



## 3.2 DESERTIFICATION

### 3.2.1 Introduction

Inadequate environmental protection has led to desertification and degradation of land in Mongolia. However, environmental protection does not mean keeping all natural resources out of use and not use them for national economic and social development.

Mongolia signed the "UN Convention to Combat Desertification" in 1996 and ratified it in 1997. The Government of Mongolia approved National Action Plan to Combat Desertification by its resolution 193 in 1996. Although adoption of the National Action Plan is only one among all required measures, which need to be taken, it however, is a clear example of government's special attention to desertification problems.

Researchers and scientists have estimated that 90% of Mongolia's territory is vulnerable to desertification. Causes of desertification can be divided into two

categories: i) natural causes and ii) anthropogenic causes. Researchers estimate that only 13% of the desertification is caused by natural factors whereas anthropogenic factors have contributed towards 87 % of all cases.

### 3.2.2 Pressure

Climatological variations are a major cause which may lead to natural disasters that, through interaction with human factors, will lead to accelerated degradation at local level. For instance, desertification in the Gobi ecological zone is reported as being caused primarily by increasing aridity of climate and livestock grazing.

Though world community might have accepted climatic changes as a reality, it is difficult to analyze its appearance at specific locations such as in Mongolia. Results of research presented at two recent workshops of a Mongolian-Chinese network of meteorological scientists suggest a rise in temperature and precipitation. Other scientists claim, however, that drought is a cyclical phenomenon, but that its duration may have become longer and deeper.

Anthropogenic causes are:

- **Overgrazing-** In Mongolia, ecologically degraded pasture exists primarily as a result of livestock concentration and other causes associated with human activities. In some locales, livestock grazing is the cause of degradation of land resources due to the attempts to intensify human activities and livestock production around water sources. Cultivation of marginal soils to produce livestock supplementary feed and reduction of areas capable of producing high forage yields by conversion to marginal human food crops have added to the problem. It is also apparent from observations of Mongolian pasture resources that major areas of pasture remain in relatively pristine environment condition relative to vegetation composition and structure and stability of the biological system. Livestock induced degradation of biological systems is most pronounced at locations where climatic, topo-edaphic, vegetation, and human influences create 'convergence' of rate factors that lead to accelerated degradation. With some exceptions, even areas most degraded appeared to be ecologically capable of responding to livestock management strategies that reduced concentration of livestock.
- Wind and water erosion of cultivated soils and abandoned farm lands;
- Intentional burning;
- Vehicle tracks: This may seem negligible in a vast country like Mongolia, but it can easily be observed that most valleys are marked by the formation of these tracks. The vegetation is very vulnerable to (even one passage can be seen for a long time) the tracks. Both factors are combined to drive gully erosion that often starts at tracks, thoroughly changing the hydrology and productivity of entire valleys.

Rodents and insects also cause serious damage to natural vegetation, notably in forest lands, which in combination with other negative factors has aggravated the situation.

Degradation caused by anthropogenic factors is common to all ecological zones of Mongolia. Cropping induced soil erosion, disturbances from mining and industrial activities, and deforestation are most prevalent in the forest steppe and grass steppe ecological zones.

These also have great and fast impact on stability of biological systems in desert steppe and desert ecological zones. Although, degradation from livestock grazing, trampling and vehicular disturbance of vegetation and soils are spread throughout Mongolia, the effect is much more severe in the desert steppe and desert ecological zones (because of the nature of soils and lack of moisture). The generally arid nature and unstable soils makes the two ecological zones susceptible to anthropogenic degradation, not only in actual impacts but also in limiting opportunities to stabilize or reverse the rate of degradation.

As one of the world's most arid region, Mongolia has the high rate of drought occurrence. Mongolia's central and southern regions are the most affected regions by droughts. In these regions, over 40-50 days with arid conditions are recorded in a year. Droughts are frequently observed during the first stage of plants' growing period. The most drought-prone region of Mongolia is the Gobi desert region where severe droughts occur once in 2-3 years. Though uneven and with lesser frequency, the drought occurrence is also observed in the forest and steppe zone. Annual trend of increasing occurrence of drought in Mongolia is being observed.

### 3.2.3 State

Mongolia is a country, which experiences serious drought and desertification. More than 40% of the territory is composed of arid and desert areas, 70% of which are degraded (a recent report estimates that 21% of the country is moderately affected by degradation, and 4% severely to very severely). Information obtained from the Botanical Institute of the Mongolian Academy of Sciences indicates that most *aimags* have a high percentage of pastureland with moderate and high degradation. However, degradation of natural grazing land is less apparent in traditional, extensive pastoral livestock production areas. Both an increasing frequency of drought and an increasing rate of desertification in combination with effects of climate change severely affect arid and semi-arid areas, leading to degradation of pastureland.

Current desertification has three main aspects including:

- i) desertification of vegetation cover,
- ii) desiccation of wetland ecosystems and
- iii) increase of sand area.

Other aspects of desertification include decrease in soil fertility and wildlife population, which are not always noticed by the people and are not properly studied.

41.3% of the country's total territory (including 19.5% of Gobi and 21.8 % of deserts) is occupied with Gobi deserts. The extent of soil erosion and degradation of the territory of Mongolia is divided into three categories as follows:

- a) pasture occurrence and desertification ;
- b) erosion in Arable areas; and
- c) lack of forests, etc.

**a) Pasture occurrence and desertification:** It is observed that towards south, yield output is lower from the grassland whereas, the forest and steppe zone's yield output is as high as 3-18 times than that in the Gobi region. Most of Mongolia's pastures being erosion-prone are likely to be affected by desertification. One third of the total grassland areas are prone to degradation and erosion.

In the Gobi desert, the rate of desertification is low for 76% of region, moderate for 20%, high for 3% and extremely high for 1%. The territory within 15-16 million ha in the surroundings of the large cities, settlements and wells is highly exposed to erosion and degradation.

The amount of areas covered with sand has increased in 1990 by 18 thousand ha as compared with that of 1941. With the area of sand increasing and new sand dunes appearing, the process of desertification keeps on extending further. Since 1942, a total of 60 wells and 160 cattle pens have been sand-drifted. It is seen that the process of sand shifting to the Gobi pastures is intensifying.

The area covered by sand in Mongolia has increased by 0.038 million ha (8.7%) during the last 40 years. Sandy areas make up about 90% of the Gobi desert region. A decrease by 25-33% of the discharge of such rivers as Baidrag, Taats, Tui and Ongi, and over 80 small rivers and streams, their tributaries, flowing from the north to the south in the Gobi zone is recorded. It is the major cause of drying up of 5 Gobi lakes.

The water deficiency in the arid dry Gobi region has affected negatively the vegetation cover as seen in the lowering of yield output substantially and decrease in the plant diversity. Over 1 million ha of pasture areas are exposed to erosion and the grassland yield in 1990s

decreased making up just a half of that recorded in 1960.

**b) Erosion in Arable areas:** The total amount of arable areas has risen during the last 30 years as much as 10 times, constituting 1.34 million ha. The arable areas are highly exposed to erosion and degradation. According to the study carried out in 1991 covering 90% of the total arable areas (1,206.4 thousand ha), the erosion rate of 46.5% was moderate. As the arable areas continue to be affected by erosion and degradation processes, their fertility rates diminishes. The amount of organic substances (humus) has been reduced by 29.3%-48.7% in the erosion-exposed areas. At present, more than half of the total arable areas are left fallow. Around one million ha of land has been covered with vehicles tracks and around 0.6 million ha of land has been severely eroded due to military and technical activities.

**c) Lack of forests:** Just 8.1% of the country's territory is covered with forests. During a period from 1974 to 1994 the forest area has shrunk altogether by nearly 6 million ha which was associated with the logging activities, impacts of pests and frequent forest fires.

### 3.2.4 Impacts

The signs of degradation in Mongolia include the classical signs of desertification and land degradation observed in other areas of the world prone to desertification. It includes signs such as dramatic increase in number of dust storms in recent years, increase in flash floods, decrease in yields of agricultural produce, declining fertility rates in livestock, increase in deforested and denuded land, decrease in biodiversity, and lowering ground water tables, etc.

As desertification continues to affect more land, it is now very critical that over 70 % of pastureland has been degraded and depleted, vegetation growth rate has already decreased 5 times, and the number of plant species has reduced by 6 times.

As area of pastureland has decreased by 6.9 million ha during the last 30 years, the yield from severely degraded pasture has decreased by 5 times.

The declining productivity leads to increased pressure on the remaining resources and migration into urban areas. The tendency to return to a rural life style during the onset of the transition period has been reversed as noted in the past.

### 3.2.5 Policy Responses

Identifying desertification as a major cause leading poverty and hunger, UN Convention to Combat Desertification (CCD) was developed and signed by many countries affected by serious desertification. Mongolia signed the Convention in 1994 in Paris. The CCD calls for all signatory countries to address the problem of desertification in their countries by drafting a national Plan of Action to Combat Desertification. Apart from UNCCD, economic transition, political change, and over exploitation of natural resources, particularly, the rangeland, made it necessary for Mongolia to develop and implement a National Plan of Action to Combat Desertification (NPACD).

Within the context of UNCCD, the preparation of the NPACD as the basis for obtaining external assistance and mobilizing internal assistance is the first phase of the implementation of the Plan itself. The Ministry of Nature and Environment of Mongolia is the government body to implement both the Convention and the Action Plan through its National Committee to Combat Desertification.

Efforts to combat desertification in various degrees are reflected in over 20 programs and action plans like Ecological Concept, Mongolian Action Program for the 21st Century ( MAP-21), National Water Program, National Program on Forestry, National Program on Natural Disasters Reduction and well as in Government Action Program 2000-2004.

The NPACP has three implementation phases:

- First, focusing on creating legal environment to strengthen relations between central and local government organizations, and policy coordination on decentralization;
- Second, aiming to create desertification monitoring capacity, identify areas being severely degraded, and to weaken desertification process; and
- The last phase is dedicated to complete all required activities and to strengthen national capacity.

Other measures to combat desertification include:

- Study of physical, biological and socio-economic factors of desertification and creation of information-monitoring network: Scientific institutes of Mongolian Academy of Sciences and the Institute of Meteorology and Hydrology

are conducting scientific studies on desertification factors. Several projects have been or are being implemented on vegetation cover of deserted areas, ecosystem features, climatological factors, and water supply;

- Information and monitoring on desertification is being incorporated in hydro meteorological and satellite monitoring and information network;
- Strengthening of national capacity and organizational structure: National Committee to Combat Desertification consisting of 11 members, representatives of different ministries, scientific community and NGOs are established;
- National Center to Combat Desertification has recently been established at the Institute of Geo-Ecology;
- Mongolia has been designated a country to be in charge of the implementation of the theme " Drought reduction and strengthening of capacity to combat desertification" within the Convention to Combat Desertification;
- Public participation and awareness raising: Broad range activities have been conducted to involve people in combating desertification and to raise awareness among local communities;
- Two International Seminars have been conducted in cooperation with the Secretariat of the Convention to Combat Desertification in 1995 and 1997. A series of national seminars have also been conducted at both national and local levels to raise public awareness;
- International cooperation: Mongolia has already concluded 7 intergovernmental and over 20 interministerial agreements with neighboring and other countries to protect the environment. Many of these agreements have important provisions cooperate in combating desertification. Since 1990, there are 14 projects being implemented with total costs of US \$ 24.6 million with assistance of international donor community;
- Since desertification was severe due to cutting of saxaul for household purposes in the whole Gobi region, it is now prohibited for logging, and only local community is allowed to cut saxaul for firewood in areas where they live;
- As of today, about 20 million seedlings and 7-8 million seeds are planted in the 40 permanent nurseries annually for restoration purposes.