. Of these, 847 species (10 classes, 216 genera) belong to the Arctic ocean basin, 481 species (9 classes, 148 genera) to the Pacific Ocean Basin and 560 species (8 classes, 191 genera) to the Central Asian Inland Drainage basin.

Ecological distribution of Algae is specific: 488 species are distributed in Lakes, 256 species in rivers, 339 species in the rivers and lakes, 51 species in soil and 154 species in other places.

Table. 1.8 Algae species composition in Lakes, rivers and soil (2008)

N°	Class	family	genera	Species, sub species	Percent %
1	Cyanophyta	16	59	200	15,5
2	Euglenophyta	1	4	18	1,3
3	Dinophyta	1	4	9	0,7
4	Cryptophyta	1	2	4	0,3
5	Chrysophyta	3	10	23	1,8
6	Bacillariophyta	37	79	582	45,1
7	Xanthophyta	7	7	14	1,1
8	Rhodophyta	2	2	2	0,2
9	Chlorophyta	34	122	425	33,1
10	Charophyta	2	2	11	0,9
	TOTAL	105	293	1288	100

Mongolian Algae flora has been increasing due to new registered algae species.

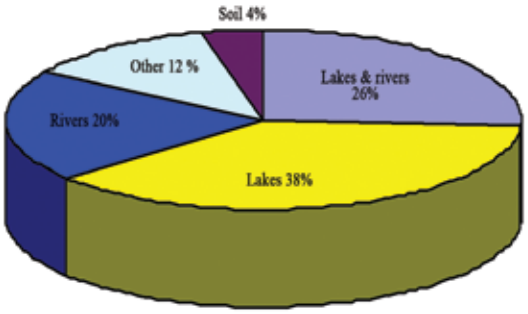


Fig. 1.5 Ecological classification of Algae

Relict (primitive) and endemic plant species of Mongolian Flora. Mongolia does not have endemic genus in flora, but **m**ore than 149 endemic and 140 subendemic species have been found in Mongolian flora. These species include Oxytropis, Astragalus, Saussurea, Potentilla genuses and Fabaceae, Asteraseae and Brassicaseae families.

The endemic plants have been divided by their origin times and age to the paleo-endem and neo-endemics. Those originating to the paleo-endemics belong to ancient desert and steppe species, whereas the Mongolian Altai and Khangai mountains' species are neoendemics. For example, ancient endemics are Sympegma Regelii Bge, Brachanthemum gobicum Krasch, Amygdalus mongolica Maxim, Potaninia mongolica Maxim, Ammopiptanthus mongolicus (Maxim. ex Kom) Cheng f, Incarvillea Potaninii Batal and neoendemics are Potentilla Khenteica, Potentilla Ikonnikovii Juz, Festuca venusta St.ves, Alchemilla Khangaica,

More than 100 species of primitive (relict) plant species have been found and include *ancient desert relicts*: Ammopipthantus mongolicus, Zygophullum xanthohylon, Ephedra przewalskii, Reaumurea soongarica, Iljinia regelii, Sympegma regelii; *ancient forest relicts:* Populus diversifolia, Halimodendron halodendron, Tamarix ramossisima; *ancient savanna relicts:* Oxytropis grubovii, Caragana tubetica, Caragana brachypoda Pojark; *relict species of frozen period*: Caragana jubata, Saussurea involicrata, Allium altaicum Pall, Ptilagrostis mongholica (Turcz. ex Trin.) Griseb, Lancea tibetica, Abies sibirica; and relict species of lakes: Nymphaea tetragona Georgi and Nuphar pumila (Timm) DC.

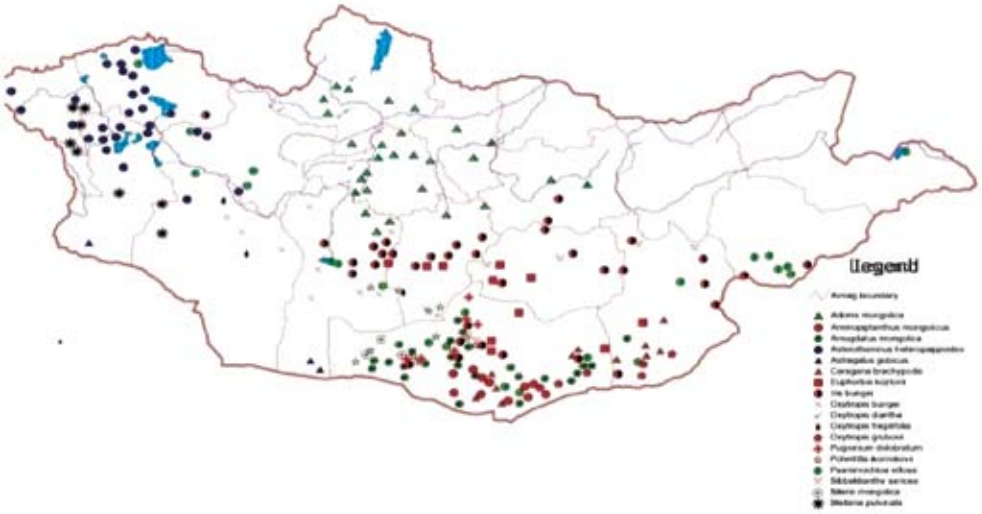


Fig.1.6. Disrtibution of some endemic species in Mongolia

Endangered and Threatened Plant Species. The subject of conservation, sustainable use and restoration of Mongolian plant species should be considered in the context of plant ecology and biology.

There have been 128 plant species registered as endangered and threatened in the second edition of Mongolian red book (1997). This group lncludes 75 medicinal species, 11 for food, 16 species used in industry, 55 decorative species and 15 species used in the soil fixing process and in controlling pests.

More than 100 species of plants are currently used for medicinal purposes and more than 200 species are used for pharmaceutical purposes. Additionally, 200 species are used for tea, 50 species for food and over 100 species are important for livestock feed. It must be emphasized, however, that because of the intensive use of more than 80 species for food and other purposes, the numbers and resources of species like Sausurrea involucrate, Allium altaicum, Sophora alopecuroides, Glycyrrhiza uralensis, Gentian algida, Cynomorium soongaricum, Allium oblicium and many others are decreasing rapidly today in Mongolia. For example, since 1998, the biological resource of Glycyrrhiza uralensis has been decreased by a factor of 6.6and the industrial resource by 7.2. Saposhnokovia divaricata is an important medicinal plant distributed in the eastern parts of Mongolia, with a 17.8 tonne biological resource and a 110.7 tonne industrial resourse, however, now some 5=6 tonnes is being prepared annually for foreign export.

Threats. The traditional way of using pasture resources is highly adapted to the climate fluctuations and environmental changes that have occured for many thousands of years. However, during the last half of the past century, the increasing impact of human activity (increase in livestock numbers, rapid development of extractive industries, road construction, fire etc.) have resulted in drastic changes, both to the global climate and locally. In Mongolia, the result has been overgrazing of vast areas of pasture land and deterioration of vegetation cover, resulting the intensification of desertification processes.

Changes in vegetation cover have also influenced grazing patterns. Currently, there is a total of 128 million ha of pasture with around 42 million heads of livestock are grazing. Due to privatization of livestock, the traditional practices of nomadic grazing is in decline, which has resulted in pasture land degradation and created conditions which allow for the invasion of weed species of plants.

Almost 80% of Mongolia's total pasture land has changed, of which 3.2 million hectares is considered degraded, andmuch is threatened by sand movement, water erosion and the impact of transport infrastructure. Over 25 million hectares of steppe is degraded from the influence of the Brandt vole and more than 30 thousand hectares of pasture in the central and western regions have been eaten by grasshoppers.

FOREST ECOSYSTEMS

Forest biodiversity and current state of the resource

Coniferous and deciduous forests are mainly located in Khangai, Khentii, Khuvsugul and the Mongol Altai mountains, in the north of Mongolia (east longitude 89^0-$116^{0,}$ north latitude 47^0-52^0) and saxaul forest (east longitude 91°-109°, north latitude 42°-45°) dominates in dessert-steppe and dessert zone. Coniferous forest in Mongolia is continuation of the Siberian big taiga at its southern end.

Forest plays a very important role in climate water regulating and soil protective functions and creating a suitable habitat for animals and microorganisms.

According to inventory of 2007, the total forest fund is 190,022,000 ha, including closed forest area occupying 133,971,000 ha, equivalent to 12.1% of the total Mongolian land area. The report on the status of Mongolia's Natural Environmental (2006-2007) reported that the closed forest area (or, the country's percentage of forest land) occupied 8.56% of the total land area, coniferous and deciduous forests occupied 75.6% of our country forest fund and saxaul forest occupied 24.6%.

Mongolian forests consist of 140 species of trees and shrubs: larch, pine, cedar, spruce and fir are conifers; birch, aspen, poplar, elm, willow and shrub are deciduous. The dominant tree is larch.

About 40 species shrub were entered in Mongolian red book, including Fir, Pinus pumila and Elaeagnus moorcroftii. (Red book, 1990).

Forest stand characteristics (taxation index)

Depending on nature, climate and geographical conditions, the average stand characteristics (including forest habitat condition, forest increment, growth rate, tree quality and stock) have a difference each tree genus.

Table 1.9 The average forest stand characteristic

№	Dominant tree genus	The average stand characteristic						
		Age (years)	Site class	Density	Stock, m^3/ha	Stock of maturity forest in 1 ha	Average annual increment in 1 ha/m^3	Total annual increment thous. m^3
1.	Larix sibirica	156	IV.4	0.51	137	142	1.0	6500.1
2.	Pinus sibirica	161	IV.8	0.53	159	162	1.0	1122.0
3.	Pinus sylvestris	114	III.4	0.57	149	167	1.5	1073.2
4.	Picea obovata	139	IV.3	0.56	148	167	1.2	27.4
5.	Abies sibirica	105	III.3	0.60	187	195	1.8	3.5
6.	Birch	55	III.9	0.60	71	81	1.4	1324.7
7.	Aspen	30	III.9	0.65	57	137	2.1	18.2
8.	Poplar (Populus laurifolia, Populus suaveolens and other species)	57	III.8	0.35	51	-	0.9	1.2
9.	Woody Salix	23	IV.1	0.52	28	-	1.3	8.0
10.	Hippophae rhamnoides	10	III.6	0.57	-	-	-	-
11.	Other shrub	12	IV.9	0.50	-	-	-	-
	Total	-	IV.2	0.52	133	143	1.0	10078.3

According to the country forest fund, the average characteristics are as follows: average site class 4.2, average density 0.53, stock in 1 ha of 133 m^3, conifer average age of 128 years, deciduous average age of 44 years (See Table 1).

Forest inventories have been repeatedly taken over the last three years for the forests of Khentii, Khangai, Bayankhongor, Dornogovi, Dundgovi and Tuv aimags. These showed decreases in the Zavkhan and Tuv aimag forests. Particularly, Zavkhan aimag forest fund area was decreased by 212.6 thousand hectares and Tuv aimag forest fund area by 219.9 thousand hectares. Through the investigation of the Joint Mongolian and Russian biological complex expedition (JMRBCE), the forest ecosystem was divided into 5 high belt complex classes, or macroecosystems, which are then classified into about 90 forest micro-ecosystems .

Forest is an ecosystem, which is in constant movement, to progress and develop. Natural and human negative effects are factors affecting forest diversity and complex ecosystem change. In the most recent hundred years, Mongolia's forests have been affected by natural and human factors, where natural factors include historical activity, climate effects, desertification and drought.

Forest genesis and evolution of the landscape through physical and geographical conditions, especially emerging mountain systems, character of relief, geological structures and rock types.

We have had the opportunity to see forest and historical vegetation tendencies and characteristics in Mongolia from the Holocene period through the JMRBCE studies.

Forest historical tendency has begun to change due to climate effects: temperature, precipitation and permafrost (Vipper and others, 1975, 1976, 1978, 1980; Savina, 1984, 1986, and others).

An investigation of paleobotany (Vipper and others, 1975, 1976, Savina, 1986) during the period of Holocene Subboreal (5000-3000 years ago) in the Mongolian Khangai, the north-eastern forestation reached a high level and the dark green coniferous taiga forest spread to the mountains and a single oak was registered in the Ulz River.

During the Sublatant period (2000-1000 years ago), the area of mountain forest-steppe increased. A survey undertaken by the JMRBCE (Forest of Mongolia, 1978; Gunin and others, 1989; Larch forest of Mongolia, 2006, Ecosystem of Mongolia, 1995) notes that overall, over the last hundred years, the forest ecosystem of Mongolia has been heavily impacted by the negative impacts of humans.

The first climate station of Mongolia was established in 1924, and there is now a short climate data record of 83 years. Since 1961 (36 years), the average world climate has warmed by +0.74 ^{0}C. Over the past 65 years, the climate has warmed +1.9 ^{0}C in summer and +3.6 ^{0}C in winter in Mongolia.

The JMRBCE investigation showed that the amount of precipitation in the forest has decreased, the precipitation character has changed, permafrost has phased down and seasonal permafrost has gone from fire damaged and overcut forest areas. As a result, the forest water and wet, regulating (Forest of Mongolia, 1983; 1988) role has decreased abruptly.

The Assembly of the World Climate Change conference organized in Paris in 2005reported that 90 percent of climate change is identified to connect with human negative activity.

The Mongolian-Russian (1980-1985) and Mongolian-American tree-ring investigations (1995-2001) have examined temperature chronological data spanning 450 years in Mongolia. This investigation provided evidence that the climate in Mongolia has become warmer.

Desertification is enhanced by the interrelated factors of nature and human negative impacts. Natural causes are warming, aridity, drought (which is frequent in Mongolia), low precipitation, midland, and dust-storms (of increasing recurrence in Mongolia).

The Gobi Desert Region, occupying 41.3% or 647.0 thousand hectares of Mongolia's territory, is threatened by desertification.

Modern human negative impacts to forest biodiversity include: legal and illegal cutting, fire, forest insects, overgrazing, cultivation for cropland, utilize of land for mining, urbanization, insect and rodent plagues, infrastructure development (including road construction), soil erosion, decreased soil nutrients, soil salinity and increased soil acidity.

From 1980-1988, the total harvest from Mongolia's forests was 2130.2-1800.5 thousand cubic metres.

In 2007, merchant timber was utilized as follows: 61.0 thousand cubic meters for selling, 20.0 thousand cubic meters for forest sanitation cutting and 580.0 thousand cubic meters for fuelwood and household purposes.

Over the aeons, the forests of Mongolia have grown and regenerated under the effects of fire. Forest genus and species resist to fire differently, with Larix sibirica being the most tolerant species.

Larix sibirica generates new needles every year, and with its thick bark and hard wood, this species has a high fire tolerance. Moderately fire tolerant species are aspen, poplar and birch. Species with fire intolerance are Siberian pinus, cedar, and Siberian spruce and Siberian fir.

Over the last 30 years, the natural forest area has decreased by 953.4 thousand hectares, negatively influencing forest biodiversity. During this time, the fire affected area has increased 3-4 times. Since 1990, 6.47 million ha forest area has been damaged by fire and 95% of this has been a result of human-induced fire damage.

In 2006, forest and steppe fires have increased 164 times across 15 aimags, 63 soums and in the green belt of Ulaanbaatar city. There, the forest area impacted by fire totalled 391.8 thousand hectares and there was 5202.2 thousand hectares impacted by steppe fires, incurring total losses to the value of 1.7 trillion tugrug.

Forest vegetation types and fire safety prepareation vary from aimag to aimag. In particular, western Khentii, eastern Khentii, north-east Khangai and eastern Khuvsugul in the forested areas are most damaged by fire. However, central Khangai and eastern Khuvsugul's forested areas are least destroyed by fire.

In 2008, forest and steppe fires have increased 178 times across 14 aimags, 68 soums and in the green belt of Ulaanbaatar city. A total of 491.5 thousand hectares of forest area and 527.4 thousand hectares steppe area was damaged by fire, incurring losses to the value of 17.1 trillion tugrug.

Forest pest and disease injury are key factors negatively affecting forest ecosystems of Mongolia

About 600 species of forest pest are registered in the country. Excessive populations of *Dendrolimus superans sibiricus*, *Ocneria dispar, willow's moth, Orgyia antiqua Linn and Erannis jacobsoni Diak* have generated injury locus. In recent years, forest pests have propagated depending on climate change, aridity, fire, human activity and injury locus, causing natural disasters.

Since 1998-1999, each year excessive populations of *Dendrolimus superans sibiricus*, *Ocneria dispar,*

willow's moth, Orgyia antiqua Linn and *Erannis jacobsoni Diak* have overrun particular areas. Surveys of forest pests were carried out in 2005 across a total of 600.0 thousand hectares, combating forest pests covering 49.1 thousand hectares. In 2006, surveys were carried out over 240 thousand hectares and they combated 17.3 thousand hectares, while in 2007, 897.6 thousand hectares were surveyed, combating 27.4 thousand hectares of pests.

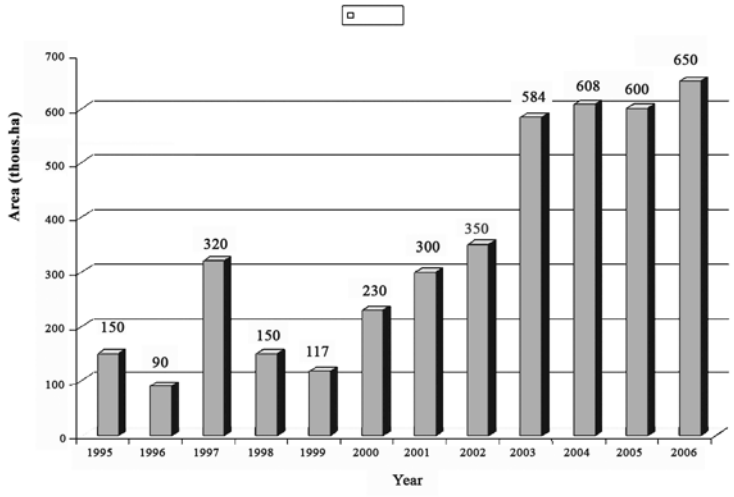


Fig.1.7 Distribution of forest pest (by year)

Plans for the prevention and combat of forest pests are developed at the aimag and soum levels. In 2006-2007, forest pest and diseases cover 1,138,108ha of forest fund in Mongolia. Forest ecosystem changes cause negative impacts in forest biodiversity. Table 1.9 shows the forest ecosystem change from 2005-2007.

Table.1.9 Forest fund change in Mongolia (thous.ha)

Index		By land detailed research		
		2005	2006	2007
Territory size of Mongolia, thous.ha		156411,6	156411,6	156411,6
Total area of forest fund		18291,8	19166,1	19002,2
Forest land area		12887,7	13448,1	13397,1
Percentage of forest land, % (doesn't involve shrub and yernik)		8,0	8,14	8,11
	Natural forest	12506,2	12740,4	12681,3
	Shrub and yernik	381,5	707,7	715,8
Closed forest area		3421,9	4208,2	4255,6
	Open woodland	2929,7	2892,7	2942,8
	Burned area	289,0	707,1	757,4
	Felled area	189,5	202,5	210,3
	Reforest area	391,0	405,9	345,1
Forest area		16686,9	17660,6	17652,7
Non-forest area		1604,8	1505,5	1349,5

INSECTS

Mongolia belongs to one of the few countries which is still considered relatively untouched regarding air, water, plant and animal species in the world. Therefore, researchers who want to study minerals and plant and animal kingdom of the country have increased. For example, over the last ten years, American-Mongolian and Mongolian-Russian researchers have organized coorporative expeditions for species composition and distribution of aquatic insects in Mongolia. That research resulted in 29 species of dragonfly (Odonata), 61 species of mayfly (Ephemeroptera), 4 species of stonefly (Plecoptera) and 68 species of caddisfly (Trichoptera) to be researched in Mongolia for first time.

One of the great questions in nature conservation, global warming, is how this will more negatively influence Mongolia in recent years and in years to come. Such a climate change has obviously influenced vegetation, water resources, and movement of forest boundaries, snow coverage and location and area of permafrost in Mongolia. For example, precipitation levels have decreased by over 10 percent compared with long-term dynamics in almost all parts of Mongolia in recent years. Associated with this, one perspective is the increasing of air temperature, providing suitable conditions for insect propagation, and from another perspective, the insect's high

biological reproductive capability will influence outbreaks of some species of harmful forest insects in several of Mongolia's aimag, sum and capital areas.

The result is that the balance in forest ecosystems has been lost, many little rivers with headwaters in the high mountains have shoaled and desertification is increasingly prevalent. From about 400 species of forest pest insects recorded in Mongolia, researchers named about 40 species that are most harmful to forests such as the Siberian silk moth (*Dendrolimus superans*), Gypsy moth (*Lymantria dispar*), vapourer (*Orgyia antiqua*), Jacobson's spanworm (*Erannis jacobsoni*), larch budmoth (*Zeiraphera diniana*), longhorn beetle (Cerambycidae), jewel beetle (Buprestidae) and the Bark beetle (Scolytidae).

Species composition and distribution of insects in Mongolia

Today there are over 13,000 species recorded in Mongolia (Tsendsuren, 1987). But the biology and ecology of most insects order and family have not yet been studied. For example some orders such as thrips (Thysanoptera), mallophaga (Malloptera), beetle (Coleoptera), fly (Diptera), membranous wings (Hymenoptera) and butterfly and moth (Lepidoptera) which has many family, genus and species, has not been thoroughly studied. The taxonomy of insect class still has not been fully defined. According to summary of references by the Entomology Laboratory of MAS, there are about 12,000 species and 26 orders of insects present in Mongolia (See Table-1). Of these, 3300 species of insects have been recorded for the first time in Mongolia and over 2700 species which belong to 79 genus and 2 subfamilies have been recorded for the first time to science within the last 40 years (Namkhaidorj, 2005).

Table 1.10 Number of Insects recorded in Mongolia (by orders). The bold number shows changed species numbers since 1997

No	Order	Species number /1995/	Species number /2008/
1	Springtail (Collembola)	26	26
2	Bristletails (Thysanura)	10	10
3	Dranfly (Odonata)	39	**68**
4	Mayfly(Ephemeroptera)	68	**129**
5	Stonefly (Plecoptera)	50	**54**
6	Earwig (Dermaptera)	5	5
7	Cockroaches (Blattoptera)	4	4
8	Mantis(Mantoptera)	5	5
9	Grasshoppers(Orthoptera)	162	162
10	Rubbed wings (Psocoptera)	39	39
11	Mallophaga (Malloptera)	148	148
12	Sucking louse (Anoplura)	19	19
13	Homoptera (Hemiptera)	1000	1000
14	True bugs (Heteroptera)	560	560
15	Thrips (Thysanoptera)	87	87
16	Beetles (Coleoptera)	2900	**2910**
17	Dobsonfly (Megaloptera)	2	2
18	Twisted winged-parasites (Strepsiptera)	2	2
19	Snakefly (Rhaphidioptera)	7	7
20	Net winged insects(Neoroptera)	86	86
21	Scorpionfly (Mecoptera)	1	1
22	Caddisfly (Trichoptera)	94	**162**
23	Butterfly& moth (Lepidoptera)	1550	1551
24	Fly (Diptera)	2400	2400
25	Fleas (Siphonaptera)	134	134
26	Membranous wings (Hymenoptera)	2100	2100

In 1996, the American and Mongolian joint "Selenge drainage" project organized an expedition through the central and northern part of Mongolia to examine diversity of aquatic invertebrates in the rivers, springs, lakes and ponds which are a part of the central Asian internal drainage basin and Arctic Ocean basin. Samples which were collected by American, Mongolian and Russian scientists during that expedition determined and recorded 96 species of mayfly which belongs to 29 genuses and 14 families in Mongolia (Namkhaidorj, 1987; Enkhtaivan & Soldan *in press*).

Also, one new species of diving beetle (*Oreodytes shorti* I) was recorded(Short & Kanda 2006), and the previous studies on the 18 species of diving beetles recorded new in Mongolia were summarized, resulting in a comprehensive, published report on the total species composition of Mongolian diving beetles (Enkhnasan 2007). Twenty-four species of water scavenger beetles (Hydrophilidae), belonging to 9 genus, were recorded, including one species *Enochrus quadripunctatus* Herbst, recorded for the first time in Mongolia (Short & Kanda 2006). About 129 species of caddisfly in Mongolia were summarized (Morse *et al*., 2006) and one new family of caddisfly and one species *Limnephilus hovsgolicus* (Morse, 1999) were first discovered in science. This last project also performed an intensive study on the fly (Diptera), which had not been studied intensively in Mongolia previously, resulting in examination of new distribution points of fly species as well as the discovery of new species of flies in Mongolia (Gelhaus, Podenas & Brodo 2000; Gelhaus & Podenas 2006).

Scientific research performed in the Khonin nuga research station of Northern Khentii, plays a major role in Mongolian insect study. Joint long term ecological research by The University of Goettingen in Germany and the Biology Faculty of the National University of Mongolia has been performed in the forest ecosystem at the headwaters of the Eroo River since 1996. Studies on the animal species and vegetation of this area and their conservation have been undertaken and published. Many Mongolian and foreign students have worked under the leadership of Professor Micheal Muehlenberg and performed and published biology and ecology research of the stonefly (Plecoptera), butterfly and moth (Lepidoptera), grasshopper (Orthoptera), true bug (Hymenoptera), dragonfly (Odonata), caddisfly (Trichoptera), mayfly (Ephemeroptera), dobsonfly (Megaloptera), fly (Diptera) and beetle(Coleoptera) in northern Khentii. For example, 154 species of butterfly (Gantigmaa 2005) and 285 species of moths have been recorded in the area and Lepidopteran studies of some species with high conservation interests performed.

Researchers of the Entomology Laboratory of MAS conducted research of 49 families in 7 orders of aquatic insects in Eroo, Khongi and Sharlan River and their reparian ponds (Gantigmaa and others, 2008). From this research, the following Dipteran families were recorded for the first time in Mongolia: Ceratopogonidae, Chaoboridae, Dixidae, Ephydridae and Thaumaleidae. The Ephemeropteran family: Acanthametrepodidae was recorded for the first time in the Eroo River basin, and distribution of the Sialidae (Megaloptera), Aeshnidae, Lestidae, Libellulidae (Odonata), Capniidae (Plecoptera), Mollanidae, Polycentropodidae and Polymitarcidae (Trichoptera) families were also newly recorded.

Many professional researchers for branches of agricultural insect study, veterinary, forest and insect taxonomy have been trained and these branches of insect study are conducted independently. For example, an orchard-based study of Mongolian insects harmful for fruit production recorded 101 species belonging to 42 families and 8 orders, and processed agrotechnical, chemical and microbiological methods for controlling those insects (Davaa, 1999). This study also showed that 13 species of ladybug (Coccinellidae), 1 species of braconid wasp (Braconidae) and 2 species of net wings (Chrysopidae) occupy Sea-buckthorn (*Hippophae rhamnoides*). Many researchers, such as Drs. Monkhoo, Namkhaidorj and Puntsagdulam worked several years in this field, determining 150 species belonging to 44 families and 10 orders. Monkhoo recorded the capability to increase the yield of buckthorn by 65.7% and blackcurrant by 20.9-36.5%, through his study on control of pest insects. In recent years, taxonomical and biological studies of beneficial insects have been intensively performed in association with "advanced technology for controlling pest insects" and biological technology. While studies of biological methods utilizing parasitic membranous wing insects for control harmful insects are widely performed in many countries, this kind of study has just started in Mongolia.

Loss of Biodiversity is one of the problematic questions in the world. So at first, the most important activity to stop these losses and conserve endangered species, we need to determine local species diversity and natural conditions of those populations. While there is an extensive accumulation of biodiversity information in northern America and Western Europe, in many other parts of the world this information is still being developed (New, 1998). For example, there are very few studies about biodiversity in the wide-ranging east Palaearctic. In Mongolia, baseline information on insect biodiversity is poorly understood and in some areas, species abundance information is almost absent.

Insect conservation and exploitation

Today, 19 insect species (which includes 11 species of butterflies and moths, 4 species of wasps, 2 species of beetles, 1 species of dragonfly and 1 species of fly) are conserved by legal protection. However, information about their population approaches and the detailed factors influencing rates of population decline are still poor. Despite this, in recent years some species with membranous wings and aquatic insects' population approaches in Mongolia have been discovered through studies on biology and ecology of those animals and the base line of information is slowly accumulating. For example, an open population of butterfly and moth species: *Leptidea morsei* F.*, Nymphalis vau-album* (Dennis & Schiff).*, Euphydryas intermedia* (Menet).*, Triphysa phryne* (Pall).*, Coenonympha glycerion* (Bork).*, Lycaena helle* (Dennis & Schiff).*, Coenonympha oedippus* (Fab).*, Coenonympha hero* (L).*, Cupido minimus* (Fues).*, Nymphalis polychloros* (L)., whose status is categorized "extinct" and "critically endangered" in most European countries, has been recorded as occupying forest steppe in Mongolia.

Main threats to diversity of insect species

Current loss of biodiversity is consequence of the overexploitation of species as a natural resource for the textile, food and pharmaceutical industries. For instance, plant species as *Saposhnikovia divaricata* Turcz. Is a main resource of pharmacy, and become endangered due to its over-exploitation.

For Mongolia insects are not used in food production sector, however, some of the species (mainly from *Orthoptera* order) are used in medicine. Thus, for Mongolian insect species the human induced threats are not significant. However, due to inappropriate use of common natural resources (land, water, air, wildlife etc.) the habitat of insects is shrinking. There are several such impacts as:

1. Consequences from construction and other engineering activities
2. Consequences from the use of pesticides and herbicides to reduce weed plants and pest insects
3. Consequences from the forest fire
4. Increase of the area affected by the pest insects or pest insect outbreaks
5. Expansion of land affected by degradation due to inappropriate land use practices
6. Pasture and rangeland degradation
7. Pollution of water bodies, drying up of lakes and rivers, water logging and other climate and human induced degradation processes.

All above mentioned threats has a great impact on insect community at the local scales and insect diversity at the broader scales. The detailed researches on how those threats impacting and which of them plays the main role have not been identified yet. Thus, some researches in this field have to be implemented.

FISH

The Mongolian water system is based on the following watersheds: Khalkh gol, Kherlen gol, Onon, Shishhed, Bulgan gol, Selenge, Tes, Great lake depression and the Southern lakes valley, and Mongolia itself geographically belongs to the three main water catchments in the region, being the Pacific Drainage Basin, Arctic Ocean Drainage Basin and the Central Asian Inland Basin. There are 76 species of fish belonging to 46 genera and 14 families reported in these watersheds. In the Arctic Ocean Drainage Basin there are 29 species, while in the Pacific Drainage – 43 species, and 10 in the Central Asian Inland Basin.

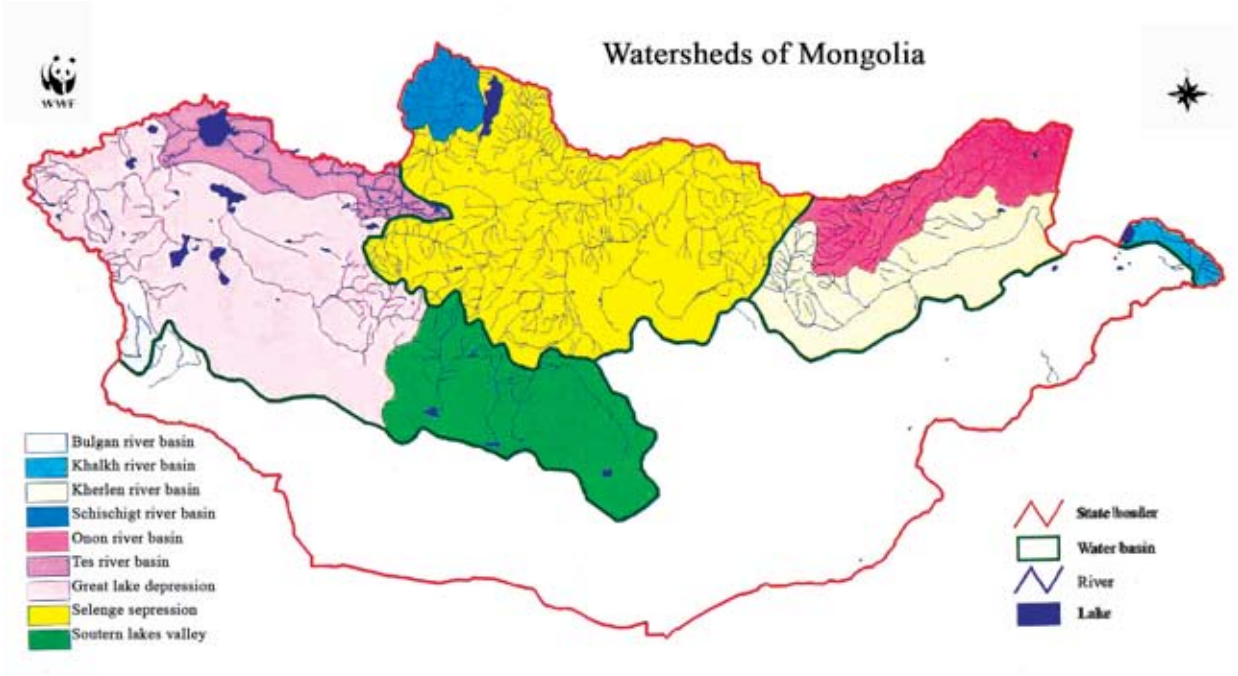


Fig.1.8 Watershed of Mongolia

According to the book on the 'Fishes of the Mongolian People's Republic' (1983) a total of 59 fish species have been recorded, later 74 species were described by G Baasanjav, Ya Tsend Ayush in 2001, and 76 fish species were listed in the Biodiversity assessment and conservation plan in (2002).

Work conducted in 2005 (funded by the World Bank's Netherlands-Mongolia Trust Fund for Environmental Reform Program) established a reliable list fresh water fish biodiversity in order to prepare a list of threatened species for which conservation action is necessary. The systematic status and nomenclature of all 76 species have been reevaluated. In total more then half (39 out of 72) of the species in this synthesis were incorrectly listed and misidentified.

Table.1.11-13 shown the fish species list and summarized nomenclaturally valid names of Mongolian watersheds.

Table 1.11 Fish composion of the Pacific Drainage Basin

Scientific name	English name	Fish composition		
		Onon watershed	Kherlen watershed	Khalkh Gol watershed
Lethenteron reissneri	Eastern brook lamprey	+	-	-
Acipenser schrencki	Amur sturgeon	**	-	-
Hucho taimen	Taimen	+	+	+
Brachymystax lenok	Lenok	+	+	+
Brachymystax cf tumensis	Blunt-snout lenok	+	-	-
Coregonus khadary	Chadary	+	-	-
Thymallus grubei	Amur grayling	+	+	+
Esox reicherti	Amur pike	+	+	+
Leuciskus waleckii	Amur ide	+	+	+
Eupallasella percnurus	Lake minnow	+	+	+
Phoxinus phoxinus	Common minnow	+	+	+
Rhynchocypris lagowskii	Lagowsk's minnow	+	+	+
Rhynchocypris czekanowskii	Czekanowsk's minnow	+	+	+
Pseudaspius leptocephalus	False asp	+	+	+
Pseudorasbora parva	Pseudosbora	+	+	+

Gobio cynocephalus	Dog-faced gudgeon	+	+	+
Gobio soldatovi	Amur gudgeon	+	-	-
Ladislavia taczanowskii	Sharp-jawed minnow	+	-	-
Gobio tenuicorpus	Whitefin gudgeon	-	-	+
Hemibarbus labeo	Horse gudgeon	+	+	+
Hemibarbus maculates	Spotted horse gudgeon	-	+	+
Chanodichthys mongolicus	Mongolain culter	-	-	+
Culter alburnus	White culter	-	-	+
Hemiculter leucisculus	Hemiculter	-	-	+
Rhodeus sericeus	Amur bitterling	+	+	+
Acheilognathus asmussi	Amur spiny bitterling	+	+	+
Carassius gibelio	Crussian carp	+	+	+
Cyprinus rubrofuscus	Asian common carp	+	+	+
Barbatula toni	Stone loach	+	+	-
Cobitus melanoleuca	Spiny loach	+	+	+
Misgurnus mohoity	Amur weather loach	+	+	+
Silurus asotus	East Asian catfish	+	+	+
Lota lota	Burbot	+	+	+
Mesocottus haitei	Haitej sculpin	+	-	-
Cottus szanaga	Amur sculpin	+	-	-
Perccottus glenii	Amur sleeper	-	-	+

Note: ** Unknown, +-observed, - not observed

Table.1.12. The Fish composition of the Arctic Ocean Basin

Scientific name	English name	Fish composition		
		Selenge watershed	Shishkhed watershed	Bulgan watershed
Acipenser baerii	Siberian sturgeon	+	-	-
Hucho taimen	Taimen	+	+	-
Brachymystax lenok	Lenok	+	+	-
Thymallus arcticus	Arctic Grayling	+	+	-
Coregonus pidschian	White fish	+	+	-
*Coregonus migratorius***-	Arctic Cisco	+	+	-
*Coregonus peled** -	Peled	-	+	-
Esox lucius	Pike	+	-	-
Carassius carasius	Gold fish			+
Carassius gibelio	Crussian carp	+	-	-
Rutilus rutilus	Roach	+	-	-
Leuciscus dzungaricus	Dzungar dace	-	-	+
Leuciscus baicalensis	Siberian dace	+	-	-
Leuciscus idus	Ide	+	-	-
Eupallasella percnurus	Lake minnow	+	-	-
Phoxinus phoxinus	Common minnow	+	+	-
Phoxinus ujmonensis	Ujmonens minnow	-	-	+
*Cyprinus rubrofuscus**	Common carp	+	-	-
Oreoleuciscus humilus	Dwarf Osman	-	-	-
Tinca tinca	Tench	-	-	+
Gobio acutipinnatus	Irtish gudgeon	-	-	+
*Abramis brama**	Bream	+	-	-
Barbatula toni	Sibarian Stone loach	+	+	+
Triplophysa sp.-	Stone Loach	+	-	-
*Silurus asotus **	East Asian cat fish	+	-	-
Perca fluviatilis	Perch	+	-	+
Lota lota	Burbot	+	+	-
Cobitis melanoleuca	Spiny loach	+	+	+
*Percottus glenii**	Amur sleeper	+	-	-

Note: * none native (invasive), ** -introdused, +-observed, - not observed

Table.1.13 Fish composition of the Central Asian Inland Basin

Scientific name	English name	Fish composition		
		Tesiin gol watershed	Great lake depression	Gobii lakes valley
Thymallus brevirostris	Mongolian gryalimg	-	+	-
Thymallus arctcticus	Siberian grayling	+	-	-
Oreoleuciscus angusticephalus	Big mouh osman	-	+	-
Oreoleuciscus potanini	Lake osman	+	+	+
Oreoleuciscus humilis	Dwarf osman	+	+	+
Barbatula compressirostris	Stone loach	-	+	-
Orthrias dgebuadzei	Gobi loach	-	-	+
Triplophysa gundriseri	Tesiin loach	+	-	-
*Coregonus migratorius***	Arctic Cisco	-	+	-
*Coregonus peled*** -	Peled	-	+	-

Note: * none native (invasive), ** -introdused, +-observed, - not observed

Main threats and causes: The major threat to fish diversity is overfishing and illegal fishing. The rivers inhabited by the species in Mongolia are also impacted by urban pollution and by pollution from large and small gold mining operations, which generate both localised sedimentation that may bury eggs at sturgeon spawning grounds. Decline in habitat quality due to climate warming and habitat decreasing. Example: This species is primarily threatened by the drying up of the lakes in the Gobi Valley of the Lakes, such as Ulaan Lake, which is now completely dry, and Orog Lake, which nearly dried out in 1980. 2004 and 2005. Goldmines in the Gobi Valley of the Lakes and in the tributaries of the Selenge and Orkhon rivers also pose a threat to the species through habitat degradation

AMPHIBIANS

Amphibians and reptiles are included in two independent classes, which are upper units of animal kingdom and inseparable members of biodiversity in Mongolia, as well as an important part of the ecosystem. If these animals are taken from the ecosystem, the normal natural substance nutrient cycle and energy flow will be destroyed. In order to keep the ecosystem in balance, there is a need to study and protect the herpetologcal species, as with other biological groups.

Geography influences biodiversity habitats. While amphibians dominate in the Northern region which has more lakes, streams and ponds, as a true terrestrial animal, reptiles mainly occur in the Gobi Desert region of the country.

There are 6 species of amphibians in Mongolia belonging to 4 families of 2 orders, and 21 species of reptiles in Mongolia belongs to 13 genera, 6 families of 2 suborders. Mongolia's diversity is low, compared to that of Middle Asia, Northeast Asia and Central Asian herpetoligical species, primarily due to the harsh continental climate of Mongolia.

Amphibia **Reptilia**

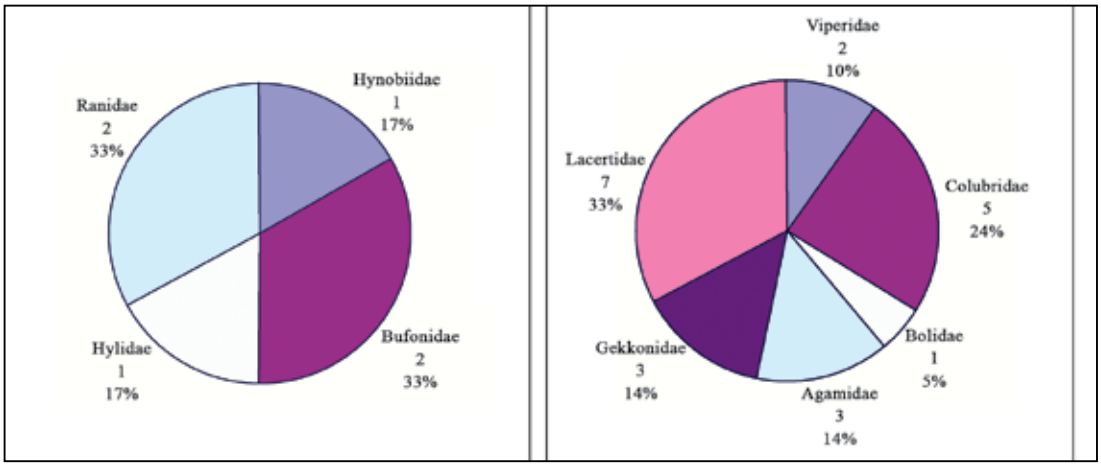


Fig.1.9 Species and percentage of Amphibians and reptiles distribution in Mongolia

From the viewpoint of evolution, whole classes of amphibians and reptiles could be a relict. Since they are cold-bloooded animals, it is very difficult to live in dry and cold climate. Despite poor species diversity, Mongolian herpetological composition is unique, having become highly adopted over a long time period to the country's harsh climate. According to A.M.Nikoliski (1916), Mountainous Asian desert has the most ancient origin, starting from the Eocene epoch. Aral-Caspian Desert has the latest origin, originating after the last ice-age. Therefore, reptiles which were originated in Mountainous Asian Desert started moving to Aral-Caspian desert which was just originating from East Turkestan.

In this way, it is possible that the estimated Middle Asian desert reptiles originated from Central Asian species. Also we can see that from Nikoliski's conclusion, Mongolian terrestrial vertebrates all did not come from surrounding areas.

There are two main characteristics in herpetilogical species composition of Mongolia. Firstly, the marginal population of widely-distributed Palearctic species entered Mongolia. Secondly, the core zone of species, originating in Central Asia, came to Mongolia. These two factors may determine the objectives and future trend through a herpetoligical study.

Recently, climate changes and human impacts on the environment have negatively influenced the marginal population species in Mongolia.

In Mongolia, a total of 6 species of amphibians have been recorded; from class Amphibia, order Urodela, family Hynobiidae, one species is present - *Hynobius keyserlingii;* from order Anura, family Bufonidae, two species: *Bufo raddei* and *Bufo pewzovi;* from Hylidae family: Hyla japonica, from Ranidae family there are 2 species: *Rana amurensis* and *Rana chensinensis*. Recently, one study included *Hynobius keyserlingii* in the Salamandridae family, but we prefer the previous classification which included this species in an independent family: "Hynobiidae".

The origins of Mongolian amphibian fauna are divided into Central Asia-Mongolia, Siber-Europe, Eastern and Middle Asia (Munkhbayar, 1973).

A green toad species recorded as *Bufo viridis* (Bannicov, 1953; Munkhbayar, 1973) is ascribed in a species of *Bufo danatensis* (Borkin et al, 1981) due to detection of polyploidy in a recent study. Thus this is an important discovery which exposed 4n=44 chromosome in Mongolian amphibians. There is a publication about this issue from Doctors L.Y. Borkin and Kh. Terbish, in the journal of the Academy of Science of USSR.

Lately, researchers recorded the Mongolian polyploid green toad with the first name as *Bufo pewzovi*. In our opinion, the most appropriate classification is that the Pewzovi toad should included in the Central Asia – Mongolian fauna. There are a total of 21 species of reptiles in two suborders (snake, lizard) of the order (Squamata) distributed in Mongolia, and from these, 13 species of 13 genera of 6 families are lizards, as follows: Kaspischer even-fingered gecko – *Alsophylax pipiens;* Przewalski's wonder gecko – *Teratoscincus przewalskii;* Gobi naked-toed gecko – *Cyrtopodion elongates;* Mongolian agama – *Laudakia stoliczkana altaica;* Toad-head agama – *Phrynocephalus versicolor;* Sunwather toadhead agama – *Ph.helioscopus;* Sand lizard – *Lacerta agilis;* Viviparous lizard – *L.vivipara;* Mongolian racerunner – *Eremias argus;* Variegated racerunner – *E.vermiculata;* Stepperunner – *E.arguta;* Multi-ocellated racerunner – *E.multiocellata;* and Gobi racerunner – *E.przewalskii.* Eight species are snakes, as follows: Tatar sand boa – *Eryx tataricus;* Slender racer – *Coluber spinalis;* Steppes ratsnake – *Elaphe dione;* Amur rat snake – *E.schrenckii;* Grass snake – *Natrix natrix;* Steppe ribbon racer – *Psammophis lineolatus;* Northern viper – *Vipera berus;* and Halys pit viper – *Gloydius halys*.

The origin of Mongolian reptilian fauna has been divided into three complex groups (Peters, 1982): West Palearctic forest centered originated species (Viviparous lizard, Grass snake and Northern viper), East Palearctic forest centered originated species (Mongolian racerunner, Halys pit viper and Steppes ratsnake), and Desert centered originated species. Desert centered originated species divided into the complex of Turan (Sunwather toadhead agama, Squeaky pygmy gecko, Stepperunner, Tatar sand boa and Steppe ribbon racer), complex of Tuvd (Mongolian agama), and complex of Mongolia (Plate-tailed gecko, Tuva toad-head agama, Gobi racerunner, Variegated racerunner and Slender racer).

Also, some researchers divided the fauna as follows: Euro-Siberian cool zone, Manjuur, Central Asian, South Palearctic (Asian) and Palearctic zone. These species were then included in the Central Asian complex, for example the Sunwatcher toadhead agama, Mongolian agama, Plate-tailed gecko, Gobi naked-toed gecko, Mongolian racerunner, Multi-ocellated racerunner, Gobi racerunner and Slender racer (Orlova et al, 1986).

Main threats and causes

The distribution of many species of amphibians and reptiles has been decreased from the original distribution area, including due to climate change and human activities. Particularly, the levels of rivers and streams, lakes and pools lowered and then dried out, negatively influencing the amphibians' distribution and diversity. From the estimation of the Nature and Environmental conditional report (2006 and 2007), the results of 2007 show that there are total of 5128 rivers and streams, of which 652 have dried out, about 9306 springs and wells of which 2277 have dried out, about 3747 lakes and wetlands of which 1181 have dried out, and lastly a total of 429 hot and cold springs of which 60 have dried out. These results show that climate change, agriculture and farm activities are negatively affecting the system, resources and quality of water. Populations of the Siberian wood frog of the north facing slope of Bayanzurkh Mountain, the Siberian wood frog around the Ulaanbaatar

city and its streams, springs and ponds, and the Mongolian toad, have disappeared. Also the viviparous lizard has disappeared from the Ikh and Baga Bayan and Khandgait valleys. Unfortunately, this may be the result of environmental and water pollution. We found an albino in the Siberian wood frog population at 11pm on June 3rd, 2008, at the Shatan River (N 48 O 30' 25'': E 106 O 50' 29'') and east tributary of Kharaa river in Batsumber soum. The sample was a male frog and color was pinkish, and the eyes were bright red. Doctor M. Munkhbaatar (2008) has suggested this preliminary result, probably a result of water pollution, and then the genetic level has changed from the pollution and by phenotype.

Over the last ten years, we have organized several field expeditions at Shatan River basin in Batsumber soum of Tov aimag, for the students of biology and ecology at the Mongolian State University of Education, and we have not seen any albinism in the Siberian wood frog population.

Fig. 1.10 Albino and normal Siberian frog's (Photo by M.Munkhbaatar)

Albinism is characterized by a lack of melanin pigment and results from inheritance of heterogenic groups. This is caused by a lack of the tyrosinase enzyme, which is necessary for the production of melanin and color of the body. This condition mostly affects invertebrates, and vertebrates such as birds and mammals, but, occasionally it occurs in fish, toads and frogs.

Albinism has not been found before in Mongolian amphibians, particularlythe Siberian wood frog. For example, there is no information about this disease including in the publications of Kh. Munkhbayar (1976), L.Y. Borkin and S.L. Kuzimin (1988). Also there is no news from neighboring areas and states on the Siberian wood frog population.

The sample of this albino frog is male with a body length of 56.8 mm; length from tip of the mouth to the nostril is 4.5 mm; and from this to the anterior of the eye is 7.6 mm; toe length is 32.9 mm; thigh length is 27.9 mm; and tibia length is 29.1 mm (the normal form of a morphometer condition). We have compared ages of Siberian wood frog from the study, with an analysis of a cross section of the thigh bone (Borkin et al, 1988), showings the albino is about 2-5 years old.

Discovery of amphibian albinism is new and scientifically very interestinghowever, thinking of inheritance disease, we would not want this happen again. Also there are unfortunately episodes such as oligodactyly found from Mongolian toad, which is when fewer than normal fingers and toes develop among the tadpoles of the Mongolian toad population at Kherlen and Balj rivers.

We have found the same situation at several ponds around the Kherlen river (N 48 O 04' 13,6'': E 114 O 04' 13,6'', elevation 729 м) near center of Dornod aimag, and about 56 of the 140 individuals and about 40% of tadpoles' latest metamorphotype of the Mongolian toads were oligodactyly. Pond water pH is 8,3. But, we have not found any oligodactyly individual from the nearest ponds.

Also we have found same situation at Mankhaadai spring (N 48 O 40' 10,6'', E110 O 52' 09,3'', water pH 9,45, elevation 1055 м) close to Binder of Dadal soum, where the spring has almost dried out. We estimated the oligodactyly, and 14 of the 40 individuals (about 35%) are malformed. This probably resulted from the water pollution.

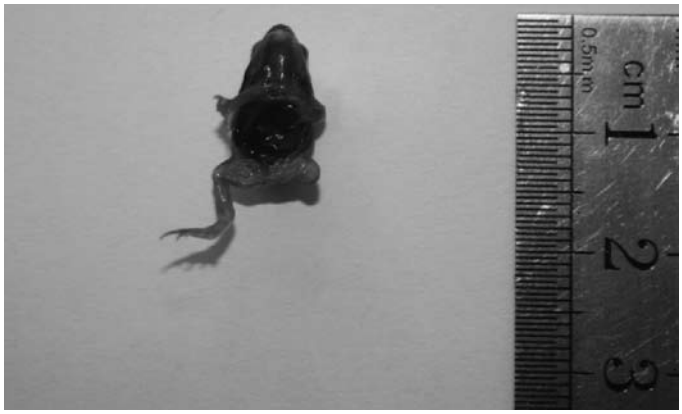


Fig.1.11 Non one hind leg Mongolian toad's juvenile (Photo by M.Munkhbaatar)

Malformed individuals of toad-head agama have been found around the center of Dundgobi aimag, where the body's spine and tail bones have been curved. This evidence from amphibians and reptiles is a useful for indicator of the pollution.

We have found many very rare species, (rare for the last 30-50 years) in the Mongolian desert, as well as new records for Mongolia such as the Squeaky pygmy gecko, Plate-tailed gecko, variegated racerunner and Gobi naked-toed gecko. These new findings are related to the improvement and intensity of research and study, and also correlate with global warming and expansion of thermopile organisms' distribution and area in the north.

We are offering a few suggestions to create several restricted resource areas for the conservation of amphibians and reptiles' marginal populations. Restricted resource area will be small therefore should not affect the any agricultural or farm activities. We are offering the following species and regions for restricted resource areas: the Siberian salamander, Japanese tree frog, Siberian wood frog and Mongolian toad live together around the Buureg tolgoi at Shaamar soum of Selenge aimag, where one hectare area could be fenced off for the conservation of these populations; the Gobi naked-toed gecko, Plate-tailed gecko, Squeaky pygmy gecko, Variegated racerunner and Tatar sand boa can be protected in two hectares at Nogoon tsav valley of Bayankhongor aimag. Also, there is the possibility of creating a resource area for the conservation of Nomrog River's amphibians and reptiles.

BIRDS

Currently, about 472 bird species have been recorded in Mongolia, belonging to 61 families and 19 orders. There are 81 species of resident birds and 391 species of migratory birds. In addition, 254 species of migratory birds breed in Mongolia, 10 species are winter visitors from Siberia, 8 species are summer visitors and 64 species are vagrants.

Four major global migratory routes have been recognized in Mongolia: the East Asia-Australasia flyway; the Central Asia flyway; the West Pacific flyway; and the Africa-Eurasia flyway. Of these, the former two account for the majority of bird migration.

Bird habitats and communities

The main bird habitats in Mongolia are comprised of grassland steppe, semi-desert and desert, mountain steppe, high mountains, forested mountains, wetlands and riparian areas. Birds characteristic of grassland steppe include Upland Buzzard *Buteo hemilasius*, Steppe Eagle *Aquila nipalensis*, Saker Falcon *Falco cherrug*, Mongolian Lark *Melanicorypha mongolica*, Crested Lark *Galerida cristata*, Eurasian Skylark *Alauda arvensis,* Demoiselle Crane *Anthropoides virgo*, Mongolian Plover *Charadrius mongolus*, Great Bustard *Otis tarda*, Northern Wheatear *Oenanthe oenanthe*, Isabelline Wheatear *Oenanthe isabellina*, Lesser Short-toed Lark *Calandrella rufescens* and Horned Lark *Eremophila alpestris*. Birds adapted to desert and semi desert habitats include Pallas's Sandgrouse *Syrrhaptes paradoxus*, Houbara Bustard *Chlamydotis undulata*, Greater Sand Plover *Charadrius leschenaultia*, Desert Wheatear *Oenanthe deserti*, Mongolian Ground Jay *Podoces hendersoni,* Desert Warbler *Silva nana*, Asian Short-toed Lark *Calandrella cheleensis* and Saxaul Sparrow *Passer ammodendri*. Mountain steppe areas are characterised by species such as Upland Buzzard *Buteo hemilasius*, Steppe Eagle *Aquila nipalensis*, Saker Falcon *Falco cherrug*, Cinereous Vulture *Aegypius monachus*, Daurian Partridge *Perdix dauuricae*, Little Owl *Athene noctua*, Short-eared Owl *Asio fl ammeus*, Eurasian Eagle-owl *Bubo bubo*, Meadow Bunting *Emberiza cioides,* Pied Wheatear *Oenanthe pleschanka*, Isabelline Wheatear *Oenanthe isabellina*, Rufous- tailed Rock-Thrush *Monticola saxatilis* and Eurasian Hoopoe *Upupa epops*. Black Kite *Milvus migrans*, Eurasian Hobby *Falco subbuteo*, Eurasian Sparrowhawk *Accipiter nisus*, Greater Spotted Eagle *Aquila clanga*, Booted Eagle *Hieraaetus pennatus*, Hazel Grouse *Tetrastes bonasia*, Black Grouse *Lyrurus tetrix*, Western Capercaillie *Tetrao urogallus,* Ural Owl *Strix uralensis*, Daurian Redstart *Phoenicurus auroreus*, Common Rosefinch *Carpodacus erythrinus,* Red Crossbill *Loxia curvirostra,* Lemon-rumped Warbler *Phylloscopus proregulus,* Eurasian Treecreeper *Certhia familiaris*, Naumann's Thrush *Turdus naumanni,* Siberian Jay *Perisoreus infaustus* and Eurasian Jay *Garrulus glandarius* are among the species typical of forested mountains.

High mountain species include Golden Eagle *Aquila chrysaetos*, Himalayan Griffon *Gyps himalayensis*, Cinereous Vulture *Aegypius monachus*, Lammergeier *Gypaetus barbatus*, Altai Snowcock *Tetraogallus altaicus*, Chukar *Alectoris chukar*, Rock Ptarmigan *Lagopus mutus*, Alpine Accentor *Prunella collaris*, White-winged Redstart *Phoenicurus erythrogaster*, White-throated Bushchat *Saxicola insignis,* Rufous-tailed Rock-Thrush *Monticola saxatilis*, White-winged Snowfi nch *Montifringilla nivalis* and Wallcreeper *Tichodroma muraria*. Wetland and riparian habitats are characterised by Black-throated Loon *Gavia arctica*, Swan Goose *Anser cygnoides*, Bar-headed Goose *A. indica*, Mallard *Anas platyrhynchos*, Common Pochard *Aythya ferina*, Red-crested Pochard *Netta rufi na*, White-headed Duck *Oxyura leucocephala*, White-naped Crane *Grus vipio*, Common Crane *G. grus*, Relict Gull *Larus relictus*, Mongolian Gull *L. mongolus*, Asian Dowitcher *Limnodromus*

semipalmatus, Amur Falcon *Falco amurensis*, Pied Avocet *Recurvirostra avosetta*, Eastern Marsh Harrier *Circus spilonotus*, Pied Harrier *C. melanoleucus*, Penduline Tit *Remiz pendulinus*, Yellow-breasted Bunting *Emberiza aureola*, Bearded Parrotbill *Panurus biarmicus* and Great Reed Warbler *Acrocephalus arundinaceus*. Rare species found in these habitats include the Reed Parrotbill *Paradoxornis heudei*, which is dependent on a very few wetland sites in eastern Mongolia, and Dalmatian Pelican *Pelecanus crispus*, the eastern population of which breeds only at a few lakes in western Mongolia.

Endemic bird areas

Endemic Bird Areas (EBAs) are areas to which at least two restricted-range bird species (species with a total global breeding range of less than 50,000 km2) are entirely confined, while Secondary Areas (SAs) are areas that support one or more restricted-range species but to which less than two species are entirely confined (Stattersfield *et al.* 1998). In common with other countries in north-east Asia, Mongolia has low levels of bird endemism, with most of the species occurring in the country having wide breeding ranges. Stattersfield *et al.* (1998) determined that Mongolia does not contain any EBAs, and only a single SA: Mongolian Mountains. This SA is defined by the range of Mongolian Accentor *Prunella koslowi*, a poorly known species, which breeds in juniper scrub and grassland on dry mountain slopes around 2,000 m above sea level.

Threatened species

According to BirdLife International (2008), 24 Global Threatened bird species are known to have habitats in Mongolia, comprising 2 Critical, 6 Endangered and 16 vulnerable species. Six of these species only occur in very small numbers or as vagrants. Of the 18 species that are known to regularly occur in significant numbers, Mongolia has a critical role to play in the long-term conservation of many of them, because it supports globally significant breeding, passage or wintering populations; in some cases, the populations in Mongolia are the largest in the world. Species that Mongolia is of particular importance for include Swan Goose *Anser cygnoides*, Lesser Kestrel *Falco naumanni*, Saker Falcon *F. cherrug*, White-naped Crane *Grus vipio* and White-throated Bushchat *Saxicola insignis*. In addition to Globally Threatened birds, 10 Near Threatened species known are from Mongolia, of which nine regularly occur in significant numbers (BirdLife International 2008). The major threats to bird diversity in Mongolia are overgrazing by livestock, illegal logging of forests, hunting and trapping. Other threats include dam construction, mining, fires, drainage of wetlands, large-scale use of rodenticides, and disturbance by humans, livestock and dogs (BirdLife International 2004).

Threats to biodiversity at IBAs

There is increasing pressure on IBAs in the steppe zone as a result of increasing livestock populations and overgrazing. This is resulting in the degradation and desertification of grasslands. Steppe IBAs are also adversely affected by steppe fires, which can be destructive to nesting birds. It is reported that most steppe fires are accidently started in spring and early summer.

Overgrazing and trampling by livestock is of particular concern at a number of wetland IBAs in the steppe region. A further problem at some sites in recent years has been the use of rodenticides to control vole outbreaks, which has resulted in the poisoning of birds of prey and sometimes other important species, such as cranes.

The water levels of many steppe lakes have fallen in recent decades, with some wetlands completely disappearing. In some cases this is due to the damming or diversion of rivers and streams, and use or water for irrigation and livestock. In other locations the cause is believed to be climatic.

Mining, infrastructure development and tourism development are all undergoing rapid expansion and these pose a risk to Mongolia's IBAs if their environmental impacts are not anticipated and managed. On-going mining operations are currently affecting only a small number of IBAs. However, mineral exploration licenses overlap with many more IBAs. Further, mineral exploration and extraction can threaten the biodiversity values of IBAs, even when there is not direct overlap, due to indirect impacts such as water pollution and infrastructure development.

There is also increasing concern about the potential impacts on IBAs of infrastructure, including road and rail networks, hydropower development, and power transmission lines, much of which is associated with mining development. The impacts of tourism are also of growing concern. It is already resulting in disturbance and localized pollution at some sites, particularly certain wetland IBAs with important breeding colonies of globally threatened waterbirds.

Illegal hunting can have a devastating impact at IBAs, with some species being particularly vulnerable.

Dalmatian Pelican *Pelecanus crispus* is very close to extinction in Mongolia as a result of hunting, and Great Bustard *Otis tarda* populations are highly vulnerable and continue to be targeted. A comparatively recent development is the very high pressure on Saker Falcon *Falco cherrug*, which is highly sought after for the Arab falconry trade.

MAMMALS

Mongolia has 138 species of mammals, which belongs to 73 genus and 23 families, 8 orders; which includes 13 species of insectivores; 12 species of chiropters; 6 species of lagomorphs; 69 species of rodents; 24 species of carnivores; 2 species of perissodactyls; 1 species of tylopoda; and 11 species of artiodactyls (Fig.1.12). Yet, taxanomy of some mammals are unclear.

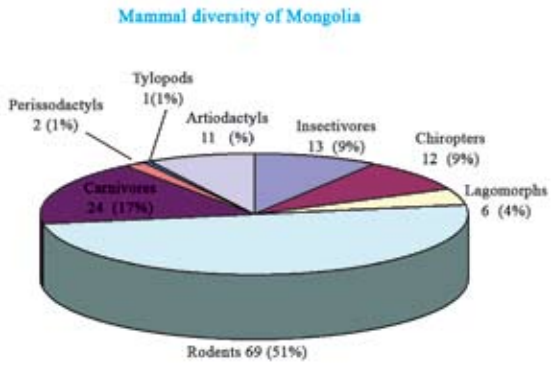


Fig.1.12 Mammal diversity of Mongolia

In further, could be that some species the taxanomy cleared up and will have little changes in way that some new species will be discovered, specially from orders, such as rodents. There could be also some species added or deleted to or from fauna defending on human activities and natural acclimatization. But main taxa will not be changed. In 2005, during the meeting, where participated national and international mammalian experts were discussed taxanomy of Mongolian mammals. The results of assessments shows that 128 native species and 4 non native species (american mink, brown rat, muskrat, house mouse) are inhabit Mongolia.

The diversity of Mongolian mammals not completed, as there are very little studies have been done on subspecies level. So far 57 subspecies have been determined among the 30species.

For last 100 years 6 subspecies of mammals, belonging 3 species and 1 genera were vanished from Mongolian fauna, reason for that were direct and indirect human activities. The last sighting of native wild horse in Mongolia took place by the mid 1960's. Wild horse were reintroduced back in Mongolia by early 1990's, they were generation of wild horses, which captured and exported from Mongolia in early 19th century.

Fig. 1.13 Reintroduction on Przewalskii horse

3 species of mammals (muskrat, raccoon dog, American mink), belonging 2 generas naturally acclimatized into Mongolia in 20th century, therefore diversity of Mongolian mammals had increas.

Distribution of mammals in natural zones of Mongolia

Mammalian species richness is highest in Mongolia's northern regions, with recorded numbers of species exceeding 60 in Hovsgol and Hentii mountain ranges, and northern parts of Hangai mountain range. Species richness shows a trend within Mongolia to decrease from north to south.

Alpine zone. The this zone is cover about 3% of Mongolian territory and consists of the high mountains at Khentii, Khangai, Khovsgol, Mongol Altai, Gobi Altai mountain ranges. There were registered 8 species of rodents, 6 species of ungulates and 8 species of carnivores species and do not have insectivores, chiropters.

Taiga forest zone. Mountain taiga is located in majority in the Khovsgol, Khentii ranges and is about 4.1% land of Mongolia. There were registered 14 species of rodents, 6 species of ungulates. Sable and Siberian weasel are common species from carnivores and few wolverine occurs in forest. Marten is leaving in rocky areas, which is located in deep forest around Hovsgol lake. Also red fox, gray wolf, brown bear, lynx are commom wildlife at mentioned natural zone.

Mountain forest steppe zone. This zone found in the Khentii, Khangai, Mongolian Altai mountain ranges and Khyangan mountains of eastern Mongolia. Species richness is highest in forest steppe, due to a zone of convergence between the Steppe and the Taiga zones. There are listed 25 species of rodents, 8 species of ungulates, 11 species of carnivores, 5 species of insectivores and 4 chiropter's species. There are many species of forest mammals such as a red deer, wild boar, roe deer, badger, lynx, chipmunks, red squirrel, Korean red-backed mouse, northern red-backed mouse etc. Here occur representatives of the steppe zones such as marmot, long tailed suslik, daurian pika, manul, weasel along species of forest zones.

Mountain steppe zone. The zone is cover about 25.2% of Mongolian territory and is mix of forest and grassland areas. There were recorded 13 species of rodents, 5 species of ungulates, 15 species of carnivores, 3 species of insectivors, 4 chiropter's species.

Steppe zone. The Steppe zone extends from the western Great Lakes Depression to Khangai and the middle Khalha steppe and to the steppes of Dornod and covers 26.1% of Mongolian land. In the steppe zone were found 13 species of rodents, 2 species of ungulates, 11 species of carnivores, 2 species of insectivores, 5 chiropter's species.

Desert steppe zones. The desert steppe is covers 27.1% of Mongolian territory and there were registered 22 species of rodents, 6 species of ungulates, 14 species of carnivores, 2 species of insectivors, 3 chiropter's species.


Desert zone. Desert zone covers 14.5% of land, in the southern portions of Mongolia and there were registered 15 species of rodents, 7 species of ungulates, 6 species of carnivores, 2 species of insectivores, 5 species of chiropters.

Further trends of mammals

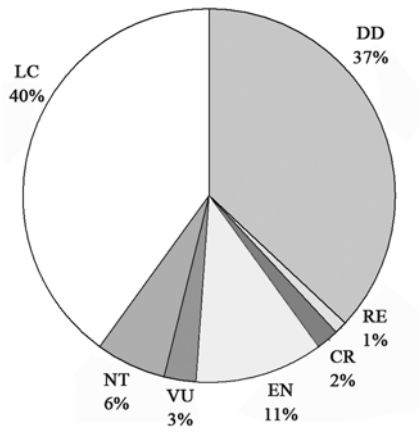
Mongolia came to retain pristine fauna as a species composition, distribution, number, and game animal resourses until 30's of past century. The culture, civilization, sustainable use of nature resourses, conservation scene of Mongolians was enabled it.

Over the past 70 years, increased direct and indirect human activities have led to population declines of wildlife and range contractions for Mongolian fauna, particularly game species. It shows to incur negative trends to gene fund of wildlife population causing by negative change in numbers and quality of mammalian population (Table 1.14).

Table 1.14 Diversity of mammals of the Mongolia and further trends

Index		Taxanomy unit				
		Order	Family	Genera	Species	Subspecies
Mammals, the beginning of 19th century (1900)	Number, present	8 (100)	23 (100)	73 (100)	138 (100)	57 (100)
Of which: extinct	Number, present	-	-	1 (1.4)	3 (2.2)	6 (10.5)
Invased	Number, present	-	-	2 (2.7)	3 (2.2)	5 (1.5)
The end of 20th century (2000)	Number, present	8 (100)	23 (100)	74 (100)	138 (100)	57 (100)
Of wich near threatened	Number, present	1 (1.25)	4 (17.4)	7 (9.6)	10 (7.2)	12 (21)

The 32 species are (23.2% of Mongolian fauna) are protected as Rare under both the Mongolian Red Book and the 2001 revision of the Mongolian Law on Fauna and registered in Mongolian Red List of mammals. From this fact is clear that further of Mongolian mammals is not best. From above mentioned species 9 species (belonging 6 genus, 4 family, 1 order) are decreased in numbers, populations of which are fragmented, habitat quality become in poor condition. These are animals from 21% of all Mongolian subspecies, 7.2% of species, 9.6% of generas, 17.4% of family, 1 order of the mammals. Thus, the need to study population fluctation and factors, which are reason of population decreases.



16% Mongoian mammal species are categorised as regionally threatened, of which 2% are Critically Endangered (CR), 11% Endangered (EN) and 3% Vulnerable (VU). Also 6% of species categorised as Near Threatened (NT). Thirty seven persent of the mammals of Mongolia are categorised as Data Deficient (DD). Only one species the Asiatic wild dog (*Cuon alpinus*), is categorised as Regionally Extinct (RE) in Mongolia.

Fig.1.14. According to the IUCN Red List Categories and Criteria regional conservation status of the 128 native Mongolian mammals. RE=regionally extinct, CR=critically endangered, EN=endangered, VU=vulnerable, NT=near threatened, LC=least concern, DD=data deficient

Threat status varies between different Mongolian mammal groups. The majority (11/14 or 79%) of Mongolia's ungulates species (Artiodactyls, Perissiodactyla) are categorized as regionally threatened, and other two species are categorized as NT. This shows that negative influence on population is high. Twelve percent of Mongolian carnivores, including the snow leopard (*Uncia uncia*), sable (*Martes zibellina*), and Gobi bear (*Ursus arctos gobiensis*), are categorized as threatened; a further 22% of carnivores are categorized as NT and 36% are categorized as Least Concern (LC). The majority of Mongolian large mammals are categorized as NT and EN. This result shows that it is necessary to implement well thinking conservation management plan for the large mammals of Mongolia.

Twelve persent of rodent species are also threatened, 2% are of them NT, and 45% are of them DD. None of the small mammals (Lagomorphs, Chiropters, Erinaceomorphia, and Soricomorpha) are categorized as threatened, but many of these species are listed as DD (43%). These results highlight a lack of research on small mammals, and further research may reveal that that a number of these species are also threatened.

Threats, facing to the mammals, negative factors

Hunting

Since ancient times, Mongolians have upheld a culture of nomadic animal husbandry and hunting game animals. Over the 60 species of Mongolian wildlife have a value in traditional subsistence hunting. Out of these, the 24 species were main game animals, 32 species were hunted time to time. Mainly were hunted carnivores, ungulates and rodents /Fig.1.15/.

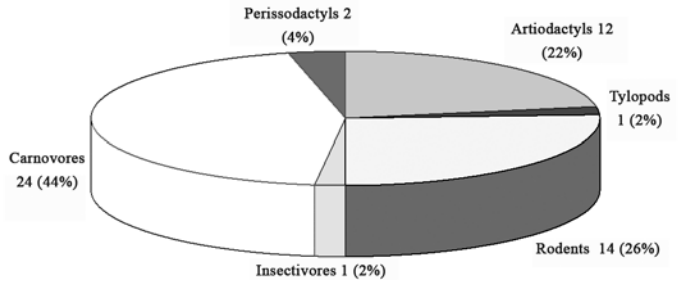


Fig.1.15 Species diversity of the game animals

Since 1930's the numbers of hunted animals and wildlife products has increased due to change to the intensive hunting with nationwide management system. Historical fur trade volumes were increased rapidly, so in average wolf 26300, red fox 145500, corsac 153800 were hunted per annum between from 1940 to 1970.

Illegal hunting of some mammals such as red deer, musk deer were increased to trade with Russia and China, law enforcement was weak and because uncontrolled hunting were difficult to save for mammals.

Study shows that red deer population has declined by 92 percent in past 18 years. Mongolian scientists calculated that musk deer populations peaked at 44,000 individuals in 1986, within forest zone of the Khangai, Khentii, Khovsgol, Khan-Khohii mountain ranges, in territory of 7 aimags and 63 soum. Only 22000 musk deer (about 50 persent of all Mongolian population) were counted in the Hentii mountain ranges. In 2008, only 400 musk deer were estimated in 13173 ha of the Hentii ranges. It means musk deer population has decreased by 50 persent compare to 1986.

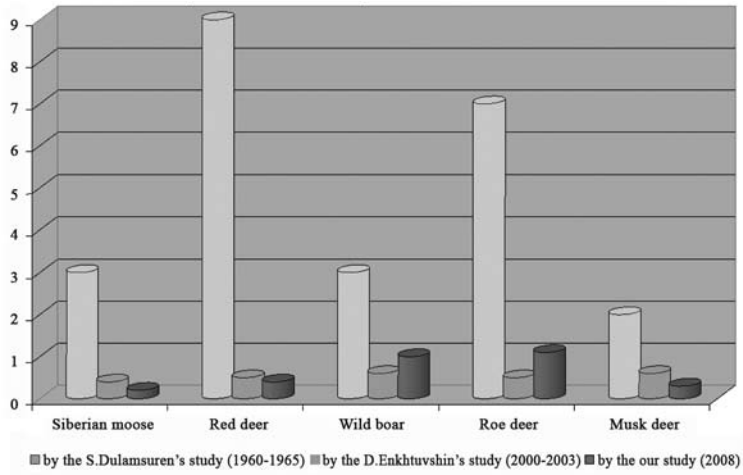


Fig.1.16 Population trends of the Ungulates in Western of Khan Khentii

The survey results in Khan Khentii SPA shows that density of mammals here has been decreasing the 3-18 times, due to direct and indirect human activities for last 40 years. For instance sable population density is decreased 4.8 times, Siberian moose population is decreased 15 times, red deer 18 times, wild boar threefold, roe deer 6.3 times and musk deer population has decreased 6.6 times than 40 years ago (fig.1.16).

Habitat degradation

Biological diversity and ecosystems of Mongolia, is assailable to the climate changes. Over the past 40 years, notiseable changes observed in ecosystems of Mongolia, such as desertification, damages of land, decreases in biological diversity, caused by the climate changes and human activities. Water is an essential ecological factor to supply biological diversity. However, In Mongolia has dried up 372 rivers and streams and 1158 springs for last 40 years.

Fig.1.17 Desertification, facing in the all of country

Researchers have concluded that 77.2 percent of total area in Mongolia has been affected by desertification, due to global warming and climate changes. This affects mammal's diversity of Mongolia, especially mammals, living under ground.

Over 70 percent of the total pasturelands of Mongolia have degradated, decreasing resourses for ungulates. The changes in pastureland vegetation composition are caused by density of the human and livestock population. Since the pasture is degradated, stimulate increase of vole population, its influence to the pasture.

Forest and steppe fire are ecological factor to quicken and slow various level processes in ecosystem.

Fig.1.18 Forest and steppe fire has been affecting to the wilflife

During period of red deer fallen antlers collection, many of these forest and steppe fires occurs. In 2007, 216 wildfires have been registered in 81 soums of 15 aimags, also in 7 districts of Ulaanbaatar city including green belts and Bogd Mountain Strictly Protected Area. Total of 1335.9 million ha of land had been destroid by fire, including 512.3 thousand ha is forest, and 823.7 thousand ha is steppes. The fire has also great negative affect to wildlife population of Mongolia.

Use of natural resourses

The Mongolia is rich with natural resources and mining has been increasing rapidly lately. However , the

environmental recovery work has not been done yet. This sitiation has negative impact on ecosystems, such as decrease of biological diversity.

Fig.1.19 Development of mining is negative affect to the wildlife

Intensive timbering has negative effect on forest, particularly on natural regeneration of forest. In 2005, total of 609.9 thousand cubic meter timber was prepared, including 39.9 thousand cubic meters for industrial use and 570.0 thousand cubic meters for firewood. In 2006, total of 574.8 thousand cubic meter timber was prepared in 6617.6 ha of land. According to the statistics of 2007, 61.0 thousand cubic meter lumber was prepared nationwide for industrial use, 20.0 thousand cubic meter for industrial use, but from forest cleaning, and 580.0 thousand cubic meters for firewood. These should affect negatively mammal's diversity in the forest zone, they could be decreasing.

Fig.1.20 Logging of trees causes negative effect to the forest mammals

As result of surveys, made by sciencitists of the Institute of Biology shows the large mammalian species diversity in place where intensive timberinig occurs 2-2.5 times lower compare to forest zone, where human activities is lower.

CHAPTER II. CURRENT STATUS OF THE IMPLEMENTATION OF NATIONAL BIODIVERSITY ACTION PLAN

The objective of this chapter is to present a general overview of National biodiversity action plan (NBAP).

Mongolia's Biodiversity Conservation Action Plan (NBAP) was prepared by the Ministry of Nature and Environment with the assistance of GEF and UNDP.

A wide range of people and institutions participated in preparation of the plan, which was adopted by Government in July 1996. It was printed in 1997 and widely distributed to Stakeholders. The overall objective of the NBAP is to set in place measures to protect biodiversity and to restore damaged areas. It aims to ensure that consciousness of biodiversity is integrated into economic and social programs.

GEF and government funded the development of the NBAP and various government and multilateral and bilateral sources have assisted with projects that are implementing aspects of the NBAP. It proposes a wide range of actions covering protected areas, population control, legislation and policy on environmental impact assessment and land-use planning, research and monitoring, education and training, public awareness, agriculture, forestry, industry, transport, mining and oil exploitation, tourism, land reclamation, energy and ex-situ management for conservation. At its launch, the NBAP received extremely high level political backing and many of its proposed actions have been given high priority for implementation but most are those carried out by the MNE itself. It advocated 17 specific objectives and 4 legal and institutional measures.

Specific objectives of NBAP of Mongolia

- Establish a complete protected area system representative of all ecosystems and protecting endangered species, including joint actions with the Russian Federation and the People's Republic of China
- Implement an effective environmental impact assessment program to understand the effects of proposed actions on biodiversity
- Establish a research program that improves knowledge of biodiversity and relevant threats
- Establish a nationwide information and monitoring system for biodiversity conservation
- Establish national education and training programs for biodiversity conservation
- Establish a public information program to improve people's knowledge of biodiversity and the importance of conserving it
- Control pollution of air, water and soil
- Control hunting and fishing
- Prevent pasture deterioration through overgrazing
- Establish effective land-use planning control and transportation planning to protect biodiversity
- Develop strong regulations to protect biodiversity from effects of mining
- Support tourism while developing sensible regulations to protect biodiversity
- Ensure that agriculture and forestry are carried out in ways compatible with biodiversity conservation
- Identify and restore damaged lands
- Develop renewable, clean energy sources and ensure environmentally safe transport of fossil fuels

Improve ex-situ management for species conservation and conserving genetic Resources

Most of the planned activities of the NBAP have been implemented, others are ongoing. Implementation status of the NBAP show below table 2.1.

Table 2.1 Implementation of Biodiversity Conservation Action of Mongolia

Main objectives	Planned action	Status of implementation
Objective 1: Establish complete protected area system representative of all ecosystem and protecting endangered species	Action 1 Complete planning, including boundaries consistent with biodiversity conservation goals for the proposed protected areas and submit proposals to Parliament.	As of 2007, special protected areas of Mongolia encompass 21.9 million hectares covering 61 areas, making up 14.0 % of the whole country's territory. There are 12 Strictly Protected Areas covering 10,554,523 ha, 21 National Parks covering 9,229,905 ha, 19 Natural Reserves covering 2,006,270 ha and 8 Natural Monuments covering 102,083 ha. In 1998, special protected areas of Mongolia comprising 11.1% of the whole country's territory were increased to 14.0% in 2007. Should land under the state protection be transferred to local government protection (10.3%) the target may become more attainable. Six areas were included in the list of World Heritage sites and Man and Biosphere of UNESCO. 11 areas were recorded on the Ramsar List of Wetlands of International Importance. According to the WWF Eco-regions, Selenge-Orkhon forest steppe, Eastern Gobi desert steppe, Gobi Lakes Valley desert steppe have less than 5% protected area (PA) cover, Mongolian-Manchurian grassland have less than 10% PA cover. Daurian forest steppe, Trans-Baikal conifer forest, Sayan montane conifer forest, Sayan alpine meadow and tundra, Khangai Mountains alpine meadow, Khangai Mountains conifer forest, Altai montane forest and forest steppe, Altai alpine meadow and tundra, Alashan Plateau semi-desert, Junggar Basin semi-desert, Great Lakes Basin desert steppe have more than 10% PA cover. Representatives of the Khan-Khentii PA in Mongolia and the Sokhond Biosphere Reserve of Chita in Russia visited each other to study possibilities to establish transboundary PAs and sign agreements of cooperation. In addition, MNE and the Russian Natural Resource Ministry prepared the agreement proposal to establish Lake Uvs PA.
	Action 3 Improve public support for protected areas, and the buffer zones surrounding them.	Upon the approval of the law on Buffer Zone of PAs in 1997, a legal basis for involvement of the local state organizations and residents in the management of PAs was created. There are 65 Buffer Zone Councils in operation within strictly protected areas and national parks. There are only 4 PA administrations that have developed their Buffer Zone Management Plans. The National Program on Environmental Public Awareness was developed, identifying State policy areas and the implementation of activities over the next seven years. The subject "Ecology" is taught in secondary schools according to the curriculum. Currently, there are 85 information centers operating at 23 protected area administrations and 80 eco-gers at 8 administrations. There are total of 380 people working for 23 Protected Area Administration, out of which, 55 percent of rangers are selected from local people. Within the framework of "Sustainable Livelihood Program", the "Strategy of Pasture Risk Management" project was implemented in all 143 soums of 8 project aimags. The following digital maps with 1:100000 scale were produced using GIS software: • Base pasture map (all 143 soums) • Pasture water supply map (all 143 soums) • Stocking density map by 4 seasons (all 143 soums) • Carrying capacity map (selected 16 soums) • Estimated carrying capacity map (selected 16 soums) The program "Step Forward" conducted community based ecological research and wildlife monitoring in conjunction with a socio-economic study in Nomgon, Bayan-ovoo, and Khanbogd soums in Umnugobi aimag and Khatanbulag soum in Dornogobi aimag. Eco-tourism is mostly centered in protected areas, particularly in National Parks. Together with tourism development, a favorable environment has been created to develop associated businesses, increase job opportunities and the sale of souvenir products for local citizens. The baseline study of Umnugobi aimag shows that the income from horse and camel riding for tourists was Tugrugs1000000-1200000 per month and income from the sale of souvenir products was US$200-300 per month. Approximately 300 tourist camps are operating in 9 protected areas, which is 5 times more compared with 2002. The tourist camps have recruited local people and make contribution to the local economic development.

	Action 4 Aggressively protect and manage protected areas using ecologically sound principles.	In last few years, investment activity in state protected areas has been increased. Particularly, in 2006-2007, a total of 806.0 million tugrug budgeted has been spent on activities in state protected area, this is six times the 1998 amount. There are total of 380 people are working for 23 Protected Area Administrations, from which, 14% are administrative workers, 15% engineers and professionals, 55% rangers and 16% are service workers. Six new administrations have been established .There are 9 administrations that had their renewal plans approved, 14 will be approved in 2008 and 5 Management Plans will be completed by 2009.
	Action 5 Undertake research and monitoring in protected areas.	In 2007, a workshop was organized jointly by the Academy of Sciences and National University of Mongolia. Participants of the workshop developed a policy proposal on long term biodiversity and ecological monitoring. There are total of 380 people are working for 23 Protected Area Administrations. Students at over ten universities in the country are specialized in over twenty natural science fields. Since 2006 the National Geo-Information Center for Natural Resource Management (NGIC) project has been operating, supported by the Ministry of Nature and Environment. From 2003 to 2006 the National University of Mongolia, in cooperation with the Zoological Society of London in Great Britain, has implemented a program “Step Forward” under a cooperation agreement. As part of this program, nine sets of summer training have been organized for students in the Gobi Baga Strictly Protected Area. About 200 students who attended the summer training were trained in developing research project proposals, ecological studies, analyzing research data and methodologies of carrying out wild species inventories. Landscape research for the conservation of Asiatic wild ass in Mongolia was undertaken by the International Takhi Group (ITG, Switzerland & Mongolia) and University of Veterinary Medicine, Vienna (Austria) in cooperation with the National University of Mongolia (NUM). Research was undertaken as to the impacts of human intrusion and well rehabilitation on wild ass and other threatened species in the Gobi Desert International Center for the Advancement of Pastoral Systems (ICAPS, USA). This was carried out in association with the University of Freiburg (Germany), the University of Veterinary Medicine (Vienna), and the University of Oregon in cooperation with the NUM financed through the World Bank. Since 1996 research on the mayfly (Ephemeroptera), the stonefly (Plecoptera), the dragonfly (Odonata), beetles (Coleoptera), net winged insects (Neuroptera), cicadas, aphids, planthoppers (Hemiptera), grasshoppers (Orthoptera), the caddisfly (Trichoptera), membranous winged insects (Hymenoptera), the fly (Diptera), butterfly and moths (Lepidoptera) were conducted at buffer zone in the Khan Khentey Strictly Protected Area. However, the survey on insect diversity and their distribution have been undertaken through the territories of Special Protected Areas in Mongolia but it is not considered to be of adequate quality. During the period 2005-2007 surveys on bird species within the territory of protected areas of the country was conducted by the Laboratory of Ornithology within the Institute of Biology. Currently, out of 60 specially protected areas, 33 are under the strict protection (National Parks and Strictly Protected Areas) and another 8 natural reserve lands play significant role in conservation of rare species of birds and wildlife. Within the framework of this research, species composition, distribution and location, and trends in population of birds have been determined for totally 41 protected areas. Subsequently, the reports include some valuable recommendations and suggestions on improving protection of birds, ways to increase their number and rational planning for tourism, especially for tour operators and administration of protected areas regarding organizing the bird watching tours. The specially protected areas network of Mongolia completely covers the main habitats of rare and endangered species of birds. However, research activities, especially regarding the increase and improvement of scientific knowledge in ornithology, have not yet been sufficiently implemented. According to the research results, the impact of climate change that occurred over last few decades has had a significant influence on distribution, migration, nesting and on population of birds. For instance, in 2007 due to severe drought, some lakes located within Mongol-Daguur SPA desiccated. Only 5-15 % of total population of White-naped crane (Grus vigrio), Swan goose (Anser Cygnoides), relict gull (Larus relictus) nested in their original habitat during this time. This situation also negatively impacted on other wetland bird species and wildlife. A significant time commitment will be required for the lake to refill, and to restore the desiccated lake and original wetland ecosystem.

		Therefore it is necessary to protect the areas that were not as severely affected, especially those which play significant role in biodiversity conservation. Currently, all such lakes and their surroundings are used for pasture and livestock watering, which aggravates the existing conservation situation. The assessments of snow leopard were conducted in Tsagaan Shuvuut SPA and Hasagt Hairhan SPA. The assessments of the mammals were conducted in the western part of Han Hentii SPA, and Gobi Gurvan Saihan National Park. Also monitoring research for argali sheep and small carnivores have been undertaken in the Ih Nart Nature Reserve. The monitoring research of Gobi bear and wild camel was implemented in the Great Gobi SPA.
	Action 6 Develop ecologically sound guidelines for delineating protected area zones.	The amendments of Mongolian law on Special Protected Areas have been developed.
	Action 7 Develop and submit to Parliament a protected area strategy incorporating the above proposals and principles.	In 1998, the Mongolian Parliament approved the National Program on Special Protected Areas to increase coverage of protected areas up to 30% of its land. In addition, strategies for strengthening of protected area management are included in policy documents such as the National Comprehensive Development Policy based MDG (2007) and the Mongolian Millennium Development Goals (2000-2015).
Objective 2: Establish effective population control measures to limit human impact on the nation's biodiversity	Action 1 Determine the country's population capacity based on the availability of renewable natural resources (soil, water, forest, grassland, renewable energy etc.), and the requirements to protect the environment and conserve biodiversity, achieving a quality standard of living for its citizens while maintaining the country 's most important cultural traditions.	Mongolia has 3,800 GB hydro energy and more than one million GB wind energy resources available. According to the research results, the establishment of wind power stations or parks in the Gobi region can provide the country with about 1113 GB renewable energy. In order to develop the renewable energy sector in the country, Mongolian Parliament adopted the Law on Renewable Energy in 2007. The World Bank, in cooperation with the Government of Mongolia and the Government of the Netherlands, has been supporting the implementation of "Use of renewable energy resources in rural energy supply" since 2007. Through this project, a number of soums across 14 aimags, currently not connected to the centralized energy supply, will have renewable energy generation facilities installed.
	Action 2 Review government policies that encourage a rapid population growth rate.	Results, outcomes and discussion points from experts resulting from: the "Strengthening Environmental Governance in Mongolia" project, with support of UNDP and the Government of the Netherlands were introduced to the Parliament and the government of Mongolia. In addition, the three inter related assessments on the environmental legal framework; sector institutional structure and implementation of UN Conventions; were introduced to the Parliament and Government of Mongolia.

	Action 3 Review government policies about population distribution and discourage schemes to promote settlements in and around protected areas.	A number of community-based organizations have been established to introduce community-based natural resource management in forested parts of the country. These organizations are responsible for the sustainable use and conservation of their forests and other resources, as well as supporting the mitigation of illegal tree cutting, and other activities with negative impacts within their area of responsibility. Conservation of endangered species and prevention of illegal activities have been actioned through a framework provided by the Eastern Mongolian biodiversity conservation and community-based biodiversity conservation projects, implemented jointly by GEF and UNDP. Subsequently, activities to promote sustainable livelihoods, especially the introduction of the practice of using secondary resources to supply household needs, has also been implemented.
	Action 4 Study the links between environment and development and use the results to determine a sustainable development strategy. This action to be linked with the MAP 21 or Capacity 21 program.	The national committee of Sustainable Development in 1996. Biodiversity conservation activity included in MAP 21.
	Action 5 Share information with the public about the environmental effects of increased population and link programs for elimination of poverty and reduction of unemployment with protection of biodiversity, and develop international cooperation in this field.	Snow Leopard Enterprises helps people living in poverty increase their standard of living, and at the same time protect their local ecosystems. This program, which was initiated in Mongolia in the late 1990s, encourages snow leopard conservation while helping increase the incomes of rural Mongolians through handicraft production. Nearly 300 herder-artisans and their families in six provinces of Mongolia are involved today, and participants increase their household income by as much as 25 percent. New classrooms designed for biology/ biodiversity conservation were established in each secondary school in the country. Local people were assisted in obtaining books, magazines, slides, videos, and other audio-visual material. The Environmental Conservation Fund was established for the promotion of public awareness activities regarding the environment including biodiversity.

Objective 3: Implement an effective environmental impact assessment (EIA) program to understand the proposed actions on biodiversity	Action 1 Establish procedures to ensure that EIA analysis is considered throughout the decision making process on proposed actions. Train staff at the national and local level, and establish processes for resolution of conflicts including determination of who adjudicates in the last resort.	The enforcement of 27 laws, over 20 regulations and rules and thirteen international conventions has been monitored. This ensures environmental laws including Environmental Impact Assessment, Protected Areas, Forestation and conservation and sustainable use of natural resources i.e., are adequately enforced. This will address forests, water sources, fauna and flora species, and underground resources in addition to other resources. Prior to the approval of permits for the use of biological reserves, it is necessary to develop an environmental impact assessment scheme. It is important to do this task prior to the approval of management plans and programs for Protected Areas.
	Action 2 Improve public understanding of EIA and encourage participation of the public in providing information, inquiries and appeals.	The communities of three soums in Uvs aimag has organized to teach the community about monitoring research and environmental assessments, funded by WWF. To suppress illegal killing of wildlife, three mobile anti-poaching units were founded in Uvs aimag and recently in Hovd aimag. Social-economics research and the introduction of an education program have been undertaken in the buffer zone of the Great Gobi SPA.
	Action 3 Require EIA's to consider cumulative impact of the proposed actions. Also take steps to plug loopholes in the present law that allows developers to split large projects into smaller ones and thus avoid the legal requirement to carry out EIA.	In 1995-2007, the Ministry of Nature, Environment and Tourism has received 6043 environmental impact assessments, out of which, in 2006-2007, total of 450 detailed environmental impact assessments have been discussed at the assessment committee meetings.

	Action 4 Improve the capability of the government to carry out monitoring of environmental impact and strengthen their enforcement capabilities.	-The Constitution of Mongolia, the NBAP and the Law on Environmental Protection and other legislative acts provides full and adequate basis for applying Environmental Impact Assessment in Mongolia. -Ministry of Nature and Environment and other relevant institutes organize about 50 seminar and workshops per year on biodiversity conservation topics. -More than 30 specialist attended short and long term courses abroad per year.
	Action 5 Establish Environmental units in all the main development ministries in order to oversee adequately the EIA processes and to ensure EIA's are considered in decision making.	Not yet implemented.
	Action 6 Develop guidelines for judging the adequacy of EIA and refine guidelines for acceptable limits to environmental impacts.	-In order to improve the quality of the assessment and in accordance with the procedures of the Committee on EIA, a report that has been prepared by authorized professional companies, has to be discussed at the meeting of the committee established under the MNET. -Since EIA was introduced into Mongolia in 1998 over 700 EIA's have been prepared but in many cases EIA is not the appropriate tool to ensure that environmental impacts associated with an investment are identified, avoided, prevented, or mitigated by investor. Development guidelines can be more helpful, particularly when most of the potential impacts and the remedies to avoid or mitigate them are well known, for example, with regard to the development of petrol stations, tourism facilities, major buildings, or small to medium-scale mining activities.
	Action 1 Initiate a research program to improve understanding of the function of Mongolia's ecosystems and their processes identifying the factors affecting the health of the ecosystems, and the most significant threats	National programs for the Snow leopard (2005), Argali sheep (2002) and red deer (2000) were developed and research data has been produced. These programs have implemented measures aimed to protect the mammals, and facilitate breeding. Recently, a national program for the protection of the Musk deer is being developed.

	Action 2 Develop accurate population and distribution information for animal and plant species with priority given to threatened and endangered species, endemic species and species that are hunted or fished.	Accurate population and distribution information for animal plant species are to be developed, with priority given to threatened and endangered species, endemic species and species that are hunted or fished; A genetic conservation research program is to be developed Ornithology research over the territory covered by the protected area network has been implemented. Some publications regarding rare species of birds have been published The Mongolian Red Book list of mammals contains 128 native Mongolian mammals and highlights their status within Mongolia. This is accompanied by other information such as conservation measures and dominant threats. Species have been assessed using the "IUCN Red List Categories and Criteria". These assessments were carried out by experts on Mongolian mammals at the November 2005 workshop. A database of the animals and plant ecosystems of Great Gobi SPA has been developed and is currently being assessed. Information regarding the Mongolian mammals has been entered to the Database Mongolian Natural Resourses in the MNE. In 2005 through funding the World Bank's Netherlands-Mongolia Trust Fund for Environmental Reform,a reliable list of Mongolian fresh water fish has been developed. The list addresses biodiversity with systematic and nomenclature notes (Fishes of Mongolia). Additionally, in 2006, the Mongolian Red List of Fishes and 64 native Mongolian fish species was published. The fish species have been assessed using the IUCN Red List Categories and Criteria (IUCN, 2001), at a regional level. The summary Conservation Action Plans for Mongolian fish was published in conjunction with this work. The publication presents information about the current known distribution, threats faced, conservation measures already established, and
	Action 3 Develop a genetic conservation research program	The Mammalian Ecology Laboratory has implemented long term research projects on wild Bactrian camels, snow leopards, gobi bears, Mongolian saigas, argali sheep, Mongolian gazelles, wild ass, and other endangered animals. The main goal of the research are to determine ecological and biological aspects of these populations, including fluctuation of population number and range, habitats of population etc.
Objective 5: Establish a nationwide information and monitoring system for biodiversity conservation	Action 1 Improve the coordination and use of various information and monitoring networks	-In cooperation with the Academy of Sciences, funding allowed for a NUM workshop for over 80 national researchers and scientists that carry out long-term biodiversity and ecological monitoring to be conducted in 2007. Workshop participants developed a policy proposal on long term biodiversity and ecological monitoring, along with proposals on the selection and establishment of monitoring and research subjects, and intentions to strengthen inter-sector cooperation. -Research institutions keep their own research data, results and reports. MNET website (www.mne.org) gives an introduction of the organizational structure, each section, environmental legislation, and information regarding biodiversity conservation. -The National information and technology park has an extensive electronic library.
	Action 2 Improve biological information, especially occurrence and distribution data. Present distribution and population data for many species are poorly known. Priority should be given to endemic and endangered species.	Since 2004, a project on ecosystem conservation of the Eg- Uur watershed has been implemented. This project has been initiated in aid of the Taimen which are listed as rare animals of Mongolia. The project has included monitoring of movement, distribution using population structure and spawning biology of species. This has been done with the help of radio and acoustic tracking devices attached to 48 fish. According to the 1996 National Report on Implementation of UNCBD, out of total 426 species of birds 108 species are migratory for Mongolia, 74 are permanently living in Mongolia, 231 are migratory but nesting in Mongolia, and 13 are wintering in Mongolia from Siberia. The bird species in Mongolia were increased by a number of new species (Bold et al., 2005, Gombobaatar et al., 2005,2007, Riding et al., 2006); a number of bird types previously identified as sub species were given independent species status and as such their classification has been changed. Now in Mongolia a total of 472 species from 204 genus, belonging to 61 families of 19 orders are present. Of these, 81 species are permanently located within Mongolia and all other (391) species are migratory. Of the migratory birds, 254 nest for summer, 6 summer in Mongolia, and it is unknown whether they nest, 49 are migratory and do not stay in Mongolia, 10 winter from the northern regions, 64 species rarely occur, and 8 met in summer, but do not nest (the list of birds registered in Mongolia and their habitat are enclosed). From this list we can see that only 17.2 % of birds live in Mongolia throughout the year. The number of birds nesting and summering in the territory of Mongolia is higher (71.0 %). Research has been undertaken on Endandangered and Rare animals, highlighting a lack of research on mammals. This represents 37 percent of Mongolian mammals which are categorised as Data Deficient.

	Action 3 Improve monitoring of trends through use of advanced technologies such as remote sensing.	The Institute of Biology, with the support of international organizations conduct research using remotely controlled chip-sensors for migratory species as white-naped crane (Grus vipio), swan goose (Anser cygnoides), bar-headed goose (A. indicus), whooper swan (Cygnus cygnus), vulture (Aequpius spp.), bustard (Otis tarda), black stork (Ciconia nigra)and saker falcon (Falco cherrug) (www. werc.usgs.gov/sattrack/mongoliaindex.html). Some results have already been achieved. Also the information regarding infectious disease might be transmitted by the migratory birds as bird flu, foot and mouth disease, have started to be collected. Geographical Information System presents an opportunity to map the forests. This would include data on current forest resources and any changes thaty could be included in the database presenting a more accurate and complete set of information. This could be made accessible to the public. Information and data on forests in Binder and Umnudelger soums of Khentii aimag has been processed with ARCVIEW GIS 3.2 and entered into the database. The GTZ project "Nature Conservation and Sustainable Management of Natural Resources" conducted forest inventory/census on 479.000 ha within the region, where the project was implemented using satellite images and GIS. Conservation of the Great Gobi Ecosystem and its Umbrella Species Project has been carried out in cooperation with researchers from the Institute of Biology (Mongolia) and Zoological Institute in Denver (USA). Satellite image colors were placed on a number of Bactrian camel in order to identify their locations and migration routes. In order to distinguish each individual Gobi bear and learn their behavior, activity and regeneration issues, ten sensors have been placed on different Gobi bear's neck. Funded by USIAD, The Gobi Forage project has been implemented in various Gobi regions. A simulation model called PHYGROW is used to model forage conditions at the monitoring sites. A statistical procedure called Autoregressive Integrated Moving Average (ARIMA) is used for forecasting forage conditions out to 30, 60 and 90 days into the future. These outputs are also integrated into regional maps. http://glews.tamu.edu/mongolia
	Action 4 Strengthen field monitoring programs.	Monitoring of foot and mouth disease among the migratory birds has been conducted in a basin of more than 100 lakes located in the territory of 50 soums of 12 aimags. During the survey the flock composition, the population, the status of infection and human impact has been assessed. The data collected was processed at the Institute of Biology. In a preparatory stage of this survey, a training series among participants was organized; the guide for identifying birds and methodology of assessment was developed and distributed. Moreover, over 200 local specialists were equipped by binoculars, GPSs and cameras. The project was implemented by the support of international organizations.
Objective 6: Establish national education and training programs for biodiversity conservation	Action 1 Establish ecology and nature protection classes and quiz competitions for school children and include the courses into the official curriculum of the Ministry of Science and Education.	- "Ecology" is taught in secondary schools according to the curriculum. -In cooperation with the Mongolian National Television, the tele-lesson "Earth is my home" was shown for one month. Tthe radio lesson "Living Environment" aired for two months. This was carried out in cooperation with the Mongolian radio study "Khurd". -More than 10 contests were announced and organised among secondary school students, incluin conjunction with Ecology, a three month campaign "Let's protect the environment" and "Untouched Nature"
	Action 2 Render assistance to aimag and city schools in obtaining books, magazines, slides, videos, and other audio-visual material.	-More than 200 policy documents, books, information bulletins, pieces of indigenous and traditional knowledge, innovations and practices and visual materials on biodiversity issues has been published and became available as an information source.. -Under GTZ "Nature Conservation and Natural Resource Management" support has been provided to information centers established in rural areas through the provision of environmental awareness materials. These materials have included books to libraries, brochures and hand books for school teachers and educators. Training and workshops have been provided for information center officers and secondary school teachers for the last ten years

	Action 3 Institute a college level degree program in ecology.	Since 2003, the National University of Mongolia, in cooperation with the Zoological Society of London in Great Britain, has implemented "Steppe Forward'. The program involves 200 students attended the summer training including developing research project proposals on wildlife population assessment, ecological studies, analyzing research data and methodologies of carrying out wild species inventories. The department of Biology the NUM has run a new department of Ecology- Nature Conservation. Similar training is conducted at other colleges and universities such as the Mongolian Educational University, Eco-Asia Institute and University of Agriculture.
	Action 4 Train teachers how to teach ecology classes while they are doing their own teacher training courses.	The Ecological Centre organizes training and re-training for teachers and instructors at secondary schools, colleges and universities in order to improve their environmental knowledge and education. The program, "Steppe Forward", in cooperation with the Centre for Ecological Education at the NUM organized mid career training for teachers of Ecology in secondary schools in countryside.
	Action 5 As part of executive training programs provide local leaders with training in basic ecological concepts tied to applied conservation.	Within the frame of the GTZ project "Nature Conservation and Sustainable Management of Natural Resources" training has been organised.
	Action 6 Establish a Biodiversity Conservation Training Center to provide high quality training in ecology and conservation biology for staff of the Ministry for Nature and the Environment, legislators, judges, other government officials, and interested members of the public.	Not yet established.
	Action 7 Establish a comprehensive library in the MNET and generally improve the country's library collection in ecological and related fields.	Not yet established.

Objective 7: Establish a public information program to improve people's knowledge of biodiversity and the importance of conserving it	Action 1 Evaluate and monitor nationally and regionally the public's perception of biodiversity and the importance of its conservation.	-Evaluate and monitor both nationally and regionally the public's perception of biodiversity and the importance of its conservation. -Encourage the spread of information through a competitive grant scheme about biodiversity through various media aspects. These include publication of environmental magazines and posters to production of television and radio programs and the holding of public meetings and seminars.
	Action 2 Encourage the spread of information through a competitive grant scheme about biodiversity through various media aspects. These include publication of environmental magazines and posters to production of television and radio programs and the holding of public meetings and seminars.	In order to improve the public's awareness on environmental law enforcement and to publicise regular awareness activities, cooperation agreements were made with media outlets, including the Mongolian National Television channel, Mongolian radio, newspapers 'Zuunii medee' and 'Unen'. In cooperation with the Mongolian radio, an NGO has prepared a ten minute program entitled "Ecological Binoculars" aired weekly. According to the cooperation agreements with newspaper "Zuunii medee' and "Unen", news on environmental issues and public awareness material is published every two weeks. Since late 2003 special programs entitled "Forest invasive species", "Environmental Pollution", "Water Reform" etc., have been shown monthly by the Mongolian National Television channel.
	Action 3 Promote public awareness of biodiversity issues through regular publication by the Ministry for Nature and the Environment of periodic fact sheets and newsletters.	Published "Guideline for rangers", "List of rare plants", "Red list of Mammals", "Red list of fish" and many books and guidelines.

	Action 4 Organize art, essay writing and presentation competitions on biological diversity among youth and children	In 1999and 2002 under theauspices of the North East Asian Crane Working group (N. Tseveenmyadag represented Mongolia) the "Who know the cranes life better" art competitions were organized. The selected art works have been exhibited in several cities in Russia, China, Japan, and Korea. Art works submitted by school children from Choibalsan, Dashbalbar, Chuluunkhoroot and Khalkhgol were selected.
	Action 5 Support initiatives on establishing or maintaining local museums and natural history clubs. Use facilities of children's summer camps as a starting point to run natural history clubs.	Since 2008, "Mongolian bird watching club" has been established, which organises various bird watching tours. The members of the club have built web page though which bird lovers can exchange knowledge and information about birds and other wildlife. This initiative is successfully running. For more information please visit the site: http://mongolbirdwatchclub.blogspot.com
Objective 8: Control pollution of air, water and soil	Action 1 Establish clear standards for acceptable levels of contaminants in air, water and soil, and make the standards stricter for protected areas.	The maximum allowable concentration of pollutants is standardized for the territory of Mongolia using the following standards: - MNS 13.020.40 – Pollution level, monitoring pollution and protection - MNS 13.060.10 – Natural water standard - MNS 13.060.20 – Potable water quality standard - MNS 13.080.99 – Soil quality standard An air, water and soil pollution monitoring network has been established. A Pollution Control Strategy and legal system has been developed.
	Action 2 Improve monitoring of air, water and soil quality through training and purchase of necessary field and laboratory equipment.	Air quality monitoring over the capital city and large towns has been conducted since 1987. In 2008 to improve the quality of environmental monitoring 2 mobile stations were purchased and are now functioning within Ulaanbaatar. The water quality monitoring has been implemented over the largest river basins. With support of the Government of Japan, in collaboration with Tokyo University and NAMHEM, the research project on water quality monitoring of Tuul River has been implemented. In 2007, with support of IAEA, the research project on monitoring the water quality of the Kharaa River using isotopic methods was conducted. The project aimed to determine the impact of industry, agriculture and urbanization on the quality of underground aquifers.

	Action 3 Continue the pollution mitigation measures initiated in the Tuul Gol under the Tuul Gol Pollution Mitigation Project and use the experience gained to control pollution on other rivers.	The Tuul River water quality control and monitoring project was implemented in two stages during 2000 and 2003, with the support of the Government of Japan. The project aimed to distribute knowledge gained from the projects and programs to the general public, as well as broaden scientific research activities within the river basin.
Objective 9: Control hunting and fishing	Action 2 Through the public information program convince people of the need to take from nature at a rate lower than or equal to the replacement rate for renewable resources, such as wild animals. Through public education, gain the help of the general public in preventing illegal hunting and fishing.	A communication about the Snow Leopard has been prepared by the local press agency. A regular radio broadcast was prepared entitled “Don’t startle the Snow leopard” A broadcast about the conservation measures and status of some mammals, such as a wild camel, saiga, musk deer, through “Education channel” television was prepared and distributed.
	Action 3 Ensure that all harvest quotas are based on accurate biological information and that, following the precautionary principle, the quotas are known to be sustainable.	Since 1994, Mongolia is exporting the Saker falcon to the Arabian countries. According to the Saker falcon census, implemented in 2002, a total of 6500 birds were estimated to exist. Since then, due to minimal resourcing the monitoring of the number of this species is implemented only in regions where the Saker falconwere collecting in 2007 and 2008. The surveys showed that overall number of Saker falcon has decreased and the number of high quality bird also decreased. The Ministry of Nature, Environment and Tourism has been urged not to exceed the number of catches beyond 50-100 birds in year. Unfortunately, this recommendation has not been implemented and the country continue exporting around 240-320 falcon a year.
	Action 4 Strengthen border controls and train customs officers in detection of animals and their parts which are in illegal trade.	In 2001 the “Reference book to the CITES” and in 2008 the “Guide to identify specimen of wild animals and plants” were published and distributed. Series of papers, flyers and other public awareness material has been prepared and distributed.

	Action 5 Review and make necessary changes to the laws and regulations concerning wildlife exploitation, including closed areas, seasons, permits, quotas, bag and possession limits, and removal methods.	In 2006 and in 2007 the Ministry of Nature and the Environment of Mongolia developed and endorsed, several law amendments of laws, such as "Mongolian Law on Environmental Protection" (1995), "Mongolian Law on Fauna" (2000) , "Mongolian Law on Hunting" (2000), "Mongolian law on Hunting reserve Use Payments and on Hunting and Trapping Authorization Fees". The Ministry has developed and approved the Rules on Marking and Trapping of the Animals.
Objective 10: Prevent pasture deterioration through overgrazing	Action 1 Determine the health of the Mongolia's pasture land.	The Mongolian pasture land survey is conducted once every 5 years, most recently in 2008. This research assesses plant species composition, level of land degradation, population capacity and other indicators of pasture health. Moreover, recommendations are developed for required actions based on the survey results. All assessment reports are delivered to the Central State Body responsible for land affairs. This is used by the central and rural self-governing organization as a reference to guide follow up action. With support from USAID as part of the 'Gobi forage' project and using the ARIMA model for pasture yield, population capacities are calculated monthly and broadcasted via the project website.
	Action 2 Establish grazing capacities through scientific research	Funded by USIAD, Gobi Forage project has implemented in gobi regions. A simulation model called PHYGROW is used to model foragimg conditions at the monitoring sites. A statistical procedure called Autoregressive Integrated Moving Average (ARIMA) is used for forecasting forage conditions out to 30, 60 and 90 days into the future. These outputs are also integrated into regional maps. The model is able to run in near-real time using rainfall (CMORPH) and temperature data provided on a daily basis by the US National Oceanic and Atmospheric Administration (NOAA) http://glews.tamu.edu/mongolia
	Action 3 Establish procedures to ensure that numbers and kinds of livestock are within the grazing capacity of the particular pasture and that the best of traditional and modern management are used.	In 2005-08, the UNDP supported the implementation of the "Sustainable Grassland Management" Project, in order to restore traditional practices and reduce negative environmental impacts related to pastures. The project design included work in 15 soums across 5 aimags, formalising more than 50 herder community organizations. Within those communities, traditional ways of livestock breeding have been restored as well as new technologies adopted. This can be distinguished as a first step towards adjusting livestock number and flock composition to the pasture carrying capacity.
Objective 11:Establish effective land-use planning controls and transportation policy	Action 1 Develop national policy on land use in Mongolia taking into account biological resources and their distribution	The nation-wide land use plan was developed and ratified in 2005 by the Government of Mongolia. The national strategy for land use and land management is reflected in this plan

	Action 2 Develop ecologically sound land-use plans using biological data for each aimag and soum. The plans should have enforceable rules that protect biodiversity.	Land use plans for all administrative units, consistent with the national land use plan were developed during 2006-2008. Every soum is responsible to revise and amend its land use plan according to social demand every year. Aimag and soum land use plans are then ratified by the Local Citizens' Representative Hural as the highest governing body. Further, according to the regional development concept, regional land use plans have been under development since 2008.
Objective 12: Develop strong regulations to protect biodiversity from effects of mining.	Action 1 Ensure that all mining operations include stringent environmental protection measures and habitat restoration after operations have ceased.	According to the amendment to the Law on Mineral resources, every organization undertaking mining and extractive activities should have an environmental protection plan and is obliged to carry out technical and biological restoration. In 2008 following this amendment, all the standards dealing with the assessment of the state of environment within the mining sites, as well as restoration requirements, were revised. With the economic development of the country negative threats affecting biological diversity are increasing. To study how the economic development impacts on environment, ensure that significant habitats are protected, and transfer technology and best practices from other countries with similar conditionsa project has been undertaken. WB, Birdlife International, TNC, Department of geology and mining cadastre, Agency of Land Affairs, Geodesy and Cartography, Department of Tourism, Centre for wildlife research, National University of Mongolia have jointly implemented a project on "Linking the environmental protection activities with economic development".
	Action 2 Require environmental impact assessments not only for proposed mining operations themselves but also for new settlements and other developments that result from the mines.	According to EIA legislation, environmental impact assessments should be undertaken by every organization intending to use natural resources or potentially impact environmental settings. An EIA is therefore required to be undertaken by an authorized organization for projects such as: road construction, implementing civil construction, developing industry or mining/extractive activity, in the territory of Mongolia.
Objective 13: Support tourism while developing sensible regulations to protect Biodiversity	Action 1 Include special consideration for tourism in protected areas in the National Development Plan.	In 2004, the Master Plan for Developing Tourism in Mongolia was published by the former MoRTT; the plan is in support of rural development.

	Act ion 2 Establish clear mechanisms for assessment of environmental impacts of tourism activities and for decisions to be made on whether they should be permitted under particular conditions. This will require close cooperation between local government and the National Service Protected Area and Ecotourism in cases of tourism in protected areas.	In last years, made general assessment 1109 projects related to tourism.
	Action 3 Include tourism in the National Program for Protected Areas. Tourism activities within protected areas should be consistent with the National Program and permitted by approved protected area master plans.	Within the framework of Tourism Development Strategy for Mongolia 2007-2011 in 2007, tourism policy is to be improved near the Special Protected Areas.
	Action 4 Encourage the involvement of local people in tourism so that economic benefits stay in the area.	-In 2004 a Master Plan on Tourism Development that focused on rural development was developed and adopted. As tour camps and ger camps are established and run at local levels, projects and programs on improvement of livelihood of local communities have been implemented. Local people have also initiated small businesses that play an important role in tourism development. -The most recent strategy for tourism development is the Tourism Development Strategy for Mongolia 2007-2011, published by the former MoRTT. The objectives in the strategy is for mitigation of poverty with benefits for households on low incomes, and socially fragile groups etc.

	Action 5 Prepare regulations that set limits on the environmental effects of tourists in protected areas.	Since 1990, Mongolia has developed several key laws, regulations and guidelines related to tourism development, including; The Law on Special Protected Areas (1994), Ministerial Order №.43 on the Regulation of Tourism Operations in Protected Areas (1996). The Master Plan for Developing Tourism in Mongolia, supported by JICA (1999), The Tourism Development Strategy for Mongolia 2007-2011.
	Action 6 Monitor the effects of tourism on the environment and on the socio-economic conditions in the area.	The mission of the Sustainable Tourism Development Center is to contribute towards the design, monitoring, evaluation and improvement of sustainable tourism practices and principles in Mongolia.
Objective 14: Ensure that agriculture and forestry are carried out in ways compatible with biodiversity conservation	Action 2 Introduce and support ecological agricultural practices.	The government has developed a special policy on Agricultural Sector Development for 2003-2015 that promotes the objectives to increase agricultural outputs and to cultivate mainly local varieties, avoiding insects and other negative factors using progressive technologies. Working towards achieving results in activities such as establishing a gene pool of plants, decision making of conservation activities and the use of chemical-biological The project “Country Need Assessment in Biodiversity Conservation”, funded by GEF, has assessed Mongolian Agriculture biodiversity resources. For more information, please visit www.mnec/biodiversity
Objective 15: Improve ex-situ management for species conservation and conserving genetic resources	Action 1 Assess carefully the needs for captive breeding in Mongolia Limit captive breeding and reproduction programs to Mongolian species or to those whose extinction is otherwise imminent. There must also be a commitment to habitat restoration and protection of the wild population.	29 red deer were trapped in the Hustai National Park, and transported to the red deer breeding center supported by the GTZ, located in Mungunmorit soum, Tuv aimag. Scientists implemented the project to reintroduce marmot in three different regions- Mungunmorit soum in Tuv aimag, Baruunharaa soum in Selenge aimag and Ikh Bogd mountain in Bayanhongor aimag. Recovery work for the wild camel, gobi bear’s habitat, with manyinternational and national organization is underway, however the results are low.

	Action 2 Carry out necessary research before embarking on captive breeding projects.	A study to assess significant dietary overlap between domestic sheep, goat and horse and wild ass and Mongolian gazelle has been carried out in Dornogobi aimag. The food habits of these animals were studied by faecal analyses method.
Objective 16: Identify and restore damaged lands	Action 1 Assess total extent of damaged lands through gathering of existing information and collection of further data through research. Determine areas, distribution and the reasons for the degradation. Land will be classified according to level of degradation.	Every five years, a national land quality assessment is conducted, identifying the area of land affected by land degradation and the forms of land degradation. These assessments reflect recommendations on actions to be undertaken and technologies to be used to restore land affected by degradation. Currently, the assessments of natural and human factors causing land degradation and their appearance for each land use type are being implemented.
	Action 2 Establish priorities for restoring damaged lands and establish a ten-year timetable within which to accomplish restoration. Define the restoration methods that should be employed in each case. In all cases, the cause of degradation is to be stopped before restoration begins.	The land restoration plan is incorporated in two national action plans: NAP on Combating Desertification and NAP on Green wall. The regions affected by land degradation have also developed their own action plans at the regional or local level. Assessments on determining the area affected by land degradation and identifying its levels and types at the local level are not sufficient.

The NBAP is prepared by goals and activities, but not by articles of the Convention. It is difficult to make an assessment of implementation of the NBAP, so an assessment has been made of the current status of the implementation of NBAP according to the Articles of the Conventions on Biodiversity. To do so, the Activities of the NBAP were grouped into several components according to the Articles of the Convention, such that Articles 7-20 of the Convention can be now treated as equivalent to the components of the NBAP. A summary of results of the current status of the NBAP, according to articles of Convenstion is shown below.

Article 7 of the CBD: Identification and monitoring

The Mongolian Biodiversity Conservation Action Plan highlights the need for establishing wildlife inventories and monitoring them. Issues on constant observation, control and analyzing of ecosystem components and providing a database on nature have been legalized in the law on "Environmental Protection", law on "Wildlife", law on " Natural Plants", law on "Environmental Impact Assessment" and the law on "Protected Areas. With financial support from the State budget, the assessment of resources and an inventory program were implemented at rare and endangered species level. For example, a programme was implemented to assess the status of some animals which are recorded in the Red Book, such as wild mountain sheep *(Ovis ammon)*, wild goat *(Capra siberica),* Gobi bear *(Ursus arctos gobiensis),* snow leopard *(Uncia uncia)*, Przewalski's Horse *(Equus przewalskii)* and the Bactrian camel *(Camelus bactrianus ferus)*. Also at the national level an inventory of falcon and deer was carried out. With the support of foreign donors, the Protected Area Administration together with scientific institutions has organized research, study and monitoring activities in Protected Areas. For example under the Eastern Steppe Biodiversity Project fifteen research projects were implemented to study the ecology and biology of mammals, fish, birds, reptiles and the impact of pastoral monitoring methodologies and climate changes on biological diversity. The Information and Computer Center of the Ministry for Nature and Environment is using software and GIS equipment for processing and analyzing biodiversity data. For instance, maps based on the NOAA satellite data on forest and steppe fires, as well as snow and grass cover, have been produced. However, common problems such as unsatisfactory information on biological resources, lack of developed and integrated methodologies of monitoring and lack of qualified professionals still exist.

Actions needed to be carried out for further successful implementation of NBAP for article 7 of the convention:

- Set up comprehensive monitoring and research plans and programs at the national level.
- Extend observation and surveys, including on the overall climatic system, and studies of land resources, erosion and degradation, vegetation cover, plant animal diseases, insect infestations, surface and underground water
- Create a system for the biological and chemical monitoring of air, water and soil, conduct monitoring of agro chemistry, hydrobiology and the distribution of germs on cellular level
- Prevent biological disasters, strengthen system of quarantine on plants and food, conduct monitoring of diseases and harmful insects
- Increase regional cooperation in field of monitoring and of biological diversity and alien species
- Introduce up-to-date biodiversity monitoring techniques and technology, enhance the economic base, develop a control-analyzing programme, identify integrated methodologies, standards and norms and train specialists in this area.

Article 8 of the CBD: In-situ conservation (including articles 8h and 8j)

In situ conservation is key goal of the NBAP. Mongolia has taken certain steps to establish a system of Protected Areas and ensure their management recognizes the great importance of Protected Areas which balance the virginity of nature, support the main ecological processes, represent rare and endemic species and preserve and protect historical and cultural property. Scientists consider that a country which has nature, climate and territory features like Mongolia has to take under the protection no less than 30% of its territory, and by carrying out economic activity effectively it can ensure its ecological balance. Although the budget for this from the State is increasing from year to year it is insufficient to protect effectively the biological diversity in conformity with its environment.

Mongolia has prepared and is implementing measures for *in situ* conservation of its biological diversity.

Mongolia has defined its strategy for in-situ biodiversity conservation, protection of rare and vanishing species and plants, and created a strong legal framework.

Legal documents and plans of action, including the law on "Environmental Protection", law on "Special Protected Areas", law on 'Buffer Zones of Protected Areas", law on "Wildlife", law on "Protection of Plants", National Biodiversity Conservation Action Plan, National Program on Protected Areas and law and requlations on import and export of alien species across the country's borders have been approved by the Parliament and the Government of Mongolia. Legal acts and regulations related to the conservation of flora and fauna have been introduced and enforced.

!998, special protected areas of Mongolia comprised 11.1% of whole territory, where increased to 14% in 2007. As of 2007, special protected areas of Mongolia encompass 21.9 million hecttars covering 61 areas. There are 12 strictly protected areas covering 10,554,523 ha, 21 national parks covering 9,229,905 ha, 19 national reserves covering 2,006,270 ha and 8 natural monuments covering 102,083 ha.

Actions needed to be carried out for further successful implementation of NBAP for article 8 of the convention:

- Promote protection of ecosystems and natural habitats, as well as the maintenance of viable populations of species in natural surroundings.
- Encourage environmentally sound development in buffer zones around protected areas.
- Improve existing regulatory provisions for the protection of threatened species and populations.
- Conduct national assessments of alien invasive species to identify species, numbers, distribution and functions of alien invasive species and establish data base
- Promote the use of traditional culture of native people to deal with nature utilizing biological resources and their restoration
- Include traditional knowledge in formal and informal education program program, and improve teaching methodologies and provide necessary supplies

Article 9 of the CBD: Ex-situ conservation

The Mongolian Biodiversity Conservation Action Plan highlights the need of Ex-situ conservation. The law on "Wildlife" and law on "Natural Plants" define plant and animal protection measures as the reintroduction, domestication and support of breeding of animals and plants. According to the above-mentioned Law, permission must be obtained from relevant authorities for domestication and deliberate rearing of wild animals. Hunting and catching of rare and endangered animals is permitted only for scientific purposes under control of the central state administrative organization. As for plants, creation of nurseries and gardens has been encouraged at the policy level and financed from the state budget. Animal Husbandry and Plant and Agricultural Institutes have been conducting research and experimental works on the possibility of growing special sorts of cultivated food and fodder plants suitable to the Mongolian climate through reproductive selection methods, as well as on improvement of livestock breeds.

Some fur bearing animals were introduced into Mongolia and farmed, such as *Ondatra zibheticus*, Stoats and Raccoon Dogs, while the two species of native gazelle, Saiga antelope, Przewalski's Horse, Asian beavers and wild goats are being reintroduced into areas where they used to dwell and also into new areas. The Przwalski's Horse reintroduction programme has been going since 1992. There are now over 200 horses in the country, centered on two sites; Takhiin Tal in the Gobi desert and Hustain Nuruu in Tov province.

Made significant step to conserve the Bactrian Camel, Gobi bear, Saiga antelope, snow leopards and red deer are planned.

The utilization of 133 species of plants was legally prohibited and 128 higher and lower species were registered in the Red Book of Mongolia, which means that favorable conditions for their natural rehabilitation have been created. Over 20 endangered plants are now being re-cultivated.

A botanical garden was established in eastern Ulaanbaatar in the 1970's in order to conserve native, rare and economically useful plant species. For the last twenty years research has been carried out on over 100 species at the garden, and plants are provided for the city's green areas from this garden.

An arboretum was established in the north-east of Ulaanbaatar in the 1980's and has cultivated about 800 species of native trees and 50,000 other plants. Operations of both gardens have recently been reduced as a result of financial problems and a shortage of qualified staff.

Over 20 projects, including The Cultivation of rare and useful plants in the Gobi; Genetic resources of the

original, rare and useful plants in Mongolia and Studies on cultivation of rare plants are being implemented for the purpose of cultivating plants as well as presenting their extinction.

Actions needed to be carried out for further successful implementation of NBAP for article 9 of the convention:

Establish and improve the national breeding and domestication centres for endangered and rare animals and plants (breeding stations, zoos, botanic gardens)

- Improve skills and qualifications of staff.

Expand the scope of research studies on increasing biodiversity, introduce up-to-date The NBAP is widely admired and accepted. Completion of the plan was followed up by government. Also, the Government made enough policy response in implementation of the NBAP. The NBAP has been integrated in other sectors and in some important economic and social development strategies of the country. As result of the above policy response of the Government, the NBAP has carried out successfully

- Technology and cooperate with foreign countries.
- Pay more attention to improving the method, technology and facilities for ex-situ conservation.
- Continue to research plants, animals and micro-organisms in the country.
- Promote co-operation in providing financial and other support for ex-situ considerations.

Article 10 of the CBD: Sustainable use of components of biodiversity

The socio-economic development of Mongolia is widely dependent on the utilization of natural resources. Sustainable utilization of the natural resources has been put as the main objective in the State Policy on Ecology, Mongolian Action Program for the 21st century, the National Biodiversity Conservation Action Plan, and 20 other programs on environmental policy. Also 25 environmental as well as other relevant laws have created the legal basis for the 'polluter pays' and 'utilizer protects' principles. These environmental laws regulate the relations on sustainable use of natural resources. For example such laws as the law on "Environmental Protection", law on "Hunting", law on "Natural Plants" created the economic mechanism for sustainable use of natural resources. These laws also defined the full responsibilities of central and local organizations. Particularly the law on "The Ratio of the Income from Natural Resource Use Payments to be spent for Environmental Protection and Natural Resource Restoration" has been approved by the Parliament. The Government approved Resolution No. 52 on the "Procedures to Create, Spend and Report on the Financial Resources for the Protection of Environment and Restoration of Natural Resources" in 2000.

The work on the assessment of the Mongolian flora and fauna, on the study of its resources, on the improvement of utilization of animals and plants based on its ecological and economic evaluation has not been fully conducted at the state level due to financial restraints. However there have been certain improvements in the field of research and study. Some measures have been taken to breed and propagate some animal and plant species. The planting of some useful plants, the production of animal and plant products under the control of state organizations and through the funding of economic entities has tended to increase.

Within the framework of "National Program on Forests" the "Procedures on Lending Forest Resources through Contracts" was approved through the Government Resolution No. 125 of 1998. As a result of this forest resources were lent by the State to four companies in Selenge and Darkhan-Uul provinces, which prepare wood and execute reforestation works. "Forest conservation community" was created involving local communities with the purpose of increasing public participation in forest conservation and improving the living standard of the local communities.

As a result of the decrease in pine resources over the years, the decision of the Ministry of Nature and Environment on decreasing the quantity of pine being felled and prohibiting pine

preparation has been approved. The areas where pine grows have been taken under the protection of local government and measures to limit exportation of pine logs and other products have been taken.

The environmental laws of Mongolia give the rights and responsibilities of administering the natural resources to communities and state administrative organizations. The principle of increasing the participation of local people in processing local programs and plans for sustainable utilization of biological diversity has started to be implemented. Special Protected Area management plans have started to be implemented with the participation of local communities. The process of consulting with the local people while conducting environmental impact

assessments has also been done.

Actions needed to be carried out for further successful implementation of the NBAP for article 10 of the convention:

- Ensure that the sustainable use of biodiversity resources is included in different strategic documents, policies and legislation.
- Develop effective and strong mechanisms to integrate the consideration and sustainable use of biological resources into the national decision making process.
- Support local populations to develop and implement actions in degraded areas where biodiversity has been reduced.
- Encourage co-operation between governmental authorities, the private sector and civil society.
- Prepare and implement regional and local land management plans and establish proper pasture use system.
- Involve local people in the long-term sustainable utilization of natural resources, allowing them equal access to common resources and to provide the conditions by which the local people can improve their lives.

Article 11 of the CBD: Incentive measures

The Government of Mongolia agrees that proper incentive measures will be promoted for biodiversity conservation and sustainable utilization activities. In a country like Mongolia with rich biodiversity resources, implementing socio-economic incentive approaches will make effective the implementation of obligations under the Convention. We have developed all kinds of incentive measurements at all levels of authority, including state, provincial and local levels. Incentive measures can be given through different economic and social motivations like tax and credit policy, rewards and honorary awards. However Mongolia is a developing country and needs more information exchanges on incentive measures from other countries and seeks more financial assistance in order to improve and ensure the effectiveness of using incentive measures.

The legal base for using economic incentives is already determined in the law on "Environmental Protection" and law on "Natural Resource Payment". For instance, Articles 19 and 34 of the law on "Environmental Protection" allow the state to give incentive measures to the people, businesses and organizations for their contributions in the activities of conservation, sustainable use and restoration of natural resources, and in adopting different kinds of environment-friendly modern technologies.

In the "Law on Hunting" it states that the person who discovers an illegal act and who informs the relevant authorities will be rewarded with 15% of the fine for the violation. Similar articles can be found in The Law of Forest and The Law of Water. Also, the Government Resolution No 95 of 1998 issued "A rule of using incentive measures for the people, economic entities and organizations that adopt environmentally friendly technologies".

Based on the Mongolian Law on Forest, the Government made a resolution that the community or business enterprises can possess forestland area for a 40-year period from the State. They then have the obligation of protecting the forest resources from illegal cutting and wild fire, regenerating the forest areas through establishing nurseries, and using the forest resources to improve the living standards of the local people. Local government will provide tax exemption for use of timber or fodder collecting. The Government also has a fund for reforestation, and communities can obtain a grant to carry out reforestation activities. A total of 19 community forestry units have been established in 4 provinces.

Every year the Ministry of Nature, Environment and Tourism selects an "Environmentally friendly technology user" and "Ecologically clean product" and awards certificates and prizes. The Ministry also announces a "Governor-Best friend of the environment" contest each year and grants an "Annual Prize for the Environment" – up to 1 million MNT is awarded to people who make a significant contribution to nature protection activities. The Government always promotes and co-operates with environmental NGOs.

Actions needed to be carried out for further successful implementation of the NBAP for article 10 of the convention:

- Strengthen the legal base to create a flexible economic incentive system for sustainable use and restoration of natural resources
- Improve financial methods of fees and taxes for the conservation, regeneration and use of natural

resources, relating to aspects of ownership and contracting
- Provide incentive measures through reductions or exemption from different kinds of fees and taxes
- Set a realistic amount for the fines incurred for polluting the environment and use a certain percentage of this income for rewarding good environmental behavior
- Establish incentive funds through the support of state and local budgets and donations and funding from economic entities and local and international organizations
- Promote the use of environmentally friendly technologies using foreign aid, loans and investment
- Strengthen the legal base to create a flexible economic incentive system for sustainable use and restoration of natural resources
- Provide incentive measures through a reduction or exemption from different kinds of fees and taxes

Article 12 of the CBD: Research and training

The Mongolian Government attaches great importance to developing the scientific research necessary to achieve biodiversity conservation. The National Programme on Scientific and Technological Development was approved in 2000, and will run until 2010. It incorporates the building of a democratic society with an economic structure based on sustainable natural resource utilization. Biological research has been a given high priority, in particular, work connected with studying the ecological balance and the surveying and monitoring of wild and domestic species of animal and plants.

Recently some detailed studies have been carried out on the ecology and behaviour of certain species, for instance on the Gobi bear, snow leopard, wild ass, mountain sheep and black tailed gazelle.

Many fields of natural sciences are developed in Mongolia through the university education system and specialist scientific organizations. The research activities through the Academy of Science and other special scientific institutions and universities have been financed by different sources. Much research material is available on the biodiversity of Mongolia prepared by international and local experts for many years. A lot of research work has been done on the ecosystems of Mongolia, including the distribution, population and eco-biological features of species, identifying a scientific base on which to establish the Protected Area network, developing eco-tourism and biodiversity impact assessments. The Science and Technology Fund spend approximately 1 million MNT every year funding environmental research projects. As a result of these projects, many books, pamphlets and research papers have been published. There are more than 100 experimental laboratories, and 2500 research workers are working in scientific institutions and universities.

Training and re-training the national professionals in the up to date methods for conserving biological diversity is also important.

Workshops and training on biodiversity conservation, strengthening protected area management, environmental impact assessments, and environmental law enforcement are regularly organized by the MNE for representatives from all levels of both central and local organizations. A Basic Conservation Training Curriculum for Protected Area Rangers and Provincial Inspectors has been developed by GTZ, working through the MNE.

Over the last 3 years, over 50 officials were involved in short/long-term study tours and training abroad.

Professionals in Biology are currently working in over 20 natural science faculties of the Mongolian National University, Mongolian Pedagogical University, Medical University of Mongolia and Agricultural University of Mongolia. The academic programs and curriculums of these universities are under review.

Due to a shortage of finances, Mongolia is not able to fund the necessary training and research work from its own resources. For a country like Mongolia with a vast territory, it is necessary to adopt modern techniques and technologies of land use, including GIS to improve the productivity of bio-diversity surveying, monitoring and investigation works.

Actions needed to be carried out for further successful implementation of NBAP for article 12 of the convention:
- Seek greater involvement from the private sector.
- Encourage research which contributes to sustainable use of biodiversity
- Promote the application of research to natural resource management and environmental decision making.
- Evaluate the benefits of research in promoting sustainable use of biodiversity.
- Include targeted funding for biodiversity-related research as part of science and technology funding.

- Develop a genetic conservation research program.
- Establish national education and training programs for biodiversity conservation.
- Make contact and collaborative research agreements with foreign universities and institutions in order to increase the training of research staff and promote joint biodiversity conservation studies.

Article 13 of the CBD: Public education and awareness

The Ministry of Enlightenment and Ministry for Nature and Environment (MNE) have implemented a program of ecological education and training within the framework of the formal and informal education systems. In 1997 the Government approved the program on "Public Education on Ecology". This is the main policy document that states the importance of public awareness to biodiversity conservation and environmental protection. It is necessary first to provide information to the public in order to involve them in environment conservation. Some activities have been carried out and are showing good results. Many other related government institutions have developed programs and projects. For example, in 1997, the Government approved an environmental conservation program to be incorporated into the curricula of formal and informal education. For example, an ecology subject in high school and the inclusion of Ecology and Environment Conservation subjects in university curriculum. The program is planned to give a basic understanding of environmental protection to primary and secondary school students, and, depending on the professional orientation of colleges, universities and professional training organizations, to arrange training on environmental conservation.

NGOs play an active role in enhancing public awareness and ecological education. More than 100 environmental NGO's have been established over the last few years. The MNE has also set up a Co-ordinating Committee to strengthen public involvement and participation in crucial environmental decision-making. The committee is responsible for coordinating activities of governmental and non-governmental organizations and to ensure that public opinion is taken into consideration. These kinds of committees have also been established at local and regional levels.

Environment Public Awareness Programme (EPAP), supported by the Dutch Government, was implemented in Mongolia between 1997 and 1998. The goal of the EPAP was to identify and demonstrate effective community-based strategies that could, through dissemination of effective messages, reduce the threats to Mongolia's environment. Within the framework of this programme almost 100 projects on environmental public awareness were implemented by NGOs and governmental agencies in all 21 provinces. A lot of these were aimed at raising awareness among young people, including projects like "Protect the Black-tailed Gazelle", "Gobi bear among Nature and Children" and "How to plant a tree".

Between 1995 and 2000 a number of books, magazines and publications on environmental issues were published. These included the "Mongolian Environmental Laws", a Report on the Environmental status of Mongolia, the Mongolian Red Book, the Protected Areas of Mongolia and Nature and Children. Other handouts, information bulletins and visual materials have been produced and made available to the public.

An Ecological Training Center was set up in Ulaanbaatar in 2001. It aims to improve the environmental education of teachers from secondary schools and universities.

Various international and national environmental NGO's have contributed a great deal to the protection of endangered species by raising public awareness and distributing information. The Mongolian Association for Conservation of Nature and the Environment is probably the most important NGO in Mongolia with over 50,000 members and nearly 400 member organizations.

Actions needed to be carried out for further successful implementation of NBAP for article 13 of the convention:

- Promote public awareness of the existence NBAP, including amongst the younger generation.
- Build on existing general environmental public awareness programs so that considerations regarding the sustainable use of biodiversity are included within them
- Increase the funding for promotion of environmental education at both national and local levels.
- Create an environmental education information network that connects the education systems of the capital city and provinces.
- Strengthen the environmental NGO's capacity and increase their role in promoting public awareness
- Promote active participation of communities, NGOs and other stakeholders in environmental decision making processes and biodiversity conservation actions

Article 14 of the CBD: Impact assessment and minimizing adverse impacts

The Government of Mongolia attaches high priority to the important role of environmental impacts at all levels. This will ensure the prevention of potential adverse impacts such as the destruction of biological diversity, air or soil pollution, and other negative consequences.

The Mongolian law on Environmental Impact Assessment was passed by Parliament in 1998 and amendments were added in 2001. The purpose of the law is to regulate the implementation of environmental impact assessments and decisions regarding projects implemented for environmental protection and proper use of natural resources. It contains 4 chapters and 13 articles covering, for example, procedures for conducting general and detailed environmental impact assessments, requirements for the writing of environmental protection plans and

At present there are 21 private firms licensed by MNE to conduct Environmental Impact Assessments.

The Environmental Impact Assessments decision-making working group, chaired by the Vice Minister of the MNE, includes experts/representatives from relevant departments of the MNE. These experts have an advisory role and final decisions are made by the MNE.

A project funded by the Asian Development Bank focused on staff training, transfer of international methodologies and the review and development of MNE procedures, regulations, standards, and legislation related to EIA. Training in various computer programs and models was conducted and database programs were established for the development of a computerized database (EIA-Data Management System). The Project was among the first of its kind in Mongolia to be funded by an international aid agency.

Actions needed to be carried out for further successful implementation of NBAP for article 14 of the convention:

- Develop and implement specific procedures for the assessment of industry impacts on biodiversity, for example on wildlife migration.
- Promote existing laws to the public, including the younger generation.
- Encourage community involvement in the environmental impact assessment process, including with respect to biodiversity conservation.
- Establish a biodiversity conservation fund for supporting the restoration of degraded areas, including re-introduction of threatened species.
- Provide adequate resources for, and strengthen the enforcement mechanism.
- Develop waste emission standards and create a pollution levy system for identified industries
- Develop sector guidelines for EIA (mining, energy, tourism)

Article 15 of the CBD: Access to genetic resources

This Article is important to Mongolia and so adequate priority is given to it. However, due to an absence of capacity to formulate national legislation and make evaluations neither national legislative, administrative or policy measures for access to genetic resources are adequately developed. Plans to improve the situation include the appointment of national authorities responsible for access to genetic resources and for fair and equitable sharing of the results of research and development.

The inventory and maintenance of genetic resources is rather complicated, which needs a large amount of funds and technologies.

Mongolia is a country with extreme environments and a high endemism of genetic resources. Biotechnology development based on genetic resources is one of the important issues for the sustainable development of Mongolia's economy. Due to this Mongolia gives a high priority to this Article and is very interested in development of national legislation, formulation of national policy and administrative measures for access to genetic resources. It is also necessary to ensure the fair and equitable sharing of the results of research and development, and the benefits arising from commercial and other utilization of genetic resources.

However, due to the lack of capacity and finance to undertake the above activities, this process is very slow and ineffective. Nevertheless, there are several Mongolian laws on biological resources.

Actions needed to be carried out for further successful implementation of NBAP for article 15 of the convention:

- Address the use and development of genetic resources.
- Consider the protection of traditional knowledge associated with genetic resources.

- Create conditions to facilitate access to genetic resources for environmentally sound uses by the private sector.
- Develop and carry out scientific research on genetic resources with full participation from the public.
- Implement a national human and institutional capacity building program to build the capacity for the development of legislation, assessment and inventory of genetic resources.
- Develop case studies on the provision of information on the origin of genetic resources.

Article 16 of the CBD: Access to and transfer of technology

Mongolia is interested in access to and the transfer of technologies that are relevant to the conservation and sustainable use of biological diversity, or that makes use of genetic resources without causing significant damage to the environment. However, most priority is given to the transfer of technologies from other Contracting Parties. Legislation, administrative and policy arrangements have not been developed due to the lack of capacity, experience and finance.

Mongolia actively participates in the international system on intellectual property rights. Mongolia joined the World Intellectual Property Organisation (WIPO) in 1979, and is a signatory to the following treaties: The Paris Treaty of industrial property rights protection, the Madrid Agreement on registered trade marks (1985), the Patent Co-operation Treaty (1991), the Hague Union for the international deposit of industrial designs and the WTO's Agreement on Trade-related aspects of intellectual property rights (TRIPs) (1997). In 1998, Mongolia also joined the Berne Union for the protection of literary and artistic works. However, in the National law on Intellectual Property gaps still exist on biotechnological inventions.

Mongolia's Patent Law, amended in 1996, stipulates that medicine used for the treatment and diagnosis of human and animal diseases, microbiological methods and products are granted with a patent. However, this law does not cover plant varieties and animal breeds received through biological methods. The Mongolian Patent Law should therefore be improved to cover biotechnological inventions.

A case study on the impacts of intellectual property rights on the achievement of CBD objectives needs to be carried out with financial and expertise assistance from CBD's relevant bodies.

Training and international co-operation in the transfer of technologies of biodiversity conservation and technologies that make use of genetic resources, and do not cause significant damage to the environment, are also needed.

Actions needed to be carried out for further successful implementation of NBAP for article 16 of the convention:

- Provide more information on how to facilitate access to and transfer of technologies.
- Address the issue of intellectual property rights in the development and sharing of technologies.
- Address current legislative gaps in this area, in particular with respect to the transfer of technologies from other countries.
- Promote information exchange, including international co-operation on technologies for biodiversity conservation and sustainable use of natural resources.
- Promote technology transfer, including biodiversity-related technologies, between private sector, government and civil society.
- Encourage national capacity building on genetic resources and biotechnology transfer.

Article 17 of the CBD: Exchange of information

The exchange of information plays a significant role in effective biodiversity conservation, especially in the conservation of transboundary migratory species. Although a national information monitoring system for biodiversity conservation is already established, its activities and capacities still need to be strengthened and expanded. This information monitoring system is a means of providing the customers and policy-makers with correct and reliable information on the basis of the systematic processing of observations, measurements, collections and analyses. The environmental information is classified into 2 groups, general and specialized. These are categorized according to their scale, content and frame of use. General information belongs to the Central Database while the specialized ones to the Sub-Databases established at the professional institutions. The Central Database is available on the Internet for use by the public. There is a computer network connection between the Central and Sub-Databases to make the information more accessible to the customer and for ease of information exchange between the Databases. Again the financial situation does not allow for the operation of

the environmental information system on a regular basis, particularly, at the local level where the establishment of the information system and the availability of equipment, software and professional staff is very poor. The Computer Calculation Centre of the Ministry for Nature and Environment is the main institution holding environmental data resources. This contains much biodiversity information including information on land, soil, fauna, flora, forestry, water and the general environmental situation, including pollution. Besides this many scientific institutions also have separate information resources according to their activities. This information is scattered and cannot be collected onto the Central Database due to lack of financial support and modern equipment and technology. Mongolia has established a National Focal point of Clearing House Mechanism and preliminarily set–up a Biodiversity Clearing House website, in which to introduces the policies, laws and regulations, programs, plans, measures and key events of biodiversity conservation and sustainable use. At present, data update and website design capacity is rather weak, and the equipment is outdated. The Clearing House lacks effective methods to promote Scientific and technical cooperation between countries.

The NBAP did not identify mechanisms for the exchange of information on biodiversity conservation.

Actions needed to be carried out for further successful implementation of NBAP for article 17 of the convention:

- Further facilitate the exchange of information from all publicly available resources relevant to conservation and sustainable use of biodiversity.
- Include exchange of information from the results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with other technologies.
- Establish information databases at a provincial level and make this information freely available.
- Enhance international cooperation of biodiversity information sharing, and seek more financial support from international communities.

Article 18 of the CBD: Technical and scientific cooperation

As a developing country Mongolia cannot achieve results on the conservation of biological resources without international financial and technological assistance. The Ministry of Nature and Environment is working closely with international organizations including UNDP, GEF, WWF, GTZ, World Bank and Asian Development Bank. Mongolia participates in cooperative international and bilateral biodiversity conservation efforts. Most of the activities in NBAP in this area have been implemented. Several joint research projects have been carried out by the Academy of Science, universities and the Ministry of Nature and Environment. These projects have involved technical and scientific cooperation with international organizations such as the UNDP, UNEP and the World Bank, as well as countries such as Russia, USA, Germany, Japan and South Korea. As well as undertaking joint fieldwork in Mongolia and conducting genetic studies, Mongolia has set up a preliminary

Biodiversity Clearing House website for sharing information. Mongolia has established a National Focal point of Clearing House Mechanism and preliminarily set–up a Biodiversity Clearing House website, in which to introduces the policies, laws and regulations, programs, plans, measures and key events of biodiversity conservation and sustainable use. At present, data update and website design capacity is rather weak, and the equipment is outdated. The Clearing House lacks effective methods to promote Scientific and technical cooperation between countries. Researchers from the mammalian ecological laboratory together, with Denver Zoo in the USA, have carried out 660 man/hours of fieldwork observing the migration and daily movements of the Wild sheep, Bactrian camel, Snow leopard.

Bird researchers have carried out field work in the Khangai and Khovsgol regions to study some species of birds with funding from a French hunting and wildlife management institute from the “Office National de la Chasse et de la Faune Sauvage”.

Actions needed to be carried out for further successful implementation of NBAP for article 18 of the convention:

The following activities need to be included in future revisions of the NBAP:

- Methods of promoting international, technical and scientific cooperation in the field of conservation and sustainable use of biodiversity. More attention should be given to developing and strengthening of national capabilities by means of human resources development and institution building.
- Determine how to better establish clearing house mechanisms to promote and facilitate technical and

scientific cooperation. In its current form, the Biodiversity Clearing House website is insufficient for promoting genuine information exchange.
- Elaborate national legislation and policies to encourage and develop methods of cooperation for development and use of technologies, including indigenous and traditional technologies in biodiversity conservation and natural resource management.

Article 19 of the CBD: Handling of biotechnology and the distribution of its benefits

Mongolia currently lacks a sufficient legislative framework for undertaking research and risk assessment in the field of biotechnology. Biotechnology development based on genetic resources is one of the most important issues for the sustainable development of Mongolia's economy. However, there are very few activities included in this area in NBAP.

Actions needed to be carried out for further successful implementation of NBAP for article 19 of the convention:
- Give more attention to developing and strengthening national capabilities, including human resource development and institution building in biotechnology development.
- Develop legislative, administrative and policy measures to provide for effective participation in biotechnological research activities.
- Implement procedures for advancing informed agreement of all parties and assessing risks arising from the use of biotechnology, including potential adverse effects on the conservation and sustainable use of biological diversity.
- Assess the benefits arising from biotechnologies based on genetic resources, and making this information available to the public as well as decision makers.

Article 20 of the CBD: Financial resources

Financial resources are a decisive factor in biodiversity conservation and it should be acknowledged that the shortage of funding in Mongolia is the main threat that will effect the successful implementation of the Convention. The transition to a market-based economy means that there is a shortage of funds for biodiversity conservation. Currently, most funding in this area comes from international donors per attached table. (Annex 2)

Government funding for the environment sector is not targeted to specific areas, meaning that there is a shortage of funds for biodiversity conservation.

Actions needed to be carried out for further successful implementation of NBAP for article 19 of the convention:
- Include funding targeted specifically to biodiversity conservation in the state budget
- Work toward mobilizing more funds through promoting bilateral cooperation in the field of biodiversity conservation

SUCCESS STORIES

Story 1. Gobi bear research and monitoring (Ursus gobinsus).

Climate changes and desertification, as well as d breaking their branches, cause food shortage for Gobi Bear; thus the population has been decreasing. Gobi bear population is facing the danger of extinction in Mongolia. There only 25-50 heads of Gobi Bears live in nature, 16000 sq.km territory of Southern Gobi of Altai.

Fig.1 Mom and cub with sensors on their necks

In order to distinguish each individual Gobi bear and learn their behavior, activity and regeneration issues, 10 sensors have been placed on Gobi bear's neck.

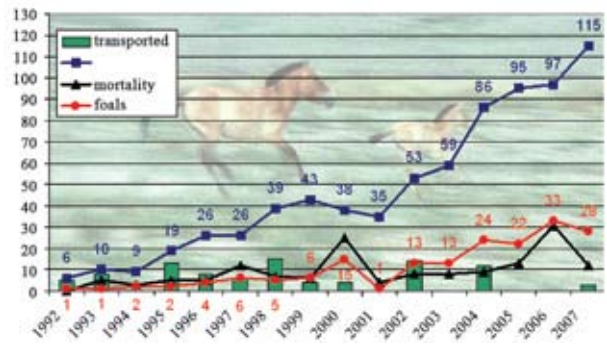
As a result of the sensors, the population and population structure of Gobi bears have been identified. And other important information can be obtained through the sensors. Information on Gobi bear's location, movement, inhabiting land, and hibernating area has been collected due to the sensors that have been put on mom and cub's necks.

Fig.2 Hindleg of Gobi Bear

Fig.3 Gobi Bear comes to get additional food at the nourishing point

Story 2. Reintroduction of Przewalsky horse or takhi.

The Government of Mongolia has implemented several measures to reintroduce Przewalsky horse in its natural habitat in Mongolia. As of 2007, approximately 300 heads of Przewalsky horse are spread in three different regions - Khustain Mountain in Tuv aimag, Takhiin tal in Gobi-Altai aimag and Khomyn tal in Zavkhan aimag. 58% percent lives in an open steppe under natural reproduction.



In 2006, the Government of Austria has spent USD 60.0 thousand to construct the building of an information center at Part B of The Great Gobi Strictly Protected Area.

Fig.4 Growth and mortality rate of reintroduced Przewalsky Horses

CHAPTER III. SECTORAL AND CROSS-SECTORAL INTEGRATION OF MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS

The purpose of the chapter is to describe efforts to integrate biodiversity conservation and sustainable use its resources into relevant sectoral and cross-sectoral plans, programmes and policies in Mongolia.

1. Millenium development goals-based comprehensive national development strategy of Mongolia

In 2009, Mongolian Parliament approved the Millennium Development Goals (MDGs)-based Comprehensive National Development Strategy of Mongolia.

The Millennium Development Goals (MDGs)-based Comprehensive National development Strategy of Mongolia defines in a comprehensive manner its policy for the next fourteen years. Policies are aimed at promoting human development in Mongolia, in a human, civil and democratic society, and developing intensively the country's economy, society, science, technology, culture and civilization in strict compliance with global and regional development trends. The objective of the MDG-based Comprehensive National Development Strategy of Mongolia is to protect and strengthen Mongolia's sovereignty, and develop it into a middle income country through achieving its Millennium Development Goals, attaching high priority to:

- promoting private sector-led dynamic economic growth;
- human development in Mongolia including education, healthcare;
- sustainable development of science, technology and environment;
- strengthening intellectual development and human capacity;
- creating a knowledge-based economy sustained by high technology, which respects environmentally friendly production and services;
- fostering a democratic system of governance which serves its citizens, protects human rights and freedoms, and is free from corruption and red tape.

The long-term development policy of Mongolia, its priorities, and strategies for their implementation and expected outcomes are defined in the MDG-based Comprehensive National Development Strategy of Mongolia in two phases. First, to achieve the Millennium Development Goals and intensive development of its economy in 2007-2015, and the second, to make a transition to a knowledge-based economy in 2016-2021.

Environment policy within the framework of Mongolia's development priority 5:

A policy, which envisages a set of integrated economic, social and ecological measures aimed at protecting the environment, including the measures to protect atmosphere, land, mineral wealth, water, forests, spices of fauna and flora; proper utilization of mineral resources, their rehabilitation; measures on adaptation to climate change, reducing the adverse impacts of desertification and drought; halting the emission of hazardous chemicals and radioactive waste; and improving waste management shall be implemented.

Both phases (2007-2021):

Strategic objective 1. Limit and terminate nature and environmental pollution and degradation:

- Implement a rehabilitation policy based on economic assessment of damages caused to nature and environment.
- Implement a set of legal, economic, managerial and organizational measures to reduce air pollution in Ulaanbaatar City, major towns and large settlements.
- Prepare and implement a programme and plan of actions to reduce air pollution in Ulaanbaatar City and major towns.
- Increase the use of renewable sources of energy, including the use of solar, wind and hydro energy on their own or in combination with each other.
- Implement an integrated policy of using new technology and management to collect, transport, store, sort out, recycle, and reuse solid waste in rban and other settled areas and thus, create new job opportunities.
- Within the framework of the Clean Development Mechanism (COM) of the Kyoto Protocol, implement a

joint project to reduce greenhouse emissions and sell it at a market price.

- Create an environment monitoring system meeting international standards.

Strategic objective 2. Implement an integrated policy aimed at proper use of land and mineral resources:

- Enhance the natural resource management at national and local levels by improving laws and regulations on the use of mineral resources and environmental protection; introducing economic instruments to enforce laws, and establishing a self-financing mechanism; and improve coordination among different sectors.
- Create a national land heritage fund, comprising of pristine areas dear to many generations of Mongolians, enhance the state policy and management of specially protected areas.
- Expand the network of specially protected natural areas, create a sound structure of its administration, and introduce a modern-day security management.

Strategic objective 3. Necessary conditions for protecting and ensuring proper use of water resources, preventing their shortage, and providing the population with water, which meets health requirements, will be created. A national programme "Water" shall be implemented:

- Enhance the legal environment for protecting and proper use of water resources; improve water resource management to save water, its structure and organization.
- Resolve the problem of public and industrial water supply through replenishing surface water reservoirs by putting some of them into economic circulation.
- Increase water reserves to supply water for cities and mining plants.

Strategic objective 4. Conditions for sustainable use and protection of forest reserves, reforestation and maintaining ecological balance shall be created:

- Explore forest reserves by using satellite data and remote sensing, determine the sprawl, structure, and composition of forests, develop forest mapping and sustainable forest management programmes, and create a forest database based on geographical information systems.
- Within the framework of a medium-term strategic objective, undertake measures to make climate milder, restock woodlands and create green zones in Gobi and steppe regions to facilitate fight against desertification, soil erosion, and sand movement.
- Strengthen forest protection through introduction of modern management methods; create a liability system to ensure proper use and protection of forests by allowing local residents and communities to own up to 20 percent of forests on a contractual basis.

Strategic objective 5. Contain the depletion of animal and plant life, and create conditions for their natural recreation and sustainable use.

- Revise procedures related to ensuring sustainability and natural growth of populations of rare and extremely rare species, create economic and legal environment for their protection, explore ways of creating reliable biological resources by using biotechnological achievements to perform assisted reproduction, and create and protect gene pools of rare and extremely rare species.
- Secure support from international organizations, donor countries and individuals for efficient implementation of long and short-term projects designed to establish and protect reserves and habitat of wildlife, and increase domestic and foreign funding sources.
- Take measures to study the dispersal and reserves of rare and extremely rare plant species, create and protect their gene pool, establish a system of registration, information and monitoring, elaborate a plan for their proper use, provide for restoration and cultivation of rare plants.

Strategic objective 6. Promote capacity to adapt to climate change and desertification, to reduce their negative impacts:

- Undertake a science-based assessment of climate change effects and define their prospects, and implement a policy in line with the concept of sustainable development.
- Assess areas affected or are at the risk of being affected by drought and erosion due to environmental degradation and climate change, define their prospects, and enhance the capacity to adapt to the peculiarities of those areas.
- Choose and cultivate those sorts of grain, potato and vegetables, fodder plants which are hardy and capable to adapt to environmental and climate change, develop new sorts, and introduce advanced methods and technology in crop-farming.

- Develop and implement a policy with regard to regulating the population and structure of livestock in accordance with pastures' capacity.
- Develop in combination both nomadic and intensive animal husbandries capable to adapt to environmental and climate change, which would be more productive and with good biological capability.
- Increase public participation in the activities related to climate change and desertification, to defining and introducing adaptation measures, means to cope with climate change, to reducing their adverse impacts, expand the work on providing to the public related knowledge and information

2. Mongolia Action Programme in the 21st Century

Mongolia Action Programme in the 21st Century (MAP-21) adopted in 1999 includes many important environment management issues including biodiversity conservation In this comprehensive document reflects the following tasks on protection of biodiversity (sources: Summary report of the Mongolian action programme for 21st century)

- An accurate evaluation of the current conditions and threats to biodiversity;
- Identify causes of species decline, and define trends;
- Develop species protection policies and programmes;
- Create species preserves;

3. Millennium Development Goals

Goal 7 of the Millennium Development Goals refers to environmental sustainability. The most pressing environmental problems were identified to be those summarized in Table 3.1, the World Bank commenting that Goal 7 for Mongolia related to the loss of environmental resources, increasing degradation of pasture and forest, urban pollution, loss of biodiversity, and the provision of safe drinking water. (Source: World Bank. 2004)

Table 3.1

Issue	Identified action	Comments
Land pasture degradation	Manage grassland (communal ownership, extension education, improved quality pasture, fertilizer use, rotational grazing, animal health, post-harvest value added, and diversified livelihood).	Causes of land degradation have been identified as overgrazing in localized areas close to markets and water, mining activities, and infestations by grasshopphers and Brand's vole (both related to pasture degradation)
Vehicular air pollution	Reduce emissions via vehicle inspections and tune up programs, etc., and higher standards on new vehicles.	Air pollution as in increasing urban problem where concentrations of some pollutants exceed safety levels in winter due to burning lignite coal in outdated central heating and electricity plants, and stoves in thousands of gers.
Low energy efficiency	Adopt proper pricing, improve building-based systems, use clean fuel, improve stoves, insulation, and building design.	Low energy efficiency is due mostly to under-priced energy resources. Features are poor insulation in buildings, low efficiencies in the central heating systems and the heat losses via the above ground hot water delivery. Also, the central heating systems contribute to water wastage.
Deforestation	Manage forests, enforce the regulations, collect stumpage and and other fees, and adopt community forest management.	The principal cause is illegal logging reducing forest cover from about 11% of the country in 1990 to about 8% in 2002. There is little reforestation.
Decreasing biodiversity	Protect protected areas, forests, wetlands, pasture-land, desert steppe, and adopt measures, e.g., hunting fees, etc.	Biodiversity reduction is caused by many factors, principal among them being excess and illegal hunting and habitat loss (because of deforestation and land degradation)

4. Regional Development

The Medium-Term Regional Development Strategy (2003) identified a set of policies focusing on regional development and recognizing regional and local scales and the different ecological conditions across the country. Key features of the strategy are to:

- Erase differences in social and ecological conditions across the country;
- Limit unemployment, poverty and ecological decline;
- Determine priority sectors of the economy suited to the ecology of the regions;
- Encourage local development within the regions.

The strategy proposes raising rural living standards, health and education so that the rural-urban drift may be slowed so that the benefits of development may be shared more equally across the country. Details include improvement of the livestock industry, the development of services and improved internal transportation, whereby the rural areas would be served by and contribute to new value adding post-harvest industries, tourism, mining and agricultural service activities clustered around eight urban growth poles located along new and strengthened transport axes.

The International Panel on Climate Change (IPCC) in 2001 identified potential strategies that Asian countries could adopt in order to adjust to, or mitigate the effects of, climate change and recommended that the following actions be taken:

- Assess risks to endemic species and ecosystems;
- Implement" integrated planning and management based on ecosystems;
- Reduce habitat fragmentation and protect buffer zones and migratory corridors;
- Encourage mixed-use strategies;
- Manage forests to prevent deforestation, ensure sustainable harvesting and conserve natural habitats;
- Monitor and assess trends and variabilities in key climate elements;
- Coordinate climate change adaptation activities among countries in the region;
- Apply techniques to improve understanding of climate change and its variability;
- Inform NGOs and the public on climate change and involve them in planning, adaptation and mitigation strategies.

The Government approved the National Climate Change Program in 2000 with the objective to implement a series of actions related to climate change and mitigate the effects. As part of this process, researchers identified several inter-related adaptation measures specifically to cope with Mongolian climate change, including those to:

- Improve water resources management and conservation;
- Reduce and control the number of livestock currently degrading the land;
- Improve pasture management, fodder quality and land management in general;
- Improve livestock quality, productivity, feeding and management;
- Introduce soil stabilization/enhancement techniques used in other dry climate areas and ownership/user-fee strategies to encourage long-term soil management.

5. International, Regional and Bilateral cooperation

Mongolia as a competent subject of international right has joined 14 environmental conventions and protocols, which made possible attraction of international resources for solving issues of rational nature resources management, including conservation and sustainable use of biodiversity, capacity building of all stakeholders and promotion of sectoral and cross-sectoral partnership.

In 2002 Mongolia joined Cartagena Protocol to UNCBD. Its joining allows Mongolia to implement activities related to transboundary movement of genetically changed organisms and products; take measures on non-admission their import to the country, including mutual assistance in making researches and scientific and technical elaborations, and information exchange in the field of biotechnology.

Since 1979 Mongolia is a member of World Intellectual Property Organization (WIPO). The Government of the Mongolia realized a necessity of development of methods of protection and working out of standards in the field of protection of traditional knowledge, genetic resources and folklore. Several International meetings

"Intellectual property and traditional knowledge" hold, 2008 with participation of WIPO. In the framework of meetings measures on cooperation between Mongolia and WIPO in the area of protection of intellectual property for transformation of human capacity, cultural wealth, unique folklore and ancient history in economic development. The Government of the Mongolia adopted government Programme on development of system of intellectual property. Mongolia ratified to 14 international convention.

Table 3.2

International conventions on Environment and conservation Ratified by Mongolia

Year signed	Environment convention Ratified by Mongolia
1992	Convention on Biodiversity
1992	Convention on Climate change
1994	Convention to Combat Desertification
1996	Convention on International Trade in Endangered Species of Flora and Fauna
1996	Vienna convention on Protection of the Ozone Layer
1996	Montreal Protocol on Substances that Deplete the Ozone Layer
1996	UN Convention on Combating Drought and Desertification
1997	Basel Convention on Control of Trans-boundary Movement of Hazardous
1997	Wastes and their disposal
1999	Convention on Wetlands and International Importance as waterfowl Habitat
1999	Convention on Migratory Species of Wild Animals
2002	Kyoto protocol
2002	Cartagena Protocol on Bio-Safety
2003	International Whaling Convention Persistent Organic Pollutants

The Kherlen and Khalkh Rivers of Eastern Mongolia belong to the Amar river watershed. Therefore, Mongolia participates in the conservation of the Tumen Gol river watershed in cooperation with China, Russia and Korea, six sites in Mongolia. The Mongol Daurian protected area of Dornod aimag has a territory of 210,000 ha, and is a trans-boundary protected area of Mongolia, Russia and China. Meetings and seminars are organizing by protected areas administration of three countries.

Activities towards strengthening cooperation with Kazakhstan and Russia are conducted as part of the conservation of the Altai Soyon eco-territory of Western Mongolia. Representatives of the three countries meet every year to discuss joint activities.

The inter-governmental agreement of trans-boundary water conservation was signed by Mongolia and Russia, with subsequent studies of water resources in trans-boundary areas.

There is a strong need to improve cooperation with Russia and China to conserve river water resources and biodiversity and to improve management of protected areas. Likewise, there is a strong need to improve cooperation with Kazakhstan to conserve the Altai-Sayan eco-region of western Mongolia. .

Mongolia cooperates with China to combat desertification, to improve land and pasture management, to conserve migratory wild and/or rare animals, such as the gazelle, and to exchange environmental data.

Within the framework of East Asian environmental cooperation, Mongolia works to actively implement the "Tumen River Biodiversity Conservation" project, and to establish a regional and national information system of biodiversity and water.

North East Asian environmental ministers, scientists and professionals met in Seoul, Beijing and Manilla to discuss ways to prevent yellow dust and sand storms, to reduce its damage and to remediate its underlying cause. All parties agreed that "yellow dust and sand storms are a regional disaster," and to implement a detailed study of sand storms. Representatives of the Khan-Khentii protected area, Mongolia and the Sokhond nature reserve of Chita, Russia agreed to establish transboundary protected areas and sign agreements of cooperation. In addition, the MNE and the Russian Natural resource ministry prepared the agreement proposal to establish Lake Uvs national park.

The Mongolian and Chinese Academy of Sciences agreed to establish a joint steppe ecosystem study centre.

The Mongolian-Russian biological expeditionsve been studied the composition of algal species in wetlands

of the Huder river, Orhon river valley, Telee river valley, and Tes river valley. As a result, 96 species or subspecies belonging to 5 orders, 29 families and 42 genera were listed in these areas.

In 2003, a 1:32.5 scale vegetation map of riparian and boggy plains of the Ugii nuur wetland area, listed in the Ramsar convention, was produced with funding from JICA. This material could serve as base material to inform wetland monitoring and evaluation criteria.

The National University of Mongolia organized a biodiversity study of particular regions in cooperation with foreign universities. For example, according to a contract with the Nature Conservation Centre at the Gottingen University of Germany, studies of forest steppe ecosystems and their biodiversity have been studied from the base of the Honin nuga station of West Khentii for more than 10 years.

An agreement of cooperation between environmental sectors of Mongolia and the People's Republic of Turkey was signed. Within the frame of the "Green belt" national programme, the MNE and Forest Authority of South Korea signed a memorandum of understanding for long term financial support of the programme.

The MNE and the Development Cooperation Ministry of Netherlands signed memorandum of understanding to implement environmental projects such as "Integrated water management" and "National Geo-information centre" and other programmes that will be of annual total cost of 2 million USD, starting from 2007. The Government of Netherlands provides this funding as non-repayable support to Mongolia. With the support of the UN and other financial organizations, 23 long, mid and short term projects have been implemented. From 2007, several projects with the aim of intensifying forest resource restoration work, such as "Community Forestry Management" will be implemented.

Since 1990, Mongolia's international cooperation on environmental issues has reached a high level. Projects with international organizations like GEF, UNDP, UNEP and WWF, and countries such as Germany, the Netherlands, Japan and the USA have been jointly implemented. Due to limited financial resources, obligations undertaken under agreements cannot be fulfilled. There is therefore a need to coordinate and harmonize the implementation of the Convention on Biological Diversity at a national level with related UN and other international conventions and agreements. The above conventions are aimed at the conservation of complementary and interdependent parts of the ecosystem, so the need to foster cooperation between conventions arises as an urgent issue.

Mongolia presently has seven inter-governmental agreements, including thirty bilateral cooperation agreements with foreign countries. These were established between 1990 and 1998. They serve as vitally important consensus documents that have great significance for the protection of the country's biological diversity, especially in border areas. With the view to fostering regional cooperation, and cooperation with neighbouring countries, provisions on the joint proper use of biological reserves have been incorporated into several agreements. These include "Cooperation agreement in the environmental sector between the Governments of Mongolia and the People's Republic of China" (1990), "Cooperation agreement in the environmental sector between the Governments of Mongolia and Kyrgyzstan" (1993), "Cooperation agreement in the environmental sector between the Governments of Mongolia and Kazakstan" (1998), "Cooperation agreement in the environmental sector between the Governments of Mongolia and Russian Federation" (1994), "Mongolia-China Inter-Governmental Agreement on Protection of Transboundary Waters" (1994) and the "Mongolia-Russia Inter-Governmental Agreement on Protection of Transboundary Waters" (1995).

6. Agriculture

Agriculture sector and processing industry were and remain the key sector in providing of food safety of the country. The main impact of agriculture on biodiversity is related to extreme livestock pasturing, expansion of arable lands, watering lands and destruction of habitat of flora and fauna.

Land degradation has caused substantial impacts on agricultural production, especially crop yield and animal production. Crop yield has also been reduced due to fact that farmland soil fertility has decreased by about 20%. Wheat yield has halved since 1980s. As a result of overgrazing, Mongolia's over 40 million livestock lack pastureland. The lack of pastureland has resulted in malnutrition, loss of livestock heads and in reduction of animal products, thereby affecting the country's economy.

The total land area of Mongolia is 156.5 million ha of which 118.4 million ha (75.8%) is capable of agricultural production and pastoral livestock production. Cultivated land occupies 1.35 million ha of the total land urea, Over 57% of total arable land is located in the north-central aimags (provinces) of Tov and Selengc

and the northeastern aimag of Dornod,

As of today, 126.3 million ha or over 70 % of the total pastureland areas have been degraded. The total area of the damaged or depleted land is estimated to be 121.7 million ha of which 91.7 million ha are eroded by the combination of wind and water, 21.1 million ha eroded by water, 1.0 million ha are considered damaged, and 7.9 million ha are covered by sand as a result of human activities. About 8.6 million ha of pastureland has been severely degraded due to intensive use of pasture all around the year.

Almost half a million ha of land which has been used for agriculture during the last 40 years has been eroded and the fertility has decreased by 20 %. The size of pastureland damaged by grasshoppers reached 0.423 million ha of land and plants in these areas are becoming extinct. Due of mismanagement or improper use of farmland, soil fertility is often lost or destroyed by even single windstorm or flood event.

Protection of biodiversity resources from degradation or destruction has always been a key issue for consideration by the Mongolian Government. The Government of Mongolia adopted two resolutions: one in 1974 on "Urgent measures to protect soil from erosion", and the other in 1981 on "Introduction of soil protection systems in farm land management". During the implementation of these two resolutions, the old destructive technology of farming was replaced by new advanced techniques, which has saved a substantial amount of soil from loss. Forest belts were built around many farmlands. The use of farmland has shifted to a rotational basis. Additionally Mongolia is working towards implementation of projects to reduce land degradation and erosion by rehabilitation of land resources affected by mining operations; and combating desertification and sand movements.

In l995, Mongolia adopted a package of Land Laws to regulate land relations in market economy conditions. While these laws are enacted, Government of Mongolia has started a process to renew land policies and is providing innovative land policies for sustainable management of land resources. To realize the new innovative land policies, the Government has re-drafted "Land law" and "Law on Land Fees" which are endorsed by the Parliament on 7th June 2002 (communication with MNE, 7th June 2002). The "Law on Land, 1995" has specific provisions towards land use protection in its articles such as:

Article 51: Pasture, its rational use and protection

Article 52: Rational use and protection of hay fields

Article 53: Rational use and protection of cultivation areas

Article 55: State Certificate on land characteristics and quality and its' procedures. According to this, the state certificate shall include following indicators: thickness of fertile soil layer; contents of decomposition; soil pollution and chemical pollution; changes in vegetation cover; changes in land surface characteristics; and changes in the composition of pasture and hayfield plant species, etc.

7. Public health

Public health is one of the sectors of Mongolia that is being reformed. It reflects its role not only in health care but in increasing life expectancy and welfare of the Mongolia's citizens and achievement of Millennium Development Goals. The Government's National Biodiversity Strategy specifically mentions medicinal plants as a biological resource requiring management for their conservation and sustainable use. It also recognizes the need to address the preservation and maintenance of knowledge, innovations and practices of indigenous communities embodying traditional lifestyles. The Mongolian Agenda 21 and the National Action Plan against Desertification also advocate the conservation and sustainable use of medical plants.

Mongolian traditional medicine considers the body, both of humans and of livestock, as a whole and complete entity. The diagnosis of ailments is based mainly on observation, feeling the pulse, palpation, listening to breathing, smell, urinary examination, and, in the case of humans, questioning. From the combination of these the doctor diagnoses the illness or syndrome and prescribes treatment. The medical concoctions required many involving plants, are either brought by the doctor, found by the herders directly, or bought from outlets in rural towns or cities.

Over 3000 species of vascular plants have been recorded in Mongolia, of which 600 are said to have medicinal properties beneficial to humans and livestock. Mongolian traditional medicine, including herbal plant applications, has a history of more than 2000 years, and is regarded as a valuable national heritage.. Medicinal plants thus constitute an important aspect of health care in Mongolia, accounting for over 70 percent of all Mongolian medicine. Hospitals and modern care are not easily accessible, and are often prohibitively

expensive, so a large part of the population relies on traditional medicine for their primary health care.

It is estimated that at least 85 Mongolian plant species are threatened with extinction and others are becoming rare due to pressures from unsustainable harvesting, heavy grazing and other factors. Thus, attention needs to be given to their conservation, sustainable harvesting and, in some cases where threats are high, cultivation.

The Government of Mongolia has assigned traditional medicine an integral place in the national health care system. There are already been a number of policies promulgated to encourage traditional medical plant use and technology. In 1991, the Ministry of Health approved a five-year plan to encourage the use of traditional medicine in public facilities, stating that plant life and herbs should be used efficiently, and drug availability should be increased, and new types of herbal medicines should be sought. In 1995, the Ministry of Health and Social Welfare developed additional polices to build upon Mongolian experience in traditional medicine for disease control. In 1999, the State Policy on Development of Mongolian Traditional Medicine was approved by Parliament, emphasizing Mongolia's commitment to the development of traditional medicines.

In addition, support has been given to the training of traditional medicine practitioners. In 1990, the Department of Traditional Medicine was established at the Mongolian National Medical University to train doctors to specialize in traditional medicines, as well as to provide short courses to doctors trained in western medicines.

There are needed to Conduct surveys of medicinal plants and identify threatened species of national and global significance and develop and execute community management plan for each Region. Also, should be done Knowledge base development and public awareness increased in project areas to promote medicinal plants as an economic resource capable of sustainable management and develop Management guidelines (e.g. harvesting techniques and regimes) produced for different types of medicinal plants in arid/semi-arid ecosystems, together with descriptions of species which could be traded only from certified cultivated sources.

One of the sectors significantly influences on biodiversity is pharmaceutical sector. In Mongolia there are 40 pharmaceutical producers. Most of them used are natural pickings from wild growing or cultivated herbs.

There is a lack of knowledge in raw materials and locations of economically important objects of flora, ecology and biology peculiarities of used species, rational approaches and methods of continuous use of wild plants in the area of medicinal herbs use.

On the basis of existing flora and fauna traditional knowledge of traditional medicine is being developed during centuries. These traditions are based on knowledge of medicinal herbs and approaches of health improvement in conditions of mountain inhabitancy. Unfortunately, local population gathers medicinal herbs, separate objects of fauna that undermines their funds opportunity to recover. It happens in most regions of the country with the connivance of local and central authorities.

State policy in the area of protection and use of flora resources is inconsequent and declarative. There is a lack of cadastre of flora species and analytical data base of plant resources, without which it is impossible to regulate system of sustainable use and effective control of raw materials. Issues of rational use of flora objects at local level are not included into the programmes of complex socio-economic development of territories. Also there is a lack of interaction between state structures and self-governance bodies.

8. Mining industry

Currently, 15-20% of GDP and 50% of the country's total exports have been contributed

by the mining industry. As of December, 2000, there were 1329 deposits licensed for exploration and 439 deposit licensed for utilization. As of today, there are over 200 operating mines of which 111 gold mines, 24 metal mines, 34 coal mines, 15 salt mines and remaining belong to other categories. Mongolia is rich with mineral resources and has a developed mining industry. Most of mining's are located at the relative step areas (including gold and ore mining), are threat to vulnerable step ecosystems and destroy habitat of species of flora and fauna, pollute rivers and ground waters. Open ways of mining destroy cover and blast works provide inconvenience to most of animals.

Necessity of planning measures on protection of natural resources for mining development.

Law of Mongolia on Environmental impact assessment has been ratified in 1998, and in accordance with

it, all companies and services that have been operating without any assessment were required to go under the environmental assessment. The true idea of the environmental impact assessment is being a coordinating mechanism of preventing and protecting the environment from possible damages and lowering the risk that can be caused by human behaviors.

Based on the environmental impact assessment, the project will be concluded in four levels, first, "not feasible", if the negative impact on the environment outweighs the benefit of the project, second, "feasible with conditions", if the some part of the negative impacts can be corrected or recovered, third, "feasible", when there is no or slight impact on the environment, and at last, the fourth, "the project cannot be implemented due its non compliance with current laws and regulations, or its technology is not environmentally friendly or the project is not included in the land management planning".

Therefore, the Government of Mongolia attaches high priority to the important role of environmental impacts at all levels. This will ensure the prevention of potential adverse impacts such as the destruction of biological diversity, air or soil pollution, and other negative consequences.

Mongolia has started transiting into a market economy since early 1990s. Along with this transition, many services and industries, particularly mining sector, have started flourishing, and increasingly started affecting the environment at the same time. "Gold Program" which was the beginning of the development of mining industry in Mongolia, and other mining projects with both foreign and domestic investments, have raised the necessity of establishing policy and legal frame on the environment in Mongolia.

The gold and other mining activities, particularly the exploitation method of heavy use of extremely poisonous chemicals such as mercury and cyanide, have casted dark shadow on the environment including soil erosion and withered rivers and streams.

Moreover, foreign and domestic investment has increased in agriculture, infrastructure, light and heavy industries and service sectors. Particularly, number of projects being implemented in mineral exploration and exploitation sector has increased; mining activities always accompany environmental risks and affect the original state of nature causing air, water, soil and underground pollution.

Among the projects that are being implemented in Mongolia, mining projects have much higher negative impacts on the environment. All problems caused by the mining industry can be grouped into three.

First: Mining industry damages the soil.

Second: Gold placers are usually located in the river basins. Because of this, river ecosystem has been destroyed resulting loss of water reserve. Moreover, due to the change of river flow, water level has been decreasing.

Third: Vegetation cover in the area is lost forever, because of the removal of soil.

Therefore, it is important to improve the quality of the environmental impact assessment and environmental protection plan, and to enforce environmental monitoring programs. Measures toward decreasing negative impacts of certain projects need to be enhanced.

As a result of the joint efforts of State Specialized Inspection Agency and the Ministry of Nature and Environment, number of mining companies which prepare environmental impact assessment reports has been increased, however, the implementation of the environmental impact assessment and recovery work do not meet the requirement. This statement can be affirmed by the environmental degradation and other problems we are facing today.

The fact, that companies are responsible for developing environmental impact assessment and consequently, its implementation, has become the main mechanism of enforcing environmental laws and regulations, having people understood their responsibilities within the government policy and conducting monitoring activities. According to the assessment, the companies will operate to minimize the negative impacts on the environment and follow professional recommendations on how to lower negative impacts and how to conduct recovery work within the allotted budget.

9. Environmental education and public awareness

In 2007 Mongolia joined global process of implementation of UN Decade on Education for Sustainable Development and implementation of UNECE Strategy on Education for Sustainable Development. Initiatives

in the field of education for sustainable development in the Mongolia are implemented in the framework of environmental education that was reflected in national political documents

Media: There are a number of printed and TV media suppliers which occasionally cover environmental issues including forest and biodiversity issues, but no specialized magazine. The MNE had agreement with main news paper such as Onoodor, Daily news on publication environment news including biodiversity conservation news. There is financial problem to publish environment articles in news paper because certain newspapers now ask for cash payments for publication.

There is a Press Institute has a training and communication centre that could become a key support centre for the media in the country in environment public awareness. . The second is the forthcoming creation of an "Baldorj" Environmental Journalists Club. This club is very active to promote environment and biodiversity conservation public awareness in the country.

Museums: At the provincial level (aimags), has a local History Museum. These museums could be a prime channel for disseminating environmental including biodiversity information, all the more as schools are still touring these institutions a lot for ecology awareness. The museums' managers would be interested in getting hold of some "new, colorful and modern" information materials and could then easily offer to collaborate in the implementation of public awareness forest projects at the provincial level. This is a less conventional channel that would deserve attention.

Religious groups: The traditional religious institutions in the country (currently undergoing some substantive revival) could serve as a good channel for dissemination of environmentally sound practices and awareness of environmental problems.

10. The role NGOs in biodiversity public awareness

NGOs contribute and publish reports in the framework of environmental education, education for sustainable development, lawmaking and public participation, which helps to develop sectoral and cross-sectoral partnership in issues of conservation of natural resources. Mass media also pay attention to rational use of natural resources and conservation of biological diversity. The initiatives of NGOs on holding clean up days and tree planting.

The Government of Netherlands, GEF, UNDP, and other projects conduct activities on increasing awareness of local communities on importance of biodiversity conservation.

The 2001 the Dutch/UNDP-funded Environmental Public Awareness project (EPAP) as one of the most interesting and useful project *in* Mongolia. Apart from working with government agencies, it effectively mobilized a *large* number of environmental NGOs and through several dozens of small pilot projects (most of them costing less than $5,000 each), implemented by NGOs between 1997 and 2001, Among other things, it demonstrated existence of opportunities to environment improvement including biodiversity.

Most foreign-funded projects are implementing public awareness activities through national NGOs that take the environment-related messages to the grassroots. The Government has been able to link with these projects to project the general direction of its environmental policies and programs.

NGOs are more active in public awareness area. The most important among them. NGOs are represented in the National Council for Sustainable Development and Environment Minister's council the effectiveness of that representation however uncertain. NGOs have bridged the information gaps only in part, and mostly in Ulaanbaatar only. There are many environmental NGOs has been established in aimags, n but there capacity are very week.

It is evident that NGOs have difficulties in disseminating the materials, documents and posters that they produce, because they do not have easy access to the media (newspaper, radio, TV) nor to government proper dissemination channels (such as the National Parks system, formal education system, etc.). However, noteworthy awareness products have been generated: color-posters, simple black and white brochures, booklets.

Cooperative coordination among agencies, working in the field of rational use biodiversity resources and conservation is restricted. Indistinct responsibilities in state structures and weak communications are a barrier to timely, full dialogue and interaction among executive ministries and agencies in decision making of significant environmental issues. There is a lack of an integrated concept of sectoral and cross-sectoral partnership at local and national levels. Rather, the strongest support for mainstreaming of environmental concerns typically comes not from the environmental or environment-related ministries themselves but from outside, especially donor-outsiders.

CHAPTER IV. PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN

The objective of this Chapter is to present a summary of the progress that has been made towards the 2010 targets and results of implementation of the strategic plan of the convention.

A. PROGRESS TOWARDS 2010 TARGET IN THE FRAMEWORK OF FULFILLMENT DECISION VIII/15

BIODIVERSITY COMPONENTS PROJECTION

Progress towards 2010 target in the framework of fulfillment decision viii/15 boidiversity components projection is shown below.

Goal 1. Promote in conservation of biodiversity of ecosystems, natural habitat and biome.

Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.

Scientists consider that a country which has nature, climate and territory features like Mongolia has to take under the protection no less than 30% of its territory, and by carrying out economic activity effectively it can ensure its ecological balance. Although the budget for this from the State is increasing from year to year it is insufficient to protect effectively the biological diversity in conformity with its environment. Mongolia has prepared and is implementing measures for *in situ* conservation of its biological diversity.

Mongolia has defined its strategy for in-situ biodiversity conservation, protection of rare and vanishing species and plants, and created a strong legal framework.

In 1998, special protected areas of Mongolia comprised 11.1% of the whole country's territory, were increased to 14.0% in 2007.

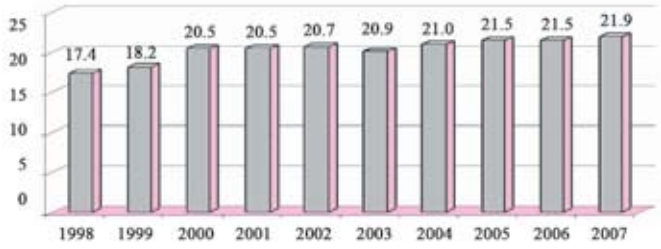


Fig. 4.1 Growth of State Protected Areas by area (million ha)
Source: *Ministry of Nature & Environment State of the Environment Report 2006-2007*

The following figure shows the percentage share of each category within the state protection area.

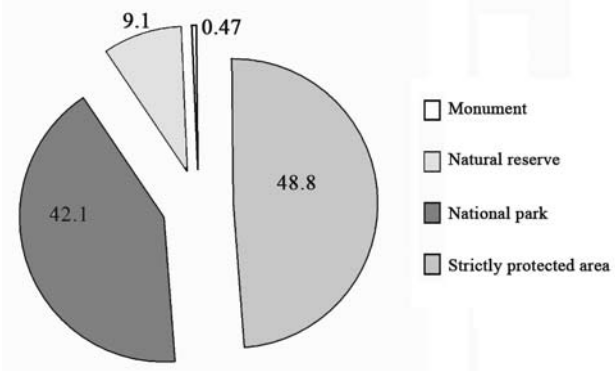


Fig. 4.2 Total coverage area of Strictly Protected Area, National Park, National Reserve and National Monument
Source: *Ministry of Nature & Environment State of the Environment Report 2006-2007*

Target 1.2: Areas of particular importance to biodiversity protected

Areas of particular importance to biodiversity

Mongolia contains important sections of a total of 15 of the WWF eco-regions. 11 eco-regions have more than 10% protected area (PA) cover, 1 eco-region has less than 10% PA cover and 3 eco-regions have less than 5% PA cover.

Table 4.1 Percent of Protected Area Cover by the WWF eco-regions

Eco-region Name	Number	National area km^2	% of world total within area	% PA cover
Daurian forest steppe	PA0804	94614	45	>10
Mongolia-Manchurian grassland	PA0813	308600	35	<10
Trans-Baikal conifer forest	PA0609	38060	19	>10
Selenge-Orkhon forest steppe	PA0816	202301	89	<5
Sayan montane conifer forest	PA0519	38294	11	>10
Sayan alpine meadow and tundra	PA1016	21540	27	>10
Khangai Mountains alpine meadow	PA1007	37167	100	>10
Khangai Mountains conifer forest	PA0512	2900	100	>10
Gobi Lakes Valley desert steppe	PA1315	139703	100	<5
Eastern Gobi desert steppe	PA1314	178315	63	<5
Alashan Plateau semi-desert	PA1302	217967	32	>10
Junggar Basin semi-desert	PA1317	33899	11	>10
Altai montane forest and forest steppe	PA0502	90369	63	>10
Altai alpine meadow and tundra	PA1001	25559	28	>10
Great Lakes Basin desert steppe	PA1316	135197	86	>10

Source: IUCN.2006. Regional Action Plan for the Protected Areas of East Asia

7 areas were included in the list of World Heritage sites and Man and Biosphere of UNESCO. Also 11 areas were recorded on the Ramsar List of Wetlands of International Importance.

Table 4.2 Mongolian International Sites

Areas	No. of sites	Protected Area (ha)
World Natural Heritage Site	1	712545
Biosphere Reserves	6	5897206
Ramsar Sites	11	1395963

Source: *Ministry of Nature & Environment State of the Environment Report 2006-2007*

Currently, a total 70 Important Bird Areas (IBAs) were identified in Mongolia. The 70 IBAs in Mongolia cover 8,358,313 ha, equivalent to 5% of the national territory. 70 percent of the IBA network by area (5.9 million ha) is protected within state protected areas. At the national level, only 14 IBAs are fully (>95%) protected within State Special Protected Areas (State SPAs). A further 15 IBAs are partially (<95%) protected within State SPAs, while 41 IBAs have no protection at all at the national level (Fig 4.3).

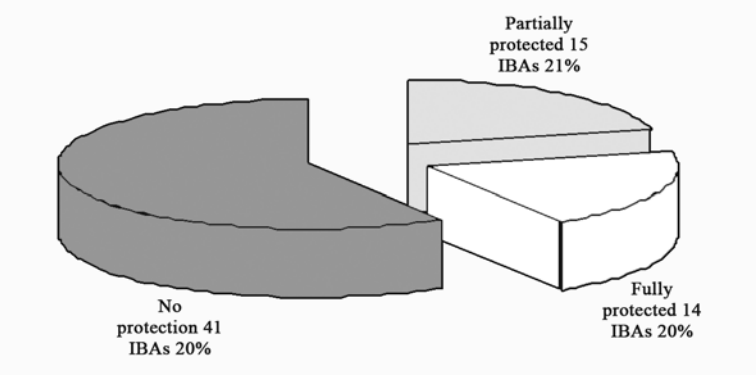


Fig 4.3 Protection of IBAs by State SPAs

Source: Wildlife Science and Conservation Center, Mongolia.2009. Directory of Important Bird Areas in Mongolia

Goal 2. Assistance in conservation of specific diversity of ecosystems

Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.

Ex situ conservation activities began with the reintroduction of wild horses back into their native range. The last known natural habitats of wild horses were in the southern Baitag Bogd mountain and Bulgan river area, Aj Bogd mountain in the east and through the south of the Altai mountain range - Huh Undur, Takhiin Shar nuruu, and Khonin us gobi. The reintroduction of wild horses began in 1992, when fifteen wild horses were transported to Hustai nuruu, and 6 horses to Bij River from European countries.

Artificial reproduction of Wild Bactrian camels, endemic species of Central Asia, and the Gobi bear, has begun. Twenty nine red deer caught from Hustai National Park have been reintroduced to Mungunmorit soum of Tuv aimag. The Red deer farm currently has 38 deer.

The Central Asian beaver was caught in its last natural habitat in the Mongolia-Bulgan river and was introduced to the Hovd and Tes rivers, which flow within the closed Central Asian watershed.

The species was therefore were reintroduced to other appropriate areas with support from Germany. 64 individuals were successfully reintroduced to Tes River of Uvs aimag and Hovd River of Hovd aimag between 1973-1978 and 1985-1989. This work, began in 1973, was completed in 2002.

Wild camels, the Mongolian saiga and the Gobi bear are all species considered to be in decline. With the purpose of conserving species within their native range, work has been conducted on reproduce the species within their natural range or and rehabilitating the species' habitat inside the protected areas using a staged approach.

The Botanical garden of the Institute of Botany represents ex situ conservation of national and foreign species in an area of 1000 m2. In the garden of cultivated and natural trees and shrubs there are implemented ex situ conservation of the species since 1961. Currently there are 140 species of trees and shrubs.

Black locust (Robinia pseudoacacia) that was transported from North Korea was successfully cultivated with in vitro technique using clone methods. The in vitro cultivated samples of black locust were reproduced (20000 micro plants) and then transferred to ex vitro (greenhouse) conditions.

Target 2.2: Status of threatened species improved.

The Red Book of Mongolia, published in 1997, indicates that there are two categories of endangered species in Mongolia: rare and endangered species. This includes 30 mammal species. Endangered animals, which are listed in the Red Book include the Bactrian Camel, Gobi Bear, Przewalski's Horse, Saiga Antelope), Shiber and Murun Elk, Wild Boar and the Asian Beaver; 70 percent of the areas in which Snow leopard, Wild Ass, River Otter, Musk Deer, Ibex and Wild Sheep live are now under state protection. The Red Book contains a list of 30 species of endangered birds. Inclusion of some parts of Hovsgol Lake, Uvs Lake, Khar Us Lake, Khorgon, Terkhiin Tsagaan, Dayan lakes and rivers gives the positive effect of conserving areas where these birds live. 6 rare fish species are listed in the Red Book of Mongolia. Therefore The Red list of Mammals, The Red list of Fishes, published in 2006.

Moreover, the use of 133 species of endangered plants has been legally abolished, as 128 species of higher and lower plants were registered in the Red Book, providing sound conditions for their natural rehabilitation. 40 percent of the total area for growing over 400 species of endangered plants has been taken under state protection. A program of transplantation and acclimatization works for 20 species has been done.

With the aim of conserving rare and very rare plants diversity, the " List of rare and very rare plants" was produced in 1995, with associated conservation activities being rolled out in a step – wise fashion.

Goal 3. Assistance in conservation of genetic diversity.

Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.

The first steps on conserving genetic resources have been made through amending Environmental Protection law, Forest law and adopting National programmes on Protecting rare plant species and their rational use, Defining maximum allowable volume for use of plant species.

In 2002 with cooperation of UN University in Tokyo joint workshop on "Benefits from genetic resource,

sharing of those benefits, traditional knowledge and biosafety" organized in Ulaanbaatar among Mongolia and respective Asian countries.

The gene bank of agricultural cultural plants is established in Darkhan – Uul province. The "Erdene sogoo" red deer breeding center established in 2000.

In the livestock sector conservation of genetic of domestic animals is regulated by related law and other normative acts in the field of veterinary. In the area of regulation of genetic engenering and microbiology activities after joining Caratagena Protocol on Biosafety the Law on biological security was developed, which is approved in 2002.

Goal 4. Contribution to sustainable use and consumption.

Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.

Environmental laws regulate the relations on sustainable use of natural resources. For example such laws as the law on "Environmental Protection", law on "Hunting", law on "Natural Plants" created the economic mechanism for sustainable use of natural resources. Particularly the law on "The Ratio of the Income from Natural Resource Use Payments to be spent for Environmental Protection and Natural Resource Restoration" has been approved by the Parliament. The Government approved Resolution No. 52 on the "Procedures to Create, Spend and Report on the Financial Resources for the Protection of Environment and Restoration of Natural Resources" in 2000.

These laws and regulations are of significant importance in creating the legal environment for the provinces and other administrative units to have a sustainable financial resource for the protection of the environment.

The work on the assessment of the Mongolian flora and fauna, on the study of its resources, on the improvement of utilization of animals and plants based on its ecological and economic evaluation has not been fully conducted at the state level due to financial restraints. However there have been certain improvements in the field of research and study.

SDC "Green gold" or project of community based pasture management is being implemented in Mongolia is a demonstration of effectiveness of community based management of natural resources as means for achievements of double goal – rational use and management of resources and walfare of rural population. Therefore "Sustainable livelihood" programs implementing in protected area's buffer zones for sustainable management of natural resources such as water, forest, plant and hunting animals and improving the livelihood of rural population.

Target 4.2: Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.

The survey results in Khan Khentii SPA shows that density of mammals here has been decreasing the 3-18 times, due to direct and indirect human activities for last 40 years. For instance sable population density is decreased 4.8 times, Siberian moose population is decreased 15 times, red deer 18 times, wild boar threefold, roe deer 6.3 times and musk deer population has decreased 6.6 times than 40 years ago and Illegal hunting of some mammals such as red deer, musk deer were increased to trade with Russia and China, law enforcement was weak and because uncontrolled hunting were difficult to save for mammals.

Study shows that red deer population has declined by 92 percent in past 18 years. Mongolian scientists calculated that musk deer populations peaked at 44,000 individuals in 1986, within forest zone of the Khangai, Khentii, Khovsgol, Khan-Khohii mountain ranges, in territory of 7 aimags and 63 soum. Only 22000 musk deer (about 50 persent of all Mongolian population) were counted in the Hentii mountain ranges. In 2008, only 400 musk deer were estimated in 13173 ha of the Khentii ranges. It means musk deer population has decreased by 50 persent compare to 1986.

Target 4.3: No species of wild flora or fauna endangered by international trade.

Since 1994, Mongolia has begun exporting Saker falcon to Arian countries. In June 2002, the first detailed study and census of Saker falcon have implemented in major habitat of the bird along the 42164 km route. The study revealed that totally 6050 falcons are summer in Mongola.

In a framework of the bilateral agreements totally 303 Saker falcon have been exported to Kuwait, Syria, Saudi Arabia and Qatar from which 1155945 USD allocated to the State and 107310 USD to the regional budgets. This means that only in 2002 Mongolia received 1263255 USD from the export of Saker falcon.

In 2003 National action plan on protection of Saker falcon have been adopted. Since 1998, studies on habitats, biology, ecology, migration, diet and population of Saker falcon have being implemented. Also, from 1998 a few artificial nests have been installed to improve habitats and increase number of birds. In period 2006-2008 out 250 artificial nests installed in Tuv and Khentii aimags 29 are in use.

The promotion and public ecological knowledge, especially focused on Saker falcon information disclosure, periodically organized. The researches over Saker falcon as well as protection of their population implemented every year; however, due to shortage of resources in 2007 and 2008 only in limited area of their distribution some researches have been conducted. The results indicating that the number of Saker falcon is decreasing, especially the number of high quality birds, thus the export of the falcon as it is urged by scientific community should not exceed 50-100 per year. Unfortunately, MNET neglecting these recommendations and continue export 240-320 of Saker falcon per year.

Goal 5. Reduction of loads, caused by loss of habitats, change of land use structure, land degradation and unsustainable water consumption.

Target 5.1: Rate of loss and degradation of natural habitats decreased

To reduce temps of theats and degradation of natural habitats in the country SPNAs (reserves, nature parks, preserves, nature heritages) and territories of regulated use were established.

As for 2006-2008 totally 72 % of the territory more or less degraded of which 23 % slightly, 26 % moderately, 18 % severely, 5 % very severily degraded.

In 2007 it was planned to implement technical restoration on 850.65 ha and biological rehabilitation on 928.9 ha out of 791.452 thousand ha land degraded under the mining activities. Comparing the results of mine site restoration over last 3 years continuously growing and comparing to 2005 in 2006 restoration was done on 1.3 times more land and in 2007 on 16.8 % more land.

In order to restore degraded land, especially in drylands Government of Mongolia initiated “Green belt” programme, which will continued for the next 15 years.

“Law on water” and “Law on fees for use of Mineral Water” of 1995 have been adopted to provide legal basic for regulation of relations related to protection, proper use and renewal of the surface and ground water resources of Mongolia. The resources sould be executed by professional organizations funded by governors of the capital city and aimags.

Report on measures to be taken to protect land says that the following measures have been taken to protect agricultural areas: planting of perennials on the territory of 1093,2 hectares, 71044 hectares have been sown in strips, 30541,3 hectares have been fertilized, and on the territory of 70414,8 hecutares destructive rodents and insect pests have been eliminated.

At the state level over 600 deposits with more than 440 types of mineral resources have been explored and their resources estimated. Of more than 200 deposits extracting mineral resources there are 24 minings extracting nonferrous metals, 111 gold mining, 34 coal mining, 15 mining extracting salt, and 50 minings extracting ordinary minerals.

According to the state enviromental observation conducted in 2001, earth-stripping was done on the territory of 10836,1 hectares, while soil rehabilitation activities were undertaken on 1767.8 hectares of land where extraction of mineral resources was done.

Goal 6. Control threats from invasive alien species

Target 6.1: Pathways for major potential alien invasive species controlled.

In 2007 the “List of plant forbidden to collect internationally and nationally” has been amended. The adoption of the “List of pest insects, weed plants and infectious disease with limited habitat in Mongolia and forbidden to import internationally” supports the enforcement of provisions 5.1.3 and 5.1.4 of the Law on forbidding the transportation of goods and product of wildlife origin, and provisions 4.2.3 and 4.2.4. of the Law on Plant protection. This also supports the improvement of controlling and monitoring systems.

Some alien species can be beneficial to the Mongolian economy but some may also result in damage to its biodiversity and great losses to its economy. Therefore, the potential impact of introducing alien species is extensive. As the market economy develops in Mongolia there are more possibilities for alien species

introductions. The Mongolian Government places great importance on prevention, control and eradication of any alien species threatening its ecosystems.

The Mongolian parliament and responsible Ministries have adopted some fundamental laws and regulations to try to prevent introduction of alien species.

Laws and regulations have been adopted on the import and export of alien species across the country's borders. The Parliament of Mongolia passed the law on "Protection of Plants" (1993), the law on "Food provisions" (1993), the law on "Protecting Livestock Gene Pools and Health" (2001), the law on "Licenses and special permissions" (2001). Also, by resolution of the Minister of Food and Agriculture, the regulation on "Quality monitoring of imported and exported goods and products" and temporary regulation on "Quarantine for the importing of domesticated and wild animals, all kinds of plants and their raw materials" (2001) were passed.

The purpose of the first regulation is to ensure the food security of Mongolia by preventing or limiting the spread of the possible adverse impacts on human and livestock health from plant and livestock diseases and harmful insects that might enter the country through international trade.

The purpose of the second regulation is to enable the Government to enforce strict quarantine regulations in the event of an outbreak of a plant or animal disease.

The Ministry has produced the following list of harmful species. **Plant disease**: Sinchitrium endobioti-cum, tilletia pancicii Bud et Ran, corinebacterium michi-ganesis, **Insects**: Grapholitha molesta Busck, leptinotarsa decemlineata Say, callosobruchus maculates Fabr, ephestia kuhniella Zell. **Weeds**: amborosia, Cenchrus tribuloides Benth, Striga Sp.Sp, and Aveng fatua,L.

As a member of the OIC, Mongolia has prepared a list of international animal deseases that occur in the country. For example, foot and mouth, vesicular stomatities, rinderpest, ontagious bovine pleuropneumonia and classical swine fewer. Of the above diseases, foot and mouth has had a huge effect on the national economy. For example, in 2001 an outbreak of foot and mouth disease in several provinces caused a loss of 1.3 billion MNT. These resources were spent on providing anti virus vaccines for livestock and expenses incurred in reducing the spread of the disease. Besides the economic loss, there is an uncalculable loss to the livelihood of the local herders. Their livestock may be destroyed and they will then have no means of generating income.

Research throughout country on the registration and assessment of alien species has not been completed, and it is therefore difficult to monitor the alien species. Especially lacking is information about microorganisms, harmful insects and rodents. The transfer and penetration of many kinds of diseases from these alien species has a negative impact on countries development. Even though quarantine units at the country's border are monitoring these kinds of alien species, its capacity is weak and needs improvement in laboratories and other necessary resources.

The harsh climatic conditions and negative human impacts cause favourable conditions for insects to mass-multiply and destroy resources, which can consequently reduce the natural regeneration ability of many ecosystems.

There are more than 300 species of pest insects in our country. Of these, including 14 genera, 35 families and 40 orders of forest pest insects are distributed in more than 400 thousand ha of forest. Forest pest insects can increase in masses and damage trees very quickly in dry years, with insufficient moisture (precipitation). In 2000, research into forest pest insects and forest diseases was organized in 300 thousand ha of forested area by the Ministry of Nature and Environment, according to the provisions of forest. The study results showed the following species of foliage and needle pest insects: Erinnis jacobsoni (Errannis Jacobsoni Diak), Siberian Silkworn (Dendrolimus sibiricus TSchw), Gypsy moth (Ocneria dispar L), Schlehen spinner (Orgyia antiqua L), Pappel Spinner (Stilpnotia salicis L), Larch Bud Moth (Zeiraphera diniana Gn). These species were distributed in the forest, with a 40-50% increase in numbers, arising in outbreak and damage to the forest. Also pest insects have been impacting negatively in agriculture production. However, over the last 30 years, 1 billion MNT were spent on the control of pest insects and rodents from the central budget, although results for the controlling mechanisms are not so good. Scientific institutes are now studying and experimenting for environmentally friendly methods of pest control.

Goal 7. Address challenges to biodiversity from climate change, and pollution

Target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change.

In framework of this target, in order to reduce the negative impact of global change, especially, drought, the reforestation in northern part of Mongolia has implementing every year. Similarly, in drylands afforestation under the "Green belt" national progamme are take place. In 2007 totally 6541.4 ha are was reforested/afforested. Of which totally 3997.3 ha reforested by state budget, 1871.1 ha by private organizations, 150 ha by financial support from Government of Republic of Korea in a framework of the "Green belt" national programme implementation and 260 ha by Mongolian Government fund responsible for 'Green belt' programme implementation.

In Mongolia totally 92.3 thousand ha area affected by pest insects, needed to tackle. In 2007 totally on 27.4 thousand ha activities to combat with pest insect have been organized.

In order to sustain water resources actions directed to establish watershed management are started. This will enable participation of local community on managing their land by themselves ensuring equity of ecological service distribution and preventing natural disaster through developed preparedness.

Conducted the research project "Impacts of climate change on ecosystems and livestock husbandary and their adaptations". There was suggested the ways to mitigate of the "Impacts of climate change on ecosystems and livestock husbandary and their adaptations"

Target 7.2: Reduce pollution and its impacts on biodiversity.

In order to monitor environmental pollution, especially air pollution mobile and semi-fixed automatic measuring systems have been installed in major cities. To decrease air pollution in cities ecologically sound oven and fuel resources have introduced for 6000 households surrounding cities during the implementation of "Oven" project with support of the World Bank.

There was taken the following actions:

- To measure water pollution along the large rivers and surface water nearby cities the monitoring stations are installed under the responsibility of Environmental Monitoring agency.
- To purify drinking water in villages and cities according to 2005 report over 50 water purification facilities have been installed.

In 2008 with support of Government of Spain central water treatment facility has been technically renovated. With this new facility sewage water will treated 50 % more than before. There is no monitoring data on volumes of water treated, thus at this stage the effectiveness of the new system can not be reported.

In order to reduce solid waste with support of the Government of Japan new landfill site have been established in 2008.

Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods

Target 8.1: Capacity of ecosystems to deliver goods and services maintained.

Many of the ecosystems (particularly the arid and semi-arid grassland and desert systems) are fragile and extremely vulnerable to over-exploitation. About half of Mongolia's population live a semi-nomadic existence tending their livestock (sheep, goats, cattle, horses and camel). Since the discontinuance of collectivisation in the early 1990s many of the nomadic herders have reverted to more traditional grazing patterns and have "reclaimed" their rights over family-based wintering and summering grounds and increased their herd sizes significantly. This has resulted in added pressure on grazing lands, resulting in further degradation of wild medicinal plant resources.

Productivity of land resources provides food security and effectiveness of poverty reduction in the country, as irrigated agriculture provides with grain and vegetables, and natural pastures with products for livestock sector. Taking into account importance of pasture and forest ecosystems for welfare of population and in accordance with national plans and strategies of sustainable development of the country in a whole it necessary to pay attention to support of these ecosystems' productivity. To provide needs of local population plantations of quick-growing trees are established. Community based management of forests are carried out, local communities rented forest plots to stocking nuts, fruits, berries and medicinal herbs. In the framework of implementation of Programme of agricultural complex development stimulating activities on use of distant pastures are conducted. With the aim

to develop community based, rational use of pastures Associations of pastures users are established. In separate rural areas centres of processing of products of livestock and crop sectors are opened. Local population is trained agrotechnical skills and nature conservation technologies. Through due to the continuous land degradation ability of ecosystems to provide goods and services to population is decreasing.

Target 8.2: Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.

In order to intensify biodiversity conservation and the sustainable use of natural resources, the Government of Mongolia uses an incentive system. In a country like Mongolia, with its rich biological resources, implementing socio-economic incentives increase the success of implementing obligations under the Convention. Incentive measures can be given through different economic and social motivations like tax and credit policies, rewards and honorary awards.

The legal base for using economic incentives is already determined in the law on "Environmental Protection" and law on "Natural Resource Payment". For instance, Articles 19 and 34 of the law on "Environmental Protection" allow the state to give incentive measures to the people, businesses and organizations for their contributions in the activities of conservation, sustainable use and restoration of natural resources, and in adopting different kinds of environment-friendly modern technologies.

In the "Law on Hunting" it states that the person who discovers an illegal act and who informs the relevant authorities will be rewarded with 15% of the fine for the violation. Similar articles can be found in The Law of Forest and The Law of Water. Also, the Government Resolution No 95 of 1998 issued "A rule of using incentive measures for the people, economic entities and organizations that adopt environmentally friendly technologies".

Based on the Mongolian Law on Forest, the Government made a resolution that the community or business enterprises can possess forestland area for a 40-year period from the State. They then have the obligation of protecting the forest resources from illegal cutting and wild fire, regenerating the forest areas through establishing nurseries, and using the forest resources to improve the living standards of the local people. Local government will provide tax exemption for use of timber or fodder collecting. The Government also has a fund for reforestation, and communities can obtain a grant to carry out reforestation activities. A total of 19 community forestry units have been established in 4 provinces.

The Government of Mongolia agrees that proper incentive measures will be promoted for biodiversity conservation and sustainable utilization activities. In a country like Mongolia with rich biodiversity resources, implementing socio-economic incentive approaches will make effective the implementation of obligations under the Convention. We have developed all kinds of incentive measurements at all levels of authority, including state, provincial and local levels. Incentive measures can be given through different economic and social motivations like tax and credit policy, rewards and honorary awards. However Mongolia is a developing country and needs more information exchanges on incentive measures from other countries and seeks more financial assistance in order to improve and ensure the effectiveness of using incentive measures.

Goal 9 Maintain socio-cultural diversity of indigenous and local communities

Target 9.1: Protect traditional knowledge, innovations and practices.

Mongolians have considerable, highly valuable traditions on nature conservation and preservation.

Our ancestors have generated and followed valuable traditions, habits and worship cultures in terms of nature conservation, preservation and use of natural resources. Natural conservation traditions and habits are incorporated into goals and objectives of over thirty laws, over two hundred legislative acts/regulatory documents and about twenty eight programmes implemented in the country in recent years. Biodiversity conservation programmes that focus on the increased participation and empowerment of local communities in conservation activities, including herders, farmers, and other community groups, are implemented in the country.

Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.

The Law on Intellectual property was adopted by Parliament in 1993. The purpose of this law was to protect intellectual property and regulate actions relating to the use of intellectual property. According to law, the established office for intellectual property is the Government Implementing Agency, under the Minster of Justice

and Internal Affairs. The role of the Agency is to receive and register intellectual property; certification; the establishment of an intellectual property database; and to assist in protecting intellectual property at the national and international level. The law has a total of 6 chapters and 26 articles.

The Law on Patents was adopted by Parliament in 1993 with some additional amendments made in 1999. The purpose of this law is to protect and regulate new products, new models, the inventor of profitable products and patient owner rights. According to law, the new production means "the product or the explored the fundamentals of any production based on natural law, which is created firstly" the law has a total of 6 chapters and articles.

In a framework of the Netherland supported and Asia Foundation implemented programme entitled 'Securing our future', directed to improve environmental initiative and promote sustainable development, public awareness broshures have been published. For instance promotion materials as:

- Public involvement in mining licensing process
- Use and protection of natural resources through establishing community based organizations

Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions

Actions to identify genetical resources in Mongolia, and their equal and efficient exploitation, have been organized. According to the biotechnological program adopted in 1998, biotechnological studies need to be intensified to increase genetic resources. Currently, two biotechnological programmes have been completed with a third programme under the development. As part of this work, laboratories of gene engineering, plant tissue and cell cultivation and genetic resources were established at the Institute of Biology of MAS. The workshop titled "Biosafety: national capacity of genetic resource exploitation, benefits from biosafety in Central Asia and Mongolia" was organized in 2002 in Ulaanbaatar, in cooperation with the UN university in Tokyo. Representative from 7 contries such as Kazakstan, Turkmenistan and of international organizations participated in the workshop, giving a total of 20 presentations on genetic resources and enhancing capacity of genetic resources exploitation. Issues of genetic resources are included in Mongolian environmental law, The Law of Forest, the Law of Hunting animals, the programme of conservation and exploitation of rare plants, and the resolution of Minister of MNE on determining the natural plant exploitation level.

Traditional methods of fermenting airag, preparing yoghurt, making cheese, and tanning skin are classical forms of biotechnology. Large amounts of microorganism taxa live in the soil, water, air, animal and plant environments, thus helping to regulate ecological balance. They therefore play an important role in life. Microindividuals with peculiar reproductive, nutritional and rehabilitation characters of Mongolia are known as good resources of biotechnology development.

By the early 1990s, 482 bacterial, 74 viral, 90 fungal, 401 Actinobacterial, and 177 yeast tribes (total of 1224 tribes) were known, with 1140 of these tribes known from components of Mongolian nature. There are many resources of different types of by-products such as by-products of alcohol and beer, milk, plant residues, and straw. Easily accessible and cheap resources can be obtained with a low amount. Produce needs to be processed using biotechnological methods thus can produce ecologically pure products for increased exports and decreased imports.

A system of cooperation towards interrelated activities amongst Government, scientific organisations and private organisations needs to be developed to establish a knowledge based development system.

Biotechnology is a primary science, and technology sectors have developed in Mongolia over a long period. However there is a lack of financial resources, private organisations do not participate and highly educated professionals are missing. Due to these problems, the level of biotechnological research is poor and conditions to obtain new foreign technologies have not yet been formed. There is a need to pay attention to appropriately implement human resource policies, to attract highly educated professionals, and enhance link between scientific organisations and private sector. In addition, there is a strong need to identify peculiar and profitable characters of animal, plant, livestock and microorganism raw materials, and extract them, conduct detailed studies of their profitability, important characteristics, prove the importance of such characteristics, obtain copyright, seek for possibilities to implement such technologies in practice and estimate economical efficiency, and to implement them in Mongolian conditions. However, most of the Mongolian research organisations today send samples of animal, plant, livestock and microorganism raw materials away in order to determine profitable characters of the materials. Cooperation to enable the training of professionals over the short and long term, finding research

funding, conducting research using modern sophisticated techniques and publishing research results in acredited international journals is required.

Goal 11. Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention

Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.

Mongolia as a country with economy in transition has not yet reached the stage where it could provide financial aid to developing countries. Donor funded projects in environment including biodiversity conservation implemented by Ministry of Nature, Environment and Tourism. (Annex 3)

Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.

The Mongolian Academy of Sciences established technology Transfer Center and become a memeber of Technology Transfer Center of Asia Pacific, blonging to UN ESCAP. During this period Mongolia actively participated in in projects and programmes as Asian medicinal plant Information Network, Biotechnology information network and New technologies, through which the information sharin gateway has been established. The number of national specialists have been educated. To ensure the implementation and technology transfer and technocal cooperation with international institutions the Government of Mongolia supporting responsible organization with necessary financial and technical support as well as with human resource development.

The Mongolian technology transfer centre is responsible for evaluating technological levels, and such activities are beginning in related sectors.

Additionally, the study programme of institutions and universities needs to be improved to meet international level sceince and technology development requirements. The sceince and technology centre needs to be improved to be strengthened, modern laboratoriesneed to be established and young specialist need to be prepared in the universities of foreign countries.

The detailed description of implementation of 2010 targets are presented in the Table 4.1. This table showing how national targets and indicators used to assess progress towards global goals and targets.

This information will be presented in the form of a table in which:

Column 1. The provisional framework of goals and targets from COP Decision VII/30

Column 2. Includes high level targets from government strategies in the Mongolia, showing how these targets link to their respective CBD target and describing briefly how they are being addressed, including the types of organization involved in delivery.

Column 3. The text in this column will set the Mongolia contribution in the context of the global 2010 target. This should allow the CBD Secretariat, when compiling national reports from many Parties, to understand the contribution that the Mongolia makes to the global issue to which the target relates. This is challenging information to produce but it should facilitate aggregation of national progress assessments into global assessments and thereby make a substantial contribution to the third Global Biodiversity Outlook and other international biodiversity assessments.

Column 4. The most relevant Mongolia Biodiversity Indicators to assess the global 2010 targets are listed.

Column 5. The most recent Mongolia indicator assessment is given. The Mongolia indicators are updated annually, depending on data availability. A full assessment will be undertaken in 2009 in order to submit the most recent information in the 4th National Report;

Key to symbols used:

 = Improving

 = little or no overall change

 = Deteriorating

 = insufficient or no comparable data

Table 4.1. The detailed description of implemention of 2010 targets

Global goals and targets	Relevance to Mongolia, related national targets	Mongolian contribute to global targets	Relevant indicators	Indicator assessment	Remarks
Protect the components of biodiversity					
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes					
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	The Mongolian Government has a target to increase coverage of protected area up to 30% of the whole country's territory by 2015	As of 2007, special protected areas of Mongolia encompass 21.9 million hectares covering 61 areas, making up 14.0 % of the whole country's territory. In 1998, special protected areas of Mongolia comprised 11.1% of the whole country's territory, were increased to 14.0% in 2007. Mongolia contains important sections of a total of 15 of the WWF eco-regions. Eleven eco-regions have more than 10% protected area (PA) cover, 1 eco-region has less than 10% PA cover and 3 eco-regions have less than 5% PA cover.	Extent of protected area		
Target 1.2: Areas of particular importance to biodiversity protected	The Mongolian Biodiversity Conservation Plan has been agreed for 85 areas of importance to biodiversity.	As of June 2008, totally 72 sites with total area of 22 million hectare included to the State protected area network, of which Strictly protected -18, National parks - 26, Natural reserves – 20 and heriages – 8. Also, 937 sites brought under the local protected areas, occupying 16 million hectares. There are some sites protected by the international treaties as 11 sites (15 million ha) under the Ramsar convention, 2 sites (1 million ha) as the World heritage, 6 sites (16 million ha) as Biosphere reserves and around 70 sites (8,4 million ha) protected as areas important for birds.	Important areas for biological diversity		
		There no any endemic species of bird in Mongolia, however, only one specie Accentor kozlova (Prunella kozlova) considered as sub-endemic or Mongolia is their second habitat. They mainly distributed in 7 important sites. Totally 41 important sites are registered in Mongolia which are habitat for species, considered as limited at the biome level or most portion of the population distributed only in one biome.	Protection of species with limited habitat in case of biomes and ecosystems.		
		In Mongolia, there are 46 "Importance areas for bird", over there 43 migration birds species come across by many from 20000 individuals or over 1 percent of global or regional population. There are 46 important bird areas, where the migratory species (43 species) habit in numbers more than 1% from its Global population. Therefore, the territory of Mongolia has an importance in conservation of water bird species laying in route of their migrations. There are 35 sites possibly will be included to the list of Ramsar Convention because of their ecological role in protection and conservation of wetland species.	Trends in population, distribution and flock formation of species		
		Some researches on developing the justifications for inclusion of some important areas for crane specie into the North East Asian Network on Protection of Cranes was done for many years. As a result of this work, in 2003 Mongol Daguur national park which is a place of summering and nesting for white-naped crane (Grus vipio) and staying while migration for Hooded crane, Siberian white crane and Japanese crane. Later in 2003 Khurkh Khuiten lake and Ugtam natural reserves were included to this network.	To protect species integrate some sites into the international SPA network		

		Some endangered and rare species range are completely included in the Protected areas, such as wild camel, gobi bear, wild horse, Ussurian elk, Siberian elkmoose, wild boar, Eurasian beaver, forest dormouse. As well as, 70% range of some mammals has included in the Protected areas, such as snow leopard, wild ass, otter, musk deer, wild sheep, Siberian ibex etc.	Trends in extent of selected biomes, ecosystems and habitats	✓	
		A resolution of the protection of the Khonin Nuga region from the khurals of the Selenge-Aimag was submitted to the Ministry of Environment and Protection of Nature. The considered area includes about 3,000 km² and it includes huge natural landscapes without human settlements. Although we find 60 % of the Mongolian butterfly fauna and about 70% of aquatic insects fauna of Mongolia in this region. Many species of butterflies, for example, which are ranked as "extinct", "critically endangered" or "endangered" in Europe are recorded in West Khentey as abundant species in safe condition. The declaration of protection depends on the decision of the parliament in Ulaanbaatar that has been due for last 8years now.	Trends in extent of selected biomes, ecosystems and habitats	≈	
	Continue evaluation of protected area system needs and submit proposals to Parliament	The some range of Snow leopards introduced a motion for including in protected areas on the basis of study results. This includes, Bayanzurh mountain ranges, some areas of Turgen mountain, Bumbat hairhan mountain in Hovd aimag, Saryn hondii in Noyon soum, Ikh Bogd mountain ranges in Bayanhongor. Out of which some areas included in the local protected areas.		✓	
Goal 2. Promote the conservation of species diversity					
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	Improve ex-situ management for species conservation and conserving genetic resources	The Government of Mongolia has implemented several measures to reintroduce Przewalsky horse in its natural habitat in Mongolia. As of 2007, approximately 300 heads of Przewalsky horse are spread in three different regions - Khustain Mountain in Tuv aimag, Takhiin tal in Gobi-Altai aimag and Khomyn tal in Zavkhan aimag. 58% percent of which lives in an open steppe under natural reproduction. Therefore, has reintroduced marmots in Bayanhongor, Tuv, Selenge aimags	Reintroduction of some mammal species	✓	
Target 2.2: Status of threatened species improved.	Establish a nationwide and monitoring system for biodiversity conservation, establish a research program that improves knowledge of biodiversity and relevant threats	With transformation to the market economy collection and export of the medicinal and useful plant species is increasingly growing resulting diminishing of their natural distribution. Thus, such species have to be included into the list of threatened species. Researches and legislations on inclusion of new species under threat into the list of rare and endangered species is not ensured yet.	Trends on distribution and number of species	≈	

			✓		
		The study on distribution, population, habitat changes and migrations for nationally and globally threatened species (Dalmatian pelican (Pelecanus crispus), Swan goose (Anser cygnoides), (Oxyura leucocephala), Saker falcon (Falco cherrug), Black vulture (Aegypius monachus), White-naped crane (Grus vipio), Hooded crane (Grus monacha), Siberian white crane (Grus leucogeranus), Japanese crane (Grus japonica) and Bustard (Otis tarda) and so on) has been organized in regions of their distribution with duration of 1-3 years. Those studies revealed biological and ecological features of species as well as developed management plans for their conservation and protection. Some of those information have been compiled in series of publications as well as in international journals (“Action plan for conservation of the Great Bustard Otis tarda in Asia” 1998, “Status overview and Recommendations for conservation of the White-headed Duck Oxyura leucocephala in Central Asia” 2003, Action Plan for the North East Asian Crane Site Network 1997-2006, 2007-2012, Action Plan of the Asia Pacific Migratory Waterbird Conservation Strategy, 2000). Due to intensification of the climate dryness the number of lakes, rivers and springs has desiccated. In other hand, the concentration of herders and livestock in water sources has a negative impact on habitats and population.			
			✓		
		Summary of conservation action plans for Mongolian amphibians and reptiles, and red list for Mongolian amphibians and reptiles have been made from the World Bank fund, and from support of the World Conservation Union, Ministry of Nature and Environment and Mongolian Government. Six species of amphibians and 21 species of reptiles have been evaluated as criteria of IUCN for the Mongolian regional red list. Total of 27 species have been checked and from these 6 species are vulnerable, a species is data deficient, 3 species are non evaluable, 5 species are near threatened and 12 species are least concern.	⋮	Trends on conservation of globally threatened species	
		Several species, that are listed as ‘extinct’ or ‘critically endangered’ in European Red Data Book such as Leptidea morsei F., Nymphalis vau-album Dennis & Schiff., Euphydryas intermedia Menet., Triphysa phryne Pall., Coenonympha glycerion Bork., Lycaena helle Dennis & Schiff., Coenonympha oedippus Fab., Coenonympha hero L., Cupido minimus Fues., and Nymphalis polychloros L. are still common in West Khentey, but we need to keep conserving, to avoid restrictions in the future. The baseline data for other insect orders are still missing in Mongolia, so it not available to mention the conservation activities.			

		As results of works conducted in 2005, funded by the World Bank's Netherlands-Mongolia Trust Fund in a framework of the Environmental Reform, reliable list of the fresh water fish diversity have been prepared in order to prepare full list of threatened species for which conservation action is necessary It has long been evident that a number of Mongolian fish species are threatened with extinction, but never before has a comprehensive conservation assessment of all Mongolian fishes been conducted.. Therefore, in 2006 under the World Bank's Netherlands-Mongolia Trust Fund for Environmental Reform published The Mongolian Red List of Fishes. 64 native Mongolian fish species have been assessed using the IUCN Red List Categories and Criteria (IUCN, 2001), at a regional level. In the summary Conservation action plans for Mongolian fishes eleven species from all of fish were identified as threatened. Each summary conservation action plan presents information about the status of the species, the current known distribution, threats faced, conservation measures already established, and recommended further conservation measures.	Change in status of threatened species	✓	
		Of the 128 native Mongoian mammal species that were assessed , 16% are categorised as regionally threatened, of which 2% are Critically Endangered (CR), 11% Endangered (EN) and 3% Vulnerable (VU). A further 6% are categorised as Near Threatened (NT). Thirty seven persent of the mammals of Mongolia are categorised as Data Deficient (DD). Only one species the Asiatic wild dog (Cuon alpinus), is categorised as Regionally Extinct (RE) in Mongolia.		✓	
Goal 3. Promote the conservation of genetic diversity					
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	Establish national education and training programs for biodiversity conservation	The Khar Us, Khar,, and Durgun lakes are within the territory Khar Us National Park which are covers with 6 soms of 3 aimag , the annual fish yield of these lakes is more than 700 tons per year. In 1996 illegal fishing began in these lakes In 2000, the Institute of Geoecology, MAS, conducted a study on fish population and fish resources, funded by the Mongolian Office of WWF. This project included organizing fishing zone, and boundaries, provided training for inspectors and rangers.	Trends in abundance and distribution of selected species	✓	

	Develop a genetic conservation research program	The gene bank of agricultural cultural plants is established in Darkhan – Uul province. Established a gene bank of donkey in genetical laboratories.	Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance	✓	
		The "Erdene sogoo" red deer breeding center established in 2000's by support the GTZ, and on local people's own initiative, which located in Mungunmorit soum, Tuv aimag. There are over the 40 red deers. As well as, other red deer breeding center located in Sharga morit, which owned the "Kabtel" LLC. There are over the 10 red deers.		✓	
Promote sustainable use					
Goal 4. Promote sustainable use and consumption					
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.	Ensure that agriculture and forestry are carried out in ways compatible with biodiversity conservation	In order to protect and ensure the natural regeneration of medicinal plants, replanting programmes have been developed. For example, the medicinal plant "Licorice" was planted in the Bogd and Baatsagaan sums of Bayankhongor aimag and Gulin sum of Gobi – Altai aimag, and Khovd aimag. This activity generated over one hundred and fifty employment opportunities. A community group of over one hundred members (most of the women) was established in Khuree Maral sum of Bayankhongor aimag for the protection, restoration and planting of natural plants. The group members were provided with training on planting and taking care of over twenty species of plants. This has provided good opportunity to make contributions to revenue generation and poverty reduction at a local level.	Proportion of products derived from sustainable sources (indicator under development)	✓	
Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.	Prevent pasture deterioration through overgrazing, Control hunting and fish	The survey results in Han Hentii SPA shows that density of mammals here has been decreasing the 3-18 times, due to direct and indirect human activities for last 40 years. For instance sable population density is decreased 4.8 times, Siberian moose population is decreased 15 times, red deer 18 times, wild boar threefold, roe deer 6.3 times and musk deer population has decreased 6.6 times than 40 years ago..	Trends in abundance and distribution of selected species	•••	

Target 4.3: No species of wild flora or fauna endangered by international trade.	Control hunting and fish	Since 1994, Mongolia has begun exporting Saker falcon to Arian countries. In June 2002, the first detailed study and census of Saker falcon have implemented in major habitat of the bird along the 42164 km route. The study revealed that totally 6050 falcons are summer in Mongola. In a framework of the bilateral agreements totally 303 Saker falcon have been exported to Kuwait, Syria, Saudi Arabia and Qatar from which 1155945 USD allocated to the State and 107310 USD to the regional budgets. This means that only in 2002 Mongolia received 1263255 USD from the export of Saker falcon. In 2003 National action plan on protection of Saker falcon have been adopted. Since 1998, studies on habitats, biology, ecology, migration, diet and population of Saker falcon have being implemented. Also, from 1998 a few artificial nests have been installed to improve habitats and increase number of birds. In period 2006-2008 out 250 artificial nests installed in Tuv and Khentii aimags 29 are in use. The promotion and public ecological knowledge, especially focused on Saker falcon information disclosure, periodically organized. The researches over Saker falcon as well as protection of their population implemented every year; however, due to shortage of resources in 2007 and 2008 only in limited area of their distribution some researches have been conducted. The results indicating that the number of Saker falcon is decreasing, especially the number of high quality birds, thus the export of the falcon as it is urged by scientific community should not exceed 50-100 per year. Unfortunately, MNET neglecting these recommendations and continue export 240-320 of Saker falcon per year..	Trends in abundance and distribution of selected species	•••	
Address threats to biodiversity					
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.					
Target 5.1. Rate of loss and degradation of natural habitats decreased.	Establish a research program that improves knowledge of biodiversity and relevant threats, Prevent pasture deterioration through overgrazing, Establish effective land-use planning control and transportation policy	As for 2006-20078 totally 72 % of the territory more or less degraded of which 23 % slightly, 26 % moderately, 18 % severely, 5 % very severily degraded. In 2007 it was planned to implement technical restoration on 850.65 ha and biological rehabilitation on 928.9 ha out of 791.452 thousand ha land degraded under the mining activities. Comparing the results of mine site restoration over last 3 years continuously growing and comparing to 2005 in 2006 restoration was done on 1.3 times more land and in 2007 on 16.8 % more land. In order to restore degraded land, especially in drylands Government of Mongolia initiated “Green belt” programme, which will continued for the next 15 years.	Trends in extent of selected biomes, ecosystems and habitats	≈	

		In 2004-2005 the water level of lakes Boon Thagaan has been decreased and increased population by sediments and Orog lake was dry. The annual fish yield of Orog lake of the Gobi valley is about 60 ton per year.1983	Trends in abundance and distribution of selected species	•••	
		The international railroad between China and Russia, which opened in 1956, bisects the habitat of the Mongolian gazelle. Scientist's study suggest that the railroad affected the migration of the Mongolian gazelle. Further research is needed to reveal the status of Mongolian gazelles and how the railroad is affecting their populations.		•••	
Goal 6. Control threats from invasive alien species					
Target 6.1. Pathways for major potential alien invasive species controlled.	Establish a system for tracking a introduction of alien speices.	In 2007 the "List of plant forbidden to collect internationally and nationally" has been amended. The adoption of the "List of pest insects, weed plants and infectious disease with limited habitat in Mongolia and forbidden to import internationally" supports the enforcement of provisions 5.1.3 and 5.1.4 of the Law on forbidding the transportation of goods and product of wildlife origin, and provisions 4.2.3 and 4.2.4. of the Law on Plant protection. This also supports the improvement of controlling and monitoring systems.	Trends in invasive alien species	≈	
Target 6. 2. Management plans in place for major alien species that threaten ecosystems, habitats or species.		As Mongolia ia a member of World organization for animal health it has prepaed the list of animal disease registered in a country. The MNET accordingly to the Law on Forest conducted forest taxation activities on 600 thousand ha are in 2006.	Trends in invasive alien species	≈	
Goal 7. Address challenges to biodiversity from climate change, and pollution					

Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	Identify and restore damaged lands	In order to reduce the negative impact of global change, especially, drought, the reforestation in northern part of Mongolia has implementing every year. Similarly, in drylands afforestation under the "Green belt" national progamme are take place. In 2007 totally 6541.4 ha are was reforested/afforested. Of which totally 3997.3 ha reforested by state budget, 1871.1 ha by private organizations, 150 ha by financial support from Government of Republic of Korea in a framework of the "Green belt" national programme implementation and 260 ha by Mongolian Government fund responsible for 'Green belt' programme implementation. In Mongolia totally 92.3 thousand ha area affected by pest insects, needed to tackle. In 2007 totally on 27.4 thousand ha activities to combat with pest insect have been organized. In order to sustain water resources actions directed to establish watershed management are started. This will enable participation of local community on managing their land by themselves ensuring equity of ecological service distribution and preventing natural disaster through developed preparedness.	Size of Restored land	✓	
Target 7.2. Reduce pollution and its impacts on biodiversity.	Control pollution of air, water and solid waste	• In order to monitor environmental pollution, especially air pollution mobile and semi-fixed automatic measuring systems have been installed in major cities. To decrease air pollution in cities ecologically sound oven and fuel resources have introduced for 6000 households surrounding cities during the implementation of "Oven" project with support of the World Bank. • To measure water pollution along the large rivers and surface water nearby cities the monitoring stations are installed under the responsibility of Environmental Monitoring agency. • To purify drinking water in villages and cities according to 2005 report over 50 water purification facilities have been installed. • In 2008 with support of Government of Spain central water treatment facility has been technically renovated. With this new facility sewage water will treated 50 % more than before. There is no monitoring data on volumes of water treated, thus at this stage the effectiveness of the new system can not be reported. • In order to reduce solid waste with support of the Government of Japan new landfill site have been established in 2008.	Quality of air and water	≈	
Maintain goods and services from biodiversity to support human well-being					

Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods					
Target 8.1. Capacity of ecosystems to deliver goods and services maintained.	Ensure that agriculture and forestry are carried out in ways compatible with biodiversity conservation	Many of the ecosystems (particularly the arid and semi-arid grassland and desert systems) are fragile and extremely vulnerable to over-exploitation. About half of Mongolia's population live a semi-nomadic existence tending their livestock (sheep, goats, cattle, horses and camel). Since the discontinuance of collectivisation in the early 1990s many of the nomadic herders have reverted to more traditional grazing patterns and have "reclaimed" their rights over family-based wintering and summering grounds and increased their herd sizes significantly. This has resulted in added pressure on grazing lands, resulting in further degradation of wild medicinal plant resources.	No indicator	✓	
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	Spread information among the public about the effects of increased population on the environment and link programs for elimination of poverty and reduction of unemployment with protection of biodiversity, and develop international cooperation in this feild	In 2008 Mongolian government has approved The National program on conservation and reproduction of Mongolian commercial fish species. In 1986 Institute of Biology MAS has been organized introduction of larvae of the Coregonus peled and Coregonus autumnailis arctic cisco from Russia and planted in to the lake Ulaagchnii Khar of Zavkhan aimag and since 2007 for conservation of these species established Fish breeding centre in this lake.	Biodiversity used in food and medicine	✓	
		The MNE, participating scientist and environmental NGO organised workshop to discuss for conservation programme of Musk deer in Mongolia.		✓	
Protect traditional knowledge, innovations and practices					
Goal 9 Maintain socio-cultural diversity of indigenous and local communities					
Target 9.1. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices	Create and developed capacity-building programmes to involve and enable smallholder farmers, indigenous and local communities, and other relevant stakeholders to effectively participate in decision-making processes related to genetic use restriction technologies	Mongolians have considerable, highly valuable traditions on nature conservation and preservation. Our ancestors have generated and followed valuable traditions, habits and worship cultures in terms of nature conservation, preservation and use of natural resources. Natural conservation traditions and habits are incorporated into goals and objectives of over thirty laws, over two hundred legislative acts/regulatory documents and about twenty eight programmes implemented in the country in recent years. Biodiversity conservation programmes that focus on the increased participation and empowerment of local communities in conservation activities, including herders, farmers, and other community groups, are implemented in the country.	No indicator	✓	

Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing.	Develop appropriate mechanisms, guidelines, legislation or other initiatives to foster and promote the effective participation of indigenous and local communities in decision making, policy planning and development and implementation of the conservation and sustainable use of biodiversity	Environmental laws give legal provisions for the active participation of local communities in the biodiversity conservation at local, national, sub-regional, regional and international levels. Participation of local communities in biodiversity conservation and sustainable use at local and national levels has increased, and has been encouraged by forest comanagement groups, herder communities of pastureland management and Taimen Conservation Groups in different parts of the country. As part of GTZ, GEF and UNDP supported projects and programmes, local communities have widely participate in biodiversity conservation and sustainable use at regional and international levels.	No indicator	≈	
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources					
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources					
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	Look for the opportunities to develop documents to provide the cooperative utilization of the Genetic resources.	The first steps on conserving genetic resources have been made through amending Environmental Protection law, Forest law and adopting National programmes on Protecting rare plant species and their rational use, Defining maximum allowable volume for use of plant species. In 2002 with cooperation of UN University in Tokyo joint workshop on “Benefits from genetic resource, sharing of those benefits, traditional knowledge and biosafety” organized in Ulaanbaatar among Mongolia and respective Asian countries.	No indicator	≈	

B. RESULTS OF IMPLEMENTATION OF GOALS AND OBJECTIVES OF THE STRATEGIC PLAN OF THE CONVENTION ON BIODIVERSITY

<table>
<tr><th>Strategic goals and objectives</th><th>National input in implementation of goals and objectives</th></tr>
<tr><td colspan="2">Goal 1. The Convention at international level plays leading role in addressing issues related to biodiversity</td></tr>
<tr><td>1.1. The Convention defines the global agenda for protection and sustainable use of biodiversity</td><td rowspan="3">The Conference of the Parties in its decision VI/26 adopted the Convention's Strategic Plan up to 2010.

To implement the Strategic Plan, the parties undertake commitment to ensure more effective and consistent achievement of three goals of the Convention in order to reach substantial reduction of rate of biodiversity loss to 2010. Goal of biodiversity conservation fixed towards 2010 was approved by the World Summit on Sustainable Development held in Johannesburg. The Conference of the parties clarified this goal at the 7th and 8th meetings and accepted a temporary structure of goals and targets formulated for 2010, and implementation of goals and targets of the programme on protected areas adopted in the decision VII/8, and Targets of the Global Strategy on Plants Conservation.</td></tr>
<tr><td>1.2. The Convention promotes cooperation between all relevant international documents and processes in order to ensure clearer harmonization of the policy.</td></tr>
<tr><td>1.3 Other international processes actively support implementation of the Convention in accordance with their adequate structures.</td></tr>
<tr><td>1.4. Large-scale implementation of the Kartakhena Protocol on biological safety.</td><td>Mongolia has been ratified the Cartagena protocol on Biosafety of the CBD in 2002 and approved the "Law on Living Modified Organisms (LMOs)" on the 28th June, 2007.

There was established the National Biosafety Committee In Ministry of Nature, Environment and Tourism. The National Committee had established the scientific supernumerary commission with a duty to make the professional conclusion on the risk evaluation report for the (LMOs) living monocytosis organisms and had approved an activity charter.</td></tr>
<tr><td>1.5. Interests of biodiversity are included in appropriate sectoral or intersectoral plans, programmes and policies at the regional and global levels.</td><td>Incorporating biodiversity conservation and the sustainable use of its resources into the following appropriate cross-sectoral and sectoral plans and programmes.
1. Millennium Development Goals (MDGs)-based Comprehensive National Development Strategy of Mongolia which approved by the Parliament in 2008.
2. The National sustainable development strategy and Mongolian Action Programm for 21st Century approved by the Government
3. Agriculture, Mining development programs, Health protection strategy which were approved by the Government
4. National development Concept approved by Parliament</td></tr>
</table>

1.6. Cooperation of the parties at the regional and sub-regional levels in order to implement the Convention.	To implement the Convention, Mongolia cooperates at the regional and sub-regional levels: Mongolia participates in the conservation of the Tumen Gol river watershed in cooperation with North East Asian Countries The Mongol Daurian protected area of Dornod aimag has a territory of 210,000 ha, and is a trans-boundary protected area of Mongolia, Russia and China. Activities towards strengthening cooperation with Kazakhstan and Russia are conducted as part of the conservation of the Altai Soyon eco-territory of Western Mongolia. Representatives of the three countries meet every year to discuss joint activities. The inter-governmental agreement of trans-boundary water conservation was signed by Mongolia and Russia, with subsequent studies of water resources in trans-boundary areas.
Goal 2. The Parties strengthened financial, human, scientific and technical-technological capacity in order to implement the Convention	
2.1. All Parties have an adequate capacity to carry out priority activities within the national strategies and action plans on biodiversity conservation.	Mongolia has limited capacity to carry out priority activities as it faces with shortage of the financial and technical resources and qualified specialists. Priority measures on biodiversity conservation are conducted in a framework of the international projects
2.2. The Parties, which are the developing countries (in particular, less developed countries and small islands) and countries in transition, have sufficient resources to implement three goals of the Convention.	Mongolia has not enough financial resources for successful implementation of main planed actions on implementation of three goals of the Convention. Projects implemented in the country under financial support of the donors contribute to compliance of the Convention on Biodiversity. Projects' activity is aimed to maintain infrastructure of the protected areas, implementation of the scientific studies of flora and fauna, data base development, public awareness and involvement of the local communities in the biodiversity conservation activities.
2.3. The Parties, which are the developing countries (in particular, less developed countries and small islands) and countries in transition, increased volume of resources and extended transfer of technologies available in order to implement the Kartakhena Protocol on Biological Safety.	Project on development of the Mechanism of implementation on biological safety was launched in the republic under support of UNEP/GEF. Mongolia's joining to Kartakhena Protocol on biological Safety allows Mongolia to implement activities related to transboundary movement of genetically changed organisms and products; take measures on non-admission their import to the country, including mutual assistance in making researches and scientific and technical elaborations, and information exchange in the field of biotechnology. Mongolia is working to develop the regulatory and legal base on biological safety.
2.4. All Parties have an adequate capacity to fulfill the Kartakhena Protocol on Biological Safety.	At present, Mongolia has not enough human, technical financial capacity to fulfill the Cartagena Protocol in Mongolia. Mongolia is developing project on implementation of the Kartakhena Protocol on Biological Safety.

2.5. Development of the scientific-technical cooperation contributes substantially in capacity building.	There is needed to promote International and bilateral scientific-technical cooperation in a framework of the Convention on Biodiversity. More training or case study on promotion of environment friendly technology and biological safety. Mongolia needs support in field of biodiversity conservation and use its resources with support communities.
Goal 3. National strategies and action plans on biodiversity conservation, and inclusion of interests on conservation and sustainable use of biodiversity in activity of the relevant sectors provide an efficient structure to achieve goals of the Convention	
3.1. Each Party introduced efficient national strategies, plans and programmes to develop national mechanisms of implementation of three goals of CBD and set clear national priorities.	Mongolia's Biodiversity Conservation Action Plan (NBAP) was prepared by the Ministry of Nature, Environment and Tourism, with the assistance of GEF and UNDP. A wide range of people and institutions participated in preparation of the plan, which was adopted by Government in July 1996. The NBAP is widely admired and accepted. Completion of the plan was followed up by government. Also, the Government made enough policy response in implementation of the NBAP. The NBAP has been integrated in other sectors and in some important economic and social development strategies of the country. As result of the above policy response of the Government, the NBAP has carried out successfully.
3.2. Each Party of the Kartakhena Protocol on Biological Safety introduced the regulation base aimed towards achievement of goals of the Protocol.	Mongolia is at stage of implementation of the draft national law "On biological safety" and the Concept on implementation and introduction of regulatory regime related to main requirements on procedures of turnover of modified objects. The work plan on implementation the Cartagena protocol on Biosafety of the CBD was developed and being implementing by the newly established National Committee.
3.3. Interests of conservation and use of biodiversity are included in the relevant national sectoral and inter sectoral plans, programmes and policies.	Interests of conservation and sustainable use of biodiversity are reflected both in the different sectoral plans (the National concept Programm on Land Management, the Concept of Forestry and husbandry), and in the inter-sectoral programm on sustainable development and Mongolian action program for 21st century. In other sectors (health, education and mining industry, and rural development), issues of biodiversity conservation are considered sufficiently (Section III).

3.4. Active realization of priorities in the national strategies and action plans on biodiversity conservation as instrument in implementation of the Convention in the national scale, and substantial input in implementation of the global agenda on sustainable use of biodiversity.	Most of activities particularly salary of national staff and operational cost for normal functioning of relevant organizations on biodiversity conservation and developing legislation. Also, some activities are implemented with support of by the international donor institutions within the international cooperation. Mongolian agenda 21 has been developed and adopted by the Government. Main goals of MAP 21 in field of biodiversity are to an accurate evaluation of the current conditions and threats to biodiversity, identify causes of species decline, and define trends, develop species protection policies and programmes, create species preserves, develop ecotourism, improve training in species protection, public education, create monitoring systems to detect movement of people, economic activity in areas of te most vulnerable species must be waste free and of the kind that does not disrupt the habitat, cooperate with other countries to save species, enact and enforce rules against mining activity in vulnerable areas.
Goal 4. There is deeper understanding of meaning of biodiversity and goals of the Convention, which led to broader involvement of different groups of the population in process of the Convention implementation	
4.1. All the Parties fulfill the strategy on communication, education and public awareness increase, stimulating public participation in implementation of the Convention.	In Mongolia according to the Aarhus Convention, work is conducted in field of education and public awareness. The Ministry for Nature and Environment approved a national Action Program on Public awareness in 1999. This is a key document outlining the government's strategy on environmental public awareness creation, and appoints a National Council to coordinate the implementation of the Action Plan. In 1997, the Government approved an environmental including biodiversity conservation program to be incorporated into the curricula of formal and informal education. The results of international projects may serve as example of active informational portal used to increase public awareness on biodiversity conservation issues. The NGOs working with great initiatives for promoting public awareness if field of biodiversity conservation. Most of the planned activities in the NBAP have been successfully implemented, while others are currently under implementation. Future revisions of the NBAP need to: • Promote public awareness of the existence NBAP, including amongst the younger generation. • Build on existing general environmental public awareness programs so that considerations regarding the sustainable use of biodiversity are included within them.
4.2. Each Party of the Kartakhena Protocol on Biological Safety facilitates and promotes awareness, education and public participation in activity supporting the Protocol.	Public awareness, education and public participation activities will be very important for implementing of Kartakhena Protocol on Biological Safety. We think that project is implementing by donors will play significant role to promotes awareness, education and public participation in activity supporting the Protocol. The Government is planning to develop GEF Project "Development of the national framework document on biological safety of the Mongolia" the activities of which would pay to increase of awareness and education levels and public participation in order to support the protocol.

4.3. Indigenous and local communities are effectively involved in processes aimed to implement goals of the Convention at the national, regional and international levels.	In Mongolia the local communities are poorly involved in processes of achieving goals of the Convention. The National Forestry Programme for 2005-2015 anticipates increase of independence of the forestry units, involvement of the local communities in the forest management, increase role of the private sector on forestry activity. Local active NGOs participate in implementation of the pilot GEF/UNDP SGP projects on biodiversity conservation (Annex III).
4.4. Main participants and entities including the private sector form the partner links in order to implement CBD and include interests on conservation and sustainable use of biodiversity in their sectoral and intersectoral plans, programmes and policies.	To implement the Convention on Biodiversity, the sector of forestry and agriculture (pastures) actively include issues on conservation and sustainable use of biodiversity in their sectoral and intersectoral plans, programmes and policies. Unfortunately, issues of biodiversity conservation are weakly reflected in other sectors of economy. Private sector, business structures and entities (farmers, cooperatives and local communities) relay on economic mechanisms in their policy ignoring environmental principles (Section III). Up to now, mechanisms of attraction of the private business and implementation of initiatives of sustainable biodiversity use are not developed in the country, which envisage protection and rehabilitation activities. In the private sector, mechanisms of protection and rehabilitation of biological resources (game and forestry units) are not identified.

C. CONCLUSIONS

1. Steppe ecosystems of Mongolia are famous around the world for their wilderness qualities and as large extent of grassland untouched by human activities. This is habitat for a large population of small and large mammals and migratory birds which exist in other similar ecoregions. Species such as gazelle, gray wolf, a variety of crane species and the Mongolian marmot are considered rare, endangered and under threat of extinction.

Dominant species in steppe ecosystems include drought-resistant grasses (*Stipa gobica, S. breviflora,* and *S. glareosa*), forbs (*Reaumuria soongolica, Hippolytia trifida,* and *Ajania fruticosa*), and small, spiny shrubs that are well-adapted to arid conditions (*Caragana microphylla, Ephedra equisetina,* and *E sinica*). Other plant communities include: *Kalidium gracile* in areas of saline soils, and salt marshes dominated by *Scirpus rufus, S. planifolium, Ranunculus cymbalaria,* and *Phragmites communis*.

The vegetation cover of the Gobi is mainly influenced by human induced factors, such as overgrazing, mining and illegal collection of plants. Habitats of plants are fragmenting under the influence of these factors, as well as the contribution of climate change impacts. As for wildlife, the decrease in populations in this part of the country are considered natural process (Great Gobi project, 2001-2007). The main threat for the Gobi ecosystem comes from warming processes and drought (as mentioned above), occurring across the vast area.

According to inventory of 2007, the total forest fund is 190,022,000 ha, including closed forest area occupying 133,971,000 ha, equivalent to 12.1% of the total Mongolian land area.

Over the last 30 years, the natural forest area has decreased by 953.4 thousand hectares, negatively influencing forest biodiversity. During this time, the fire affected area has increased 3-4 times. Since 1990, 6.47 million ha forest area has been damaged by fire and 95% of this has been a result of human-induced fire damage.

In 2006, forest and steppe fires have increased 164 times across 15 aimags, 63 soums and in the green belt of Ulaanbaatar city. There, the forest area impacted by fire totalled 391.8 thousand hectares and there was 5202.2 thousand hectares impacted by steppe fires, incurring total losses to the value of 1.7 trillion tugrug.

Today, 19 insect species (which includes 11 species of butterflies and moths, 4 species of wasps, 2 species of beetles, 1 species of dragonfly and 1 species of fly) are conserved by legal protection. However, information about their population approaches and the detailed factors influencing rates of population decline are still poor.

The Mongolian water system is based on the following watersheds: Khalkh gol, Kherlen gol, Onon, Shishhed, Bulgan gol, Selenge, Tes, Great lake depression and the Southern lakes valley, and Mongolia itself geographically belongs to the three main water catchments in the region, being the Pacific Drainage Basin, Arctic Ocean Drainage Basin and the Central Asian Inland Basin. There are 76 species of fish belonging to 46 genera and 14 families reported in these watersheds. In the Arctic Ocean Drainage Basin there are 29 species, while in the Pacific Drainage – 43 species, and 10 in the Central Asian Inland Basin.

The major threat to fish diversity is overfishing and illegal fishing. The rivers inhabited by the species in Mongolia are also impacted by urban pollution and by pollution from large and small gold mining operations, which generate both localised sedimentation that may bury eggs at sturgeon spawning grounds.

Amphibians and reptiles are included in two independent classes, which are upper units of animal kingdom and inseparable members of biodiversity in Mongolia, as well as an important part of the ecosystem.

There are 6 species of amphibians in Mongolia belonging to 4 families of 2 orders, and 21 species of reptiles in Mongolia belongs to 13 genera, 6 families of 2 suborders. Mongolia's diversity is low, compared to that of Middle Asia, Northeast Asia and Central Asian herpetoligical species, primarily due to the harsh continental climate of Mongolia.

The distribution of many species of amphibians and reptiles has been decreased from the original distribution area, including due to climate change and human activities. Particularly, the levels of rivers and streams, lakes and pools lowered and then dried out, negatively influencing the amphibians' distribution and diversity. From the estimation of the Nature and Environmental conditional report (2006 and 2007), the results of 2007 show that there are total of 5128 rivers and streams, of which 652 have dried out, about 9306 springs and wells of which 2277 have dried out, about 3747 lakes and wetlands of which 1181 have dried out, and lastly a total of 429 hot and cold springs of which 60 have dried out.

Mongolia has 138 species of mammals, which belongs to 73 genus and 23 families, 8 orders; which includes 13 species of insectivores; 12 species of chiropters; 6 species of lagomorphs; 69 species of rodents; 24 species of carnivores; 2 species of perissodactyls; 1 species of tylopoda; and 11 species of artiodactyls.

1. The major threats facing biological diversity of Mongolia include climate change, water shortage, changes occuring in land use and as consequence, the progression of desertification processes.

2. Most of the planned activities of the NBAP for Article 7-20 of convention have been implemented, others are ongoing.

The NBAP is widely admired and accepted. Completion of the plan was followed up by government. Also, the Government made enough policy response in implementation of the NBAP. The NBAP has been integrated in other sectors and in some important economic and social development strategies of the country. As result of the above policy response of the Government, the NBAP has carried out successfully.

Actions needed to be carried out for further implementation of NBAP:

- Revise the NBAP and elaborate each actions and activities of which according to current changes of social and economic development. Details of schedule, budget, source of funds and responsibility for actions should be included in a revised NBAP.
- Develop and adopt more relevant legislation and policies to ensure the conservation of biological diversity that require the integration of conservation and environmental protection into sustainable.
- The NBAP addressed issues in all sectors but there is needed to identify priorities for the actions proposed.
- Mobilize more domestic financial resources should be generated through an environmental trust fund and user charges (ecotourism development and a portion of revenues from forest and agriculture sectors).
- The committee to oversee implementation should be reactivated and promote responsibilities of each member and promote review of progress in regularly basis.
- Find out new ways for monitoring of implementation of actions of NBAP.
- Strengthen institutional arrangements needed to implement the Biodiversity Conservation Action Plan for Mongolia.
- Seek finances from all possible donors' sources in order to implement the Biodiversity Conservation Action Plan for Mongolia.
- Properly value biodiversity in the national accounting system.

3. Currently there is a range of legal documents that regulate the process of involving different interest groups in the decision making process of significant biodiversity issues. There is political will to support wide public dialogue and the process of sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations

An example of a successful sectoral partnership in fulfillment of obligations undertaken within CBD is provided in the activities of the Mongolian Action Programme for 21st century (MAP 21) and millennum development strategies .

Actions needed to be carried out for successful integration biodiversity conservation into relevant sectoral and cross sectoral plans, programmes and policies.

- Develop sustainable ecotourism;
- Improve training on sustainable use of biologocal resources;
- Promote public education on sectoral coordination for biodiversity conservation;
- Create monitoring systems to detect movement of people, economic activity, and settlement patterns that threaten Mongolia's biodiversity;
- Economic activity in areas of the most vulnerable species must be waste free and of the kind that does not disrupt the habitat;
- Monitor and regulate hunting and fishing;
- Enact and enforce rules against mining activity in vulnerable areas.

4. Measures aims towards harmonization of nature protective legislation to implement commitments on other related environmental conventions including 2010 targets are implemented to achieve set objectives. Government of Mongolia developed own 2010 targets. Most of activities of 2010 target has been implemented, others ongoing. In order to implement 2010 global and national target, would be needed to carry out the following activities:

- Develop and improve existing national target according to global goal and target;
- Increase the budget and investment via the advancement of the financing system and an accurate estimation of economical benefits of SPAs;
- The administration of SPAs should increase their income by developing eco-tourism (information centres for tourists, guest houses, camps, boat rentals, guide services etc.);

ANNEX 1.A – INFORMATION CONCERNING REPORTING PARTY AND PREPARATION OF NATIONAL REPORT

REPORTING PARTY

Contracting Party	Mongolia
NATIONAL FOCAL POINT	
Full name of institution	Ministry Nature, Environment and Tourism
Initials and position	**A. Enkhbat, Director, Sustainable Development and Strategic Planning Department**
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CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE))	
Full name of the institution	**Mongolian Nature and Environment Consortium**
Name and title of contact officer	**M. Badarch**
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SUBMISSION	
Signature of officer responsible for submitting national report	
Date of submission	

ANNEX 1.B. INFORMATION ON THE PREPARATION OF THE REPORT

The preparation of the fourth National Report on the Implementation of the Convention on Biological Diversity consists of the following stages:

The National Committee on the Implementation of the CBD meeting met at Ministry of Nature, Environment and Tourism on January 3, 2009. The committee approved a plan of action that included the involvement of different stakeholders. It was also agreed at the meeting an expert Expert group from various institutions was needed to prepare the report.

Data necessary for the preparation of the report was collected from a range of information sources such as government policies on biodiversity conservation, the 2006 - 2007 State of Environment Reports, the second and third National Reports on Biological Diversity in Mongolia, international and national project reports, research work and other relevant publications.

Firstly, the expert group met on 20 January 2009 to discuss the general format of the report, abd the collection and analysis of relevant information for each article. The group also set the timetable for preparing the first draft report.

Different meetings and focus group meetings were held by expert groups for obtaining information from different international and national biodiversity conservation related project reports for inclusion into the report.

The second expert group met on the 28th of March to discuss and compile all relevant information. The first drafts of the National report was prepared and send to the Ministry of Nature, Environment and Tourism, National Committee on CBD and other relevant organisations such as UNDP Mongolia and other research institutions.

The expert group, based on comments and suggestions from various ministries and institutions, further revised and completed the Mongolian version of the report. The Fourth National Report was then submitted to the National Committee on CBD and official approval for translation and publication was obtained.

The Fourth Country Report was then submitted to the CBD Secretariat and UNDP. In addition, the Fourth National Report was distributed to different ministries, research institutions, universities and the public.

Special thanks to B. Lkhagvasuren, G. Naranbaatar (authors for Mammal), Tseveenmyadag (author for Bird), Ch. Gantigmaa (author for Insect) of Institute of Biology, M. Munkhbaatar (author for Amphibian and reptiles) of MSUE, B. Erdenebaatar (author for Fish), Dash (author for Ecosystems) of Institute of Geo ecology, Narantuya (author for plant and vegetation), Ch. Dugarjav (author for forest ecosystem) of Institute of Botany, Tumurbaatar (author for protected areas) and M. Badarch, L. Shinetsetseg, J. Shurentsetseg, B. Ochirsukh from Mongolian Nature and Environment Consortium and other consultants.

PARTIES INVOLVED IN THE PREPARATION OF THIS REPORT

Ministry of Nature, Environment and Tourism (MNET), Ministry of Agriculture and Ligth Industry, Ministry of Education and Science and Technology (MOSTEC), Environment Department of State Professional Inspection Agency (ED SPIA), Custom office, UNDP Country office Mongolia and its projects such as Altay Sayan Ecosystem Conservation Community based Conservation Biodiversity in the Mountain Landscapes of Mongolia's Altai Sayan Eco region, Environment Governance project, Dynamics of Biodiversity Loss and Permafrost Melt in Lake Hovsgol National Park, Environment Education Project and Coping with Desertification Projects of Swiss Cooperation and Development Agency (SDC), Small Grant Programme of World Bank and Government of Netherlands and research instates such as Institute of Geo-ecology of Mongolian Academy of Science (MAS), Institute of Biology, Institute of Botany, Institute of Biotechnology, Ecology Faculty of Mongolian National University, Biology Department of State Education University, State of Agriculture and environmental non-government organisations.

The MNET and National Committee for CBD supervised and monitored the production of this report.

We express deep gratitude to the officials of the Ministry of Nature, Environment and Tourism researchers from various institutes of MAS, as well as international organisations such as the Global Environmental Facility (GEF), Secretariat of Convention on Biological diversity, the Country Office of the UNDP for providing support and assistance in developing this report.

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ANNEX 2. ENVIRONMENT RELATED PROJECTS IMPLEMENTED BY MNE

	Project name	Financial Source	$US (000s)	Time frame
	A. Environmental policy formulation			
1.	National Environmental Action Programme	World Bank	40	1994/95
2.	National Action Programme to Combat Desertification	UNEP	40	1994/95
3.	Natural Resources Management Planning Systems	DANIDA	1.100	1995/97
4.	Environment library	Australia	22	1997/98
5.	Revision of NEAP (NEAP-2000)	TACIS/Nordic Fund	90	2000
6.	Development of Bio-safety National Action Plan	UNEP	160	2002///04
		Sub-total	**1.292**	
	B. EIA development			
7.	Strengthening Environmental Assessment Procedures	ADB	370	1993/94
8.	Strengthening of Environmental Management Capacity	ADB	580	1995/97
9.	Strengthening Environmental Management Capacity at National/Local levels	World Bank	300	2003/04
		Sub-total	**1.250**	
	C. GEF-supported projects			
10.	Mongolian Biodiversity Conservation	GEF	1.500	1993/97
11.	Protected Areas of Mongolia Phase I	GEF/WWF	98	1994/97
12.	Protected Areas of Mongolia Phase II	GEF/ WWF	68	1998/00
13.	Community-based Conservation of Biological Diversity in the Mountain Landscapes of Mongolia's Altai-Sayan Eco-region	WWF/ GEF/UNDP	3.070	1997/00 2001/08
14.	Biodiversity Conservation and Sustainable Livelihood Options in East Mongolia	GEF/ UNDP	6.174	1998/2005
15.	Conservation of the Gobi Desert Using Bactrian Camels as an 'Umbrella Species'	GEF/ UNDP	979	2000 2003/07
16.	Ulaanbaatar Air Pollution Reduction; Stove Improvement Improved Household Stoves in Mongolian Urban Centers	GEF/ World Bank	24750	1999/00 2001/05
17.	Commercialization of Super Insulating Building Technology in Mongolia	GEF/ UNDP	25750	1998/99 2003
18.	Conservation of Eg-Uur Watershed	GEF/ World Bank	213.0	2003/04
19.	Dynamics of Biodiversity Loss and Permafrost Melt in Lake Hovsgol National Park	GEF/ World Bank	830	2001/05
20.	Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants	GEF/UNIDO	492	2002/05
		Sub-total	**9.317**	
	D. Nature Conservation			
21.	Protected Areas of Mongolia	WWF	296	1993/99
22.	Hustai Nuruu Mountain Steppe Reserve, Biodiversity Project, Phase I	Netherlands/ Australia/ Swit	2.000	1993/97
23.	National Action Programme to Combat Desertification	UNEP/GEF	40	1994/95
24.	Nature Conservation and Economic Incentives for Sustainable Development	IDRC	29	1994/95
25.	Nature Conservation and Buffer Zone Development	GTZ	2.030	1995/99
26.	Cheese Production in Hustai Nuruu	Netherlands/UNDP	200	1995/98
27.	Nature Conservation and Buffer Zone Development Phase I	Germany	129	1995/98
28.	Biodiversity: Takhi Horses	Australia	87	1996
29.	First National Report to the COP (Biodiversity Convention)	UNDP/ GEF	41	1997/99
30.	Conservation and Sustainable Use of Biodiversity of Steppe Region of East Mongolia-II	GTZ	56	1997/99
31.	Nature Conservation Pilot Projects in Western Mongolia	WWF/ GEF	42	1997/01
32.	Dornogobi: Development of Environmental Protection Programme	EU`	116	1997/98
33.	Combating Desertification (Pilot Project)	Secretariat of CD/ GEF	22	1998/99
34.	Nature Conservation and Buffer Zone Development, Phase II	Germany	2.970	1998/02
35.	Conservation and Sustainable management of Natural Resources	GTZ		
36.	Hustain Nuruu Mountain Steppe Reserve, Biodiversity Project, Phase II	Netherlands	3,200.0	1998/03

37.	Saker Falcon Conservation	United Arab Emirates	63	1998/00
38.	Clearing House Mechanism for the Convention of Biodiversity Implementation	UNDP/ GEF	8	1999/00
39.	Management Improvement in Khuvsgul National Park	USAID	699	1999/00
40.	Assessment of Capacity Building Needs and Country-Specific Priorities in Biodiversity	GEF/World Bank	195.0	2002/03
41.	Sustainable Management of Common Natural Resources in Mongolia Phase I	IDRC	30	2000/01
42.	Sustainable Management of Common Natural Resources in Mongolia Phase II	IDRC		2002/04
43.	Pasture Management Improvement and Anti-desertification Measures	GTZ	580	2000/03
		Sub-total	**12.800**	
	E. Land use, mapping, land use planning			
44.	Land use and Land Cover Mapping	Sweden, SIDA	430	1994/95
45.	Strengthening of Land Use Policies	ADB	824	1996/97
		Sub-total	**1.250**	
	F. Forest resources			
46.	Forest Fire Rehabilitation	New Zealand	33	1993/96
47.	Forest Resources Study in Selenge Aimag	JICA	30	1994/97
48.	Forest Fire Disaster Prevention	India	50	1996
49.	Rehabilitation of Fire-affected Areas	France	8	1996
50.	Support to Community-based Rehabilitation of Forest Areas and Disaster Management	UNDP	280	1996/98
51.	Forest Fire Control Activities	USA	280	1996/98
52.	Integrated Fire Management Project (Fire Protection Management in Khan Khentii)	GTZ	1.050	1998/00
53.	Friendship Afforestation	Hyogo Prefecture Japan	49	1999
54.	Friendship Afforestation	Hyogo P. and Kobe Steel	9	2000
55.	Forest Reforestation	Hyogo Prefecture Japan	18	2001
56.	Conservation/sustainable use of forest resources in west region of Khan Khentii protected area	GTZ	580	2000/03
57.	Assistance in the Fire Fighting	EU	216	1996/97
58.	Reforestation and Propagation of Trees	Netherlands/ UNDP	100	2000/01
59.	Community Based Natural Resource Management Phase II	FAO	198	
60.	Emergency Measures to Fight Forest Pest		395	
		Sub-total	**2.668**	
	A. Pollution control, monitoring			
61.	Equipment Supply for the Central Environmental Laboratory	JICA	8	1993
62.	Pollution Mitigation Measures in Tuul River (MON/94/302)	Netherlands/ UNDP	100	1995/98
63.	Air Pollution Reduction: Improvements of Household Stoves	UK	84	1998
64.	Cleaner Production and Waste Water Pollution Abatement by Mongolian Industries	Netherlands	2.000	1999/03
65.	Solid Waste Management	Netherlands		2000/03
66.	UB Wastewater Treatment Plant Rehabilitation	Spain		2003/04
		Sub-total	**2.196**	
	B. Climate change, climate monitoring			
67.	Inventory on sources and sinks of ozone depleting substances (Pilot project)	UNEP	6	1994/95
68.	Climate Change Studies	Netherlands	200	1998/00
69.	Preparation of Initial National Communications in Response to UNFCCC	UNEP/ GEF	240	1999/00
70.	Strengthening of Montreal Protocol Implementation Structure	UNEP/ GEF	66	2000/02
71.	Improvement of Weather Observation and Forecasting Systems	JICA	8.540	1998/00
72.	Meteorological Center Japan	Japan	70	1999/00
73.	Technology Needs Assessment in Energy Sector	World Bank/ GEF	98	1999/01
74.	Greenhouse Emission Reduction from Industrial in Asia Pacific (GERIAP)	SIDA	2.500	
		Sub-total	**8.882**	
	C. Water supply			
75.	Water Study (MON/93/005)	UNDP/WB	19	1993/96
76.	Installation of Pumps for UB Water Treatment Plant	Nordic Fund	232	1999
		Sub-total	**251**	

ANNEX 3. COP 8 DECISIONS REQUESTING PARTIES TO SUBMIT INFORMATION THROUGH NATIONAL REPORTS

12. The specific information requested in COP 8 decisions (see a list of these requests contained in Annex I of the guidelines)

VIII/5 (Article 8(j)) Para 2. *Invites* Parties to submit through their national reports, if appropriate, to the Executive Secretary, reports on progress in achieving national participation of indigenous and local communities, and associated capacity-building;

The participation of local communities, volunteer groups and units for biodiversity conservation and sustainable use its resources has been increased. Public awareness activities have also been widely conducted to help support local communities and nongovernmental organisations. There are 31 community groups and teams organised by the South Gobi Protected Area Administration within its territory, with most of them dealing with planting bushes and shrubs.

With the support of UNDP/GEF a project titled "Great Gobi SPA Protection" has been implemented since July 2006. The overall objective of this project is the long term conservation of the Greater Gobi ecosystem and umbrella species. The objective is to be achieved by building the capacity of the park's management authority, improving local community participation in Special Protected Area management and supporting research and environmental monitoring activities through the development of model conservation programme using the wild Bactrian camel as an "umbrella species". This project, in cooperation with the Great Gobi SPA Administration, conducted inventories and monitoring of some wild species e.g. Bactrian camel, Gobi bear and Khulan. Additionally, some data and samples required for research on grey wolf prey was gathered. The project, in cooperation with some researchers from the Institute of Biology (Mongolia) and Zoological Institute in Denver (USA), placed satelite image colours on a number of Bactrian camel in order to identify their locations and migration routes.

As part of the research project "Sustainable Natural Resource Management," the community based conservation management needs were developed and piloted, directed by a sustainable resource management principles. In 2003 the Aimag Governor issued a Directive # 173 to consider ecological and socio-economic issues on an integrated basis, and to improve the livelihood of local communities. A working group to monitor the distribution of forest pests was established, and a study on forest pests was conducted. In order to carry out community based forest co-management in Khan Khentii and other areas, over twenty forest co-management teams that occupy forest reserves under Agreements were established. With support (fund of MNT 20,000,000) from GTZ and UNDP, an enterprise to produce small scaled fire extinguishment equipment was established in Bugant Sum of Selenge Aimag.

In order to restore Tuji pine stands that have been severly affected by fires and illegal deforestation, the Governmental Resolution "Some measures and responses for restoration of Tuji pine stand" was issued in 2002. AS part of works associated with this resolutaion,over 1000 individuals from over 40 organisations in urban and rural areas participated in reforestation of 107 ha, at their own expenses. In total, 1257 ha area was forested with central and local budgets.

Non-governmental organisations actively participate in conservation activities against illegal activities, and volunteer conservation groups and their network have been established and run at a local level. For instance, in order to arrest and eliminate the illegal use of natural resources, an Order No: 187 (October 28, 2004) on Establishment and Running of Mobile Inspection Teams was issued by the Minister of Nature and Environment. The operational procedures and budgets were approved, and the activities were inspected and supervised. Inspection teams to organise the campaign "against illegal actions and violations" was established in all Aimags, and eighteen Protected Area Administrations. These teams conducted efficient inspections in conjunction with law and inspection organisations.. Inspection teams revealed 71 trucks transporting logs, confiscated illegally harvested wood and wooden materials including 1005 logs, 630 cubic metres of fire wood logs, and over 20 cubic metre logs prepared for house building. During the inspection by the General Police Office, a total of 3242 cubic metres of fire wood logs, 2059 pieces of logs prepared for house building, and 169 cubic metres of boards were confiscated, with a total value of MNT 499,000 collected as fines.

VIII/21 (Marine and coastal – deep seabed)

Para 3. *Concerned* about the threats to genetic resources in the deep seabed beyond national jurisdiction, *requests* Parties and urges other States, having identified activities and processes under their jurisdiction and control which may have significant adverse impacts on deep seabed ecosystems and species in these areas, as requested in paragraph 56 of decision VII/5, to take measures to urgently manage such practices in vulnerable deep seabed ecosystems with a view to the conservation and sustainable use of resources, and report on measures taken as part of the national reporting process;

Mongolia does not actively deal with these issues.

VIII/22 (Marine and coastal – IMCAM) Delet

Para 5. *Requests* Parties, in the course of reporting on implementation of the marine and coastal programme of work, to report on measures taken to enhance implementation of Integrated Marine and Coastal Area Management in their national reports, where relevant;

Mongolia does not actively deal with these issues.

III/24 (Protected areas)

Para 4. *Urges* Parties, other Governments and multilateral funding bodies to provide the necessary financial support to developing countries, in particular the least developed and small island developing States, as well as countries with economies in transition, taking into account Article 20 and Article 8 (m) of the Convention to enable them to build capacity and implement the program of work and undertake the reporting required, including national reports under the Convention on Biological Diversity, to enable the review of implementation of the program of work on protected areas in line with goal 2.2 of the program of work.

Mongolia as a country with economy in transition has not yet reached the stage where it could provide financial aid to developing countries. But, Mongolia has strong close multilateral and bilateral cooperation with other countries in field of protected areas. The Kherlen and Khalkh Rivers of Eastern Mongolia belong to the Amar river watershed. Therefore, Mongolia participates in the conservation of the Tumen Gol river watershed in cooperation with China, Russia and Korea, six sites in Mongolia. . The Mongol Daurian protected area of Dornod aimag has a territory of 210,000 ha, and is a trans-boundary protected area of Mongolia, Russia and China. Meetings and seminars are organizing by protected areas administration of three countries. Activities towards strengthening cooperation with Kazakhstan and Russia are conducted as part of the conservation of the Altai Soyon eco-territory of Western Mongolia. Representatives of the three countries meet every year to discuss joint activities.

Within the framework of East Asian environmental cooperation, Mongolia works to actively implement the "Tumen River Biodiversity Conservation" project, and to establish a regional and national information system of biodiversity and water.

Representatives of the Khan-Khentii protected area, Mongolia and the Sokhond nature reserve of Chita, Russia agreed to establish transboundary protected areas and sign agreements of cooperation. In addition, the MNE and the Russian Natural resource ministry prepared the agreement proposal to establish Lake Uvs national park.

An agreement of cooperation between environmental sectors of Mongolia and the People's Republic of Turkey was signed. Within the frame of the "Green belt" national programme, the MNE and Forest Authority of South Korea signed a memorandum of understanding for long term financial support of the programme.

The MNE and the Development Cooperation Ministry of Netherlands signed memorandum of understanding to implement environmental projects such as "Integrated water management" and "National Geo-information centre" and other programmes that will be of annual total cost of 2 million USD, starting from 2007. The Government of Netherlands provides this funding as non-repayable support to Mongolia. With the support of the UN and other financial organizations, 23 long, mid and short term projects have been implemented.

Since 1990, Mongolia's international cooperation on environmental issues has reached a high level. Projects

with international organizations like GEF, UNDP, UNEP and WWF, and countries such as Germany, the Netherlands, Japan and the USA have been jointly implemented. Due to limited financial resources, obligations undertaken under agreements cannot be fulfilled. There is therefore a need to coordinate and harmonize the implementation of the Convention on Biological Diversity at a national level with related UN and other international conventions and agreements. The above conventions are aimed at the conservation of complementary and interdependent parts of the ecosystem, so the need to foster cooperation between conventions arises as an urgent issue.

VIII/28 (Impact assessment)

Para 5. *Urges* Parties, other Governments and relevant organizations to apply the voluntary guidelines on biodiversity-inclusive environmental impact assessment as appropriate in the context of their implementation of paragraph 1 (a) of Article 14 of the Convention and of target 5.1 of the provisional framework of goals and targets for assessing progress towards 2010 and to share their experience, inter alia, through the clearing-house mechanism and national reporting;

Environmental Impact Assessment (EIA) is an important project planning tool designed to i) enhance the development and carrying out of individual projects, and ii) benefit economic development efforts through the maintenance of environmental quality and conservation of natural resources including biodiversity.

As a planning tool, the EIA procedure predicts the environmental impacts of a proposed project; recommends changes to the project's design, location, and operation to improve environmental conditions that may benefit the project and reduce possible adverse environmental impacts, and ensures predicted impacts are monitored during project construction, implementation, and operation.

Mongolia has adopted Law on Environmental Impact Assessment on 22 January, 1998 and amendments were added in 2001.. EIA legislation which consists of the Constitution of Mongolia, the Law on Environmental Protection, the EIA Law and other legislative acts provides full and adequate basis for applying Environmental Impact Assessment in Mongolia.

The EIA Law provides broad range of provisions on key aspects of EIA, including screening and detailed assessment procedures, planning and monitoring programmes, licensing procedures for conducting EIA, rights and obligations of participants in EIA, etc.

The Ministry of Nature and the Environment is responsible for Mongolian Environmental Impact Assessment Procedure (MEIAP) and the review of individual projects for their possible environmental impacts, and charged by the EIA Law with the responsibility of developing guidelines and procedures for the Mongolian Environmental Impact Assessment Procedure's implementation.

Public consultation and participation is an important step in the EIA process. The views of the public and citizens likely to be affected by the environmental impacts of a project are valuable in assessing the nature and importance of predicted impacts, and in developing mitigation measures and general project plans.

It is widely recognized that members of local communities and potentially affected citizens provide local knowledge and insights which cannot be developed by PP, EIA Consultants or government employees who are unfamiliar with the local environment and circumstances. The public and affected parties often suggest practical, affective mitigation and compensatory measures, which outside EIA consultants or environment experts may overlook.

When the views of potentially affected citizens and local communities are incorporated into the EIA process and are reflected in the proposed project's design, the community generally becomes supportive of the projects as they develop a sense of involvement in it.

ANNEX 4. PROGRESS TOWARDS TARGETS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION

Target 1. Prepare a widely accessible working list of known plant species as a first step towards development of global flora database

In order to prepare list of known plant the tentative list of vascular plants from 660 genre belonging to more than 130 order and list of soil microorganisms have been prepared. The names of the species are not finalized yet. Currently, final list of vascular plants, lichen and algae is ready and the tentative list of mosses is developed.

According to the Mongolian Red book, edited second time in 1997, totally 128 species of plant are endangered and threatened. Of which 75 medicinal plants, 11 palatable, 16 useful for industry, 55 ornamental and 15 species are useful for soil conservation.

In 2008 with support of Environmental reform project phase 2, implementing at the MNET by the Netherland Government, the guidebook on "Illustrated book of the rarest plants of Mongolia" which included 133 plant species has been published. The same project prepared list of plant exported from Mongolia. Moreover, in 2000 the "Guide to the dominant plant species of Mongolia" has been published with financial support of East and South East Asian biodiversity programme of IUCN in a framework of the CY 98 project implementation jointly supported by World Bank and Netherlands Cooperation Agency. Totally 100 species of plant distributed within all the natural zones of Mongolia have been included in this guide.

The research works on registration of vascular and non vascular is now implementing. However, the legal framework for conserving rare endangered and threatened plant species at all level: individual (population, specie), association, ecosystem (within specially protected areas), is enforced. The national programme on conservation and rational use of rare plant species have been adopted in 2002 by the Government decree number 105. The implementation of the programme is not reasonable due to lack of the financial mechanism 8 in other words the financial issues not reflected in the state budget.

Target 2. A preliminary assessment of the conservation status of all known species at national, regional and international levels

The status of rare and endangered species defined in Red Book and White book followed international and Russian methodology. Whilst the regional and international significance (importance) of the useful plant species have not been assessed yet. In a future conservation status of useful plants as well as protection of rare and indigenous plant communities have to be assessed.

The conservation status of plant species defined in Red Book and in a law on Natural plants of Mongolia. Followed this through expanding SPAs the national goals can be achieved. The legislations regarding status of common, rare, rarest plant species and their conservation and exploitation are adopted.

Target 3. Development of models with protocols for plant conservation and sustainable use basing on scientific findings and living practices.

This issue is reflected in national programmes, plans, Mongolian jurisdictions and Government action plans, which related to the national development goals.

Currently Mongolian Government as well as national experts working on developing legal framework for planting rare species as Монгол хунчир, Нангиад зээргэнэ, Чихэр өвсийг for trade (export) purposes.

According to the researches, there are 1000 forage plant species, 840 medicinal plant species, 570 infloresence plant species, more than 200 palatable species, more than 200 technical plant species, over 480 ornamental plant species and around 70 sand fixing plant species (Figure 4.) distributed in Mongolia.

In flora of Mongolia the medicinal plants (liquorice (*Glycyrrhiza uralensis*), Pheasant's eye (*Adonis spp.*), *Thermopsis*, thyme (*Thymus serpyllum*), valerian (*Valeriana spp.*), wild onion (*Allium altaicum*), Saposhnikovia (*S. divaricata*), bracken (*Pteridium*), sea buckthorn (*Hippophae rhamnoides*)) play an important role.

Licuorice (Glycyrrhiza uralensis Fisch) is mainly distributed in steppe, desert like steppe and desert zones and registered in more than 10 vegetation districts. However, increased export of plant roots the resources are become less. Thus, the plantations of this specie by seeding methods are intensified.

There over 70 oil plant species which used for produce soap, pharmacy and cosmetics, as Labrador tea (*Ledum*

spp.), Rhododendron (*Rhododendron dauricum*), thyme (*Thymus serpyllum*), *Dracocephallum*, *Schizonepeta multifida*, skullcap (*Scutellaria spp.*).

There are more than 300 medicinal, 20 tea, 50 edible and over 1000 forage plant species widely used. In order to conserve as well as promote the rational use standards, recommendations and regulations on plantation of species as liquorice (*Glycerrhiza uralensis*), saposhnikovia (*Saposhnikovia divaricata*), wild onion (*Allium obliquum*), Pheasant's eye (*Adonis mongolica*), tamarix (*Tamarix ramasissima*), oleyaster (Elaleagnus moorcroftii), astragalus (Astragalus mongolica), ephedra (Ephedra sitica), poplar (Populus diversifolia), saxaul (Haloxylon ammodendron) in open air and in a green house conditions have been elaborated.

So, the researches over the resources, distribution and population of the rare and rarest species are implementing in a certain level as well as the recommendations of their conservation and plantation has also been elaborated.

Within the Institute of Botany some experimental researches on planting and growing rare and rarest species as, Sambucus manshurica, Rhodeiola rosea, Lilium martagon, Allium macrostemon, Incarvillea Potaninii, Caragana gobica, Aconitum Kutnezoffii, Adonis mongolica, implementing.

Target 4. At least 10% of each of the world's ecological regions effectively conserved in situ.

To achieve this goal it is suitable to expand the network of specially protected area. The largest part of Altai Sayan and Mongol Daguur ecoregions located in the territory of Mongolia and since 1990s various projects related to biodiversity conservation, improve rural livelihood and enhance protected area network.

The programmes and projects to achieve national goals have been adopted. The positive outcome of this is the territory of the protected areas is increased. However, uneven coverage of the ecosystems is observed under establishing of the protected areas. Low upland ecosystems, which are rich of endemic and rare species, are not covered by the protected areas. The Mongolian government in a framework of the Millennium development goal defined that about 30% of total territory of country will be obtained under the protection. Since 2007, independent project are implementing in above mentioned globally significant two ecoregions.

The information collected through monitoring and its availability. The data and information collected during previous years have been compiled and further research directions have been planned.

Target 5. Protection of 50% of the most important areas for plant diversity assured.

With the aim of conserving rare and very rare plant diversity, the "List of rare and very rare plants" was produced in 1995 and 2008, with associated conservation activities being rolled out in a step-wise fashion.

Further, one hundred and thirty three types of higher and lower order plants are to be protected with one hundred and twenty eight of them to be included in Red book, which will have a positive effect on their natural regeneration. In this way, until now, 40% of growth habitat of more than 400 rare, very rare and endangered species of plants are taken under full protection.

To protect key species in accordance with basic principles and sustainable development views of the 21st century, 70% of the habitat area of thirty endangered species of animal, and 40% of four hundred rare, very rare and endangered plant species, are fully taken under protection.

As stated in the strategic plan of the convention, Mongolia provides a legislative environment for biodiversity conservation. However there has not been a significant improvement in the implementation of this law. This is due to continuing transitional period of political and economic system, and ubiquitous poverty and unemployment. The Economically beneficial plants, especially medicinal plants, for instance, Glycyrrhiza, Sophora, Allium altaicum, Allium obliquum and Rhododendron, are seeing a reduced habitat distribution. However, the biggest achievement of this time will be the preparation of a conservation management plan adjusted to certain species, and the implementation of national programmes conserving of rare and rarest wildlife resources.

Target 6. At least 30% of production lands managed consistent with the conservation of plant diversity.

The monitoring over the plant species in production land have not researched, thus, there is no any measures implemented. However, the restoration of vegetation cover in the mine sites, according to the law on subsoils, has to implement. This kind of works in Mongolia is in initial stages.

The restoration of vegetation cover is legally regulated by the Law on Subsoils, where any entity implementing

mining activity have to restore land and vegetation cover. As not all mining companies can implement restoration activities the selection procedure for company or entity responsible for biological restoration is not initiated. This will help to improve the restoration activities as well as management of extractive industries in terms of environmentally sound operations. During this period of time, the relevant laws and by-laws regulating this issue have been amended.

Target 7. 60 per cent of the world's threatened species conserved in situ.

Traditionally, the plants protection is carried out in the protected areas: reserves, national parks, reserves and forestries. Thus, many sites the most valuable in terms of diversity of plants are not fully considered under organization of the protected areas. Low uplands which are rich with rare and endemic species shall be included in boundaries of new protected areas. It is necessary to clarify and specify borders of the most valuable sites in terms of diversity of the plants.

Some species of globally threatened are found also in Mongolia. These included:

- Astragalus membranaceus var.mongolicus VU(A1c;A2c;B2c)
- Cistanche deserticola
- Amygdalus mongolica
- Caryopteris mongolica
- Glycyrrhiza uralensis
- Gymnadeniya conopsea
- Nuphar pumila
- Nymphaea candida
- Paeonia anomala su.sp.anomala
- Paeonia lactiflora

The in situ protection for those species is implementing.

Target 8. 60 per cent of threatened plant species in accessible ex situ collections

The Botanical garden of the Institute of Botany represents ex situ conservation of national and foreign species in an area of 1000 m^2.

In the garden of cultivated and natural trees and shrubs there are implemented ex situ conservation of the species since 1961. Currently there are 140 species of trees and shrubs.

Black locust (Robinia pseudoacacia) that was transported from North Korea was successfully cultivated with in vitro technique using clone methods. The in vitro cultivated samples of black locust were reproduced (20000 micro plants) and then transferred to ex vitro (greenhouse) conditions.

Cultivated plants, shrubs and trees from the Institute of Botany's Botanical garden were exchanged with botanical garden specimens of various countries through the index seminum programme. Rare and endangered species, including species included in the Mongolian red book, have been collected. These plants are primarily from the genus Iris and Paeonia.

As the Institute of Botany of MAS developed ex situ conservation methods, it became possible to transfer individuals of priority species to an in situ conservation method,. This in turn allowed the establishment of a 'living' gene bank, an important part of biodiversity conservation.

As the exploitation of natural resources, including minerals, has intensified in recent years, it has become important to preserve biodiversity in situ. This is because conservation and rehabilitation activities organised within the protected areas is not suffificent to maintain biodiversity, and there is a strong need to conserve fragmented populations in neighbouring areas to enlarge the habitat of rare species. To assist this process it is therefore necessary to revisit the current land management plan, and update it using best practise science.

Mongolia has implemented the ex situ conservation of rare and endangered species at a limited level. There has been localised success where ex situ conservation management methods have been implemented, however. For example, the numbers of the Asian beaver, muskrat, Mongolian saiga, wild horse and other species have increased. Additionally, population numbers of Glyzzyrhiza uralensis, Haloxylon ammodendron, Elaeagnus moorcroftii, and Populus diversifolia have increased within the protected areas. The Institute of Botany of the

MAS has organised expeditions collecting rare and useful plant seeds. With this work, the reintroduction of rare and endangered species has become possible.

An inventory of plants, including plants endemic to Mongolia, rare and medicinal plants was developed and the "live" collection of these plants has been completed.

The scientific justification for use rare and endangered species and their communities have been developed. Over 10 species of trees belonging to 4 genres, 81 species of shrubs from 14 genres, 45 species of grasses from 35 genres belonging to 17 orders have been introduced for conservation and landscape design in condition of Ulaanbaatar city.

Totally 12 species of plants, which is globally threatened species as Adonis mongolica, Gymnocarpus przewalskii, Stellaria pulvinata, Thermopsis longicarpa, Orchridacdacas and other, are included into the list of the species protected by CITES. Same time legislations on sustaining their habitat, population and resources adopted. Those species included to the Red Book (1987, 1997, and 2007) and protected by specific regulations. To establish the monitoring system over their population, habitat, distribution and resources the baseline data have been compiled. However, lack of public participation, especially involvement of local population, deliberates the process of conservation.

Target 9. 70 % of the genetic diversity of all known indigenous traditional plant varieties of crops and land races conserved

The genetic diversity of vegetables and crops has not fully registered. However, the plantation of indigenous plants (barley, wheat, garlic etc) and storing seeds on seed bank has been implementing. The conservation of genetic resources have been regulated by the law, reflected in national strategy and implemented through the national action plan. The national strategy is focused on developing agricultural sector accordingly to the natural regions, thus the regions for irrigated and rain-fed agriculture have been defined.

The Program selected and imported 6 new potato varieties named as Artemis, Provento, Madeleine, Sinora, Kuroda, Zafira from "Agrico" seed company of Holland for its early and middle early maturity, yellow flesh and preference for table consumption.

These new variety seeds were planted in the Demonstration field of the Program at Orkhon soum of Darkhan-Uul province, Branch of the State variety Testing Station Plant Science, Agriculture Research and Technology Institute and Research Institute for Plant Protection for revealing their adaptability in Mongolian agro-ecological condition, cooking quality and other variety characteristics.

Two of the potato varieties, that were tested and introduced by the Revitalization of Mongolian Potato Sector Program succeeded to be registered as adapted (Impala and Vitara) and promising (Sante) variety under Mongolian agro-ecological conditions by the Session of the State Commission for Variety Testing, held on 7th December at the Plant Science, Agricultural Research and Training Institution in Darkhan. In 2007, seeds were planted in 200 ha in most of the agricultural regions of Mongolia.

Target 10. Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems

The registration of alien species not yet implemented. Some internationally recognized weed plants rarely appear in croplands and abandoned crop fields. The activities to tackle invasion of the alien species are reflected in national strategies and plans. The monitoring over the alien species and some agricultural techniques to reduce invasion is under the development. The technical facilitation to control import of products with biological origins is also implementing.

The "List of internationally and domestically quarantined plants," enforced over the last 10 years, was revised and ratified this year. Ratification of the "List of plant disease, insect pests, crab louse and weeds, whose importation is banned in Mongolia and domestically quarantined within a limited distribution" enabled the implementation of Provision 5.1.3 and 5.1.4 of Law "About quarantine checks of the transfer of animal, plant and their products via border ports" and Provision 4.2.3 and 4.3.3 of Law "About plant protection". The ratification of these laws will significantly advance quarantine measures in Mongolia.,.In addition, this list makes provision for plant quarantine matters in cooperation with foreign countries. Planning to state criteria to define dangerous exotic types, conduct national assessment, and establish information network of their number, distribution, and peculiarities.

In the revised international quarantine list, there is now a total of twenty three stock diseases, thirty four insect species, twelve weed species, six round worms and two species of rodents are registered. Twelve plant diseases, nine insect species and four species of weeds domestically quarantined have been registered.

Laboratory of seeds and quarantine of domesticated plants:

- The Laboratory of seeds of domesticated plants, Laboratory of plant quarantine and the Laboratory of toxicology were established in 1947, 1962 and 2002, respectively. The function of these institutions is to conduct tests at the state level to check the effects of weeds, insect pests and diseases affecting the quality of seeds of domesticated plants, technological quality of wheat and seed selection, plant originated food staff, and raw materials, and estimate residual concentrations of toxic substances in soils.
- The Laboratory of virology of the external environment works to detect chronic substances in soil, water and cosmetic products.

Target 11. No species of wild fora endangered by international trade

Totally 8 species (Cistanche deserticola, Cistanche deserticola, Cypripedium macranthum, Cypripedium calceolus, Calypso bulbosa, Neottianthe cuculata, Gymnadenia conopsea, Corallorhiza trifida chatel) have included to the CITES annex to reduce impact of international trade on their resources.

Target 12. 30 per cent of plant-based products derived from sources that are sustainably managed

The issues related to the ecologically clean products have been reflected in several national and sectoral strategies, programmes and plans. The national legislative framework to supply at least 70 % of raw material from the locally produced crops and/or locally available natural plants during producing food products of plant origin adopted. The volume of product, plant yield and raw material produced monitored accordingly to the relevant legal framework.

Target 13. The decline of plant resources and associated indigenous and local knowledge, innovations and practices that support sustainable livelihoods, local food security and health care, halted.

In order to protect and ensure the natural regeneration of medicinal plants, replanting programmes have been developed. For example, the medicinal plant "Licorice" was planted in the Bogd and Baatsagaan sums of Bayankhongor aimag and Gulin sum of Gobi – Altai aimag, and Khovd aimag. This activity generated over one hundred and fifty employment opportunities. A community group of over one hundred members (most of the women) was established in Khuree Maral sum of Bayankhongor aimag for the protection, restoration and planting of natural plants. The group members were provided with training on planting and taking care of over twenty species of plants. This has provided good opportunity to make contributions to revenue generation and poverty reduction at a local level.

Target 14. The importance of plant diversity and the need of its conservation incorporated into communication, educational and public-awareness programmes.

The incorporation of the biological diversity issues to the sectoral strategies and programmes have been regulated by the National Action Plan on Biodiversity Conservation, Law on Natural Plants and National Plan on Public Ecological Education.

The scope and number of educational programmes, workshops and research projects have been increased during the last period of time. The legal framework for implementing international projects has been established. The environment related curricula for colleges and universities developed. As result every year … students are graduated in this field.

Target 15. The number of trained people working with appropriate facilities in plant conservation increased

The global and national goals are reflected in educational programmes on biology, ecology and environmental management.

The specialists in field of tourism, ecology and plant protection are educated in several state owned and private higher education organizations. The government regulations on education of specialists in this field are developed. The main gap is lack of high profile professionals and deficit of the reference materials (handbooks, books, journals etc.)

Target 16. Networks for plant conservation activities established or strengthened.

The nation-wide information network on rational use and conservation of plant species established. The next step is to join North East Asian BIONET network.

At the national level information on plant species diversity have been collected through research projects and programmes, and compiled into the series of books, guidebooks and project reports. Thus, inclusion of those data and information into the global database system is now possible.

Comparing to the previous reporting periods Mongolian Government developed and amended several environmental legislations, adopted several national plans and programmes as Green wall, Public ecological education, Protection of Rare Plant Species, and implemented a few projects with support of international donor organizations as UN organizations, World Bank and IUCN. Through this the synergy among the UN Convention implementations have been improved, the level of scientific researches have been increased, the facilitation of SPAs strengthened and the public knowledge and awareness have been enhanced. In overall the public attitudes have been increased. Such positive changes resulted increase of interest of the governmental, non-governmental organizations, research institutes and educational organization as well as private industries in participation in environmental conservation measures. The support of international organizations and donor countries to the environmental sector have been also increase during this period of time.

Since the ratification of the UN CBD Mongolian government is implementing all the possible activities to meet obligations of the Convention. For instance, the environmental legal framework have been established, some necessary monitoring and amendments have been elaborated, the actions to reduce negative effect of the natural hazards are implementing and the monitoring system at the national level is establishing. To improve the conservation activities some research actions have been undertaken. For instance, in 2004 with support of JICA detailed map of vegetation cover and plant community for Ogiin nuur lake region (site is included to the RAMSAR list) have been developed to contribute conservation measures.

The Mongolian plant species and their communities is a part of the world flora, thus the registration of vascular, non vascular plants including mosses, lichen and algae species had valuable contribution to achieve global goals on plant specie conservation in Mongolia.

The establishment of botanical garden is important step to conserve rare and endangered species of plant ex situ. Moreover, establishment of public garden, protective green strips and tree plantations can be assumed as an important action to conserve plant species at the national, regional and global scales.

In a framework to achieve the Millennium development goal the plantation of trees along the major roads have been started. Tree plantation in desert and semi desert regions also has positive impact on environment.

It is necessary to note that there are some gaps in achieving the global and national goals, which are related to the financial issues as well as to the lack of transparency among the sectoral decisions, quality of projects implemented and their sustainability.

Moreover, the absence of indicators to measure progresses of biodiversity conservation activities as well as restoration actions is considered as negative factor. Furthermore, lack of science based elaborations and absence of locally adapted (to the climate conditions and environmental settings) methods and methodologies of plantation and conservation of plant species diminish the effectiveness of those developments.

ANNEX 5. IMPLEMENTING THE PROGRAMME OF WORK ON PROTECTED AREAS (Decision VII/28)

Goals	Target	National Policy Documents	Implementation progress	Challenges
1.1 To establish and strengthen national and regional systems of protected areas integrated into a global network as a contribution to globally agreed goals.	By 2010, terrestrially and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established as a contribution to (i) the goal of the Strategic Plan of the Convention and the World Summit on Sustainable Development of achieving a significant reduction in the rate of biodiversity loss by 2010; (ii) the Millennium Development Goals-particularly goal 7 on ensuring environmental sustainability; and (iii) the Global Strategy for Plant Conservation.	• National Comprehensive Development Policy based MDG (2007-2021) • Mongolian MDG (1990-2015) • Action Plan for Mongolian Biodiversity Conservation (1996) • Sustainable Development Programme of Mongolia in 21st Century (1998) • National Programme of Special Protected Areas (1998) • State Policy on Ecology (1997)	In 1998, special protected areas of Mongolia comprised 11.1% of the whole country's territory, were increased to 14.0% in 2007. As of 2007, special protected areas of Mongolia encompass 21.9 million hectares covering 61 areas, making up 14.0 % of the whole country's territory. Six areas were included in the list of World Heritage sites and Man and Biosphere of UNESCO. Also 11 areas were recorded on the Ramsar List of Wetlands of International Importance.	A constraint to broadening the special protected area network, conserving rare species is the mineral exploration and mining licenses, issued for 70% of the territory. Climate Change Illegal Wildlife Trade
1.2 To integrate protected areas into broader land and seascapes and sectors so as to maintain ecological structure and function.	By 2015, all protected areas and protected area systems are integrated into the wider land and seascape, and relevant sectors, applying the ecosystem approach and taking into account ecological connectivity and the concept, where appropriate, of ecological network.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998) • National Programme on Water (1999)	Since 2005, the project "Community based biodiversity conservation in the mountain Landscapes of Mongolia's Altai Sayan Eco-region" funded by the UNDP/GEF has been implemented.	Lack of knowledge and practice of ecosystem-based approaches to management
1.3 To establish and strengthen regional networks, transboundary protected areas (TBPAs) and collaboration between neighbouring protected areas across national boundaries.	Establish and strengthen by 2010/2012 tranboundary protected areas, other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach, and improving international cooperation	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998)	Representatives of the Khan-Khentii PA in Mongolia and the Sokhond Biosphere Reserve of Chita in Russia visited each other to study possibilities to establish transboundary PAs and sign agreements of cooperation. In addition, MNE and the Russian Natural Resource Ministry prepared the agreement proposal to establish Lake Uvs PA.	Lack of TBPAs communication and cooperation between Mongolia, and neighbouring countries

1.4 To substantially improve site-based protected area planning and management.	All protected areas to have effective management in existence by 2012, using participatory and science based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement	• National Comprehensive Development Policy based MDG (2007-2021) • National Programme of Special Protected Areas (1998)	There are 9 administrations had their renewal plans approved, 14 will be approved in 2008 and 5 management plans will be completed by 2009.	Lack of financial, human and technical resources
1.5 To prevent and mitigate the negative impacts of key threats to protected areas.	By 2008, effective mechanisms for identifying and preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998)	Currently, the Law on Environmental Impact Assessment (1995) along with its 3 procedures and 1 methodology are being enforced.	Weak law enforcement capacity
2.1 To promote equity and benefit-sharing.	Establish by 2008 mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998) • National Programme on Forestry (1998)	Law on Environmental Protection from Environmental Resource Utilization Fee and Monetary Amount for Environmental Resource Rehabilitation Activities (2000)	Lack of benefit sharing mechanism
2.2 To enhance and secure involvement of indigenous and local communities and relevant stakeholders	Full and effective participation by 2008, of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations, and the participation of relevant stakeholders, in the management of existing, and the establishment and management of new protected areas.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998) • National Programme on Forestry (1998) • National Programme on Water (1999)	Upon the approval of the law on Buffer Zone of PAs in 1997, a legal basis for involvement of the local state organizations and residents in the management of PAs was created. There are 65 Buffer Zone Councils in operation within strictly protected areas and national parks. There are only 4 PA administrations that have developed their Buffer zone management plans	Lack of members' capacity and initiative and shortage of financial resources

3.1 To provide an enabling policy, institutional and socio-economic environment for protected areas.	By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of protected areas and protected areas systems	• National Comprehensive Development Policy based MDG (2007-2021) • National Programme of Special Protected Areas (1998)	The amendments of Mongolian law on Special Protected Areas have been developed.	Lack of economic intensive
3.2 To build capacity for the planning, establishment and management of protected areas.	By 2010, comprehensive capacity building programmes and initiatives are implemented to develop knowledge and skills at individual, community and institutional levels, and raise professional standards	• National Comprehensive Development Policy based MDG (2007-2021) • National Programme of Special Protected Areas (1998) • Programme on Environmental sector's Human Resources	National Programme of Special Protected Areas (1998), Programme on Environmental sector's Human Resources have been implemented.	Lack of financial, human and technical resources
3.3 To develop, apply and transfer appropriate technologies for protected areas.	By 2010 the development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the Conference of the Parties on technology transfer and cooperation	• National Programme of Special Protected Areas (1998)	Since 2006 the National Geo-Information Center for Natural Resource Management (NGIC) project has been implemented by the Ministry of Nature and Environment.	Lack of transfer of technology
3.4 To ensure financial sustainability of protected areas and national and regional systems of protected areas.	By 2008, sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources. (…)	• National Programme of Special Protected Areas (1998)	In last few years, an investment for activities in State Protected Area has been increased. Particularly, in 2006-2007, total of 806.0 million tugrug budget has been spent for activities in state protected area, which is six times more compared with 1998.	Lack of financial resources

3.5 To strengthen communication, education and public awareness.	By 2008, public awareness, understanding and appreciation of the importance and benefits of protected areas is significantly increased	• National Programme on Environmental Information and Awareness • National Programme on Public Ecology Education (1998) • National Programme of Special Protected Areas (1998) • Action Plan for Mongolian Biodiversity Conservation (1996)	The subject "Ecology" is taught in secondary schools according to the curriculum. Currently, there are 85 information centers operating at 23 protected area administrations and 80 eco-gers at 8 administrations.	Lack of financial resources
4.1 To develop and adopt minimum standards and best practices for national and regional protected area systems.	By 2008, standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of protected areas are developed and adopted.	• National Programme on Environmental Legal Reform • National Programme of Special Protected Areas (1998)	Criteria to reclaim areas under special categorization are set by the Institute of Geography of Mongolian Academy of Sciences with progress to take an area under protection assessed according to these criteria.	Best practice guidelines developed by IUCN are not available in Mongolian
4.2 To evaluate and improve the effectiveness of protected areas management.	By 2010, frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998)	An assessment of special protected (SPA) area capacity was conducted in 2003 to identify areas where it could be strengthened. The Mongolian programme office of the WWF investigated activities in around 30 SPAs, and determined that there is a requirement to assess and define the ecological vulnerability of 12 Strictly nature reserve and 19 National parks. This assessment should used the "RAPPAM" methodology of the WCPA.	Lack of monitoring for effectiveness of protected areas

4.3 To assess and monitor protected area status and trends.	By 2010, national and regional systems are established to enable effective monitoring of protected area coverage, status and trends at national, regional and global scales, and to assist in evaluating progress in meeting global biodiversity targets.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998)	The status and trends of special protected areas of the country are included in the State of the Environment Report.	
4.4 To ensure that scientific knowledge contributes to the establishment and effectiveness of protected areas and protected area systems.	Scientific knowledge relevant to protected areas is further developed as a contribution to their establishment, effectiveness, and management.	• Action Plan for Mongolian Biodiversity Conservation (1996) • National Programme of Special Protected Areas (1998)	Since 2006 the National Geo-Information Center for Natural Resource Management (NGIC) project has been implemented by the Ministry of Nature and Environment. The pamphlets "Red list of Mammals in Mongolia" and "Red List of Fish in Mongolia" and conservation plans for mammals and fish have been published. The Institute of Botany has about 2739 native, vascular plant species. The work to establish a digital database of these specimens is being implemented successfully	Lack of adequate scientific research capacity

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