

**Mongolia**

REPORT E0074

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**NATIONAL  
ENVIRONMENTAL  
ACTION PLAN**

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**Towards Mongolia's  
Environmentally sound  
Sustainable Development**

**February 1995**

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**- MONGOLIAN ENVIRONMENTAL ACTION PLAN -**

**TOWARDS MONGOLIA'S ENVIRONMENTALLY  
SOUND, SUSTAINABLE DEVELOPMENT**

**GOVERNMENT OF MONGOLIA**

**ULAANBAATAR**

**FEBRUARY, 1995**

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## EXECUTIVE SUMMARY

Mongolia is a relatively large country covering 1.56 million square km., with a relatively sparse population of approximately two million which is expanding at an annual rate of 2.8 percent. The climate is harsh with extremes of heat and cold. Availability of water and other renewable natural resources is very limited, and natural ecosystems are fragile, highly susceptible to degradation and slow to recover.

It was a socialist state with a centrally planned economy until 1990, when Mongolia became independent of the influences of the USSR, adopted a democratic form of government and a free market economy. Since the 1950s, rapid economic development and industrialization have transformed what was a largely agricultural economy based on nomadic animal husbandry to a largely industrial economy where only about 20 percent of the domestic product is from agriculture. Today over half the population lives in urban areas, where air pollution is seasonally severe and housing, transport, waste management and other infrastructure development are grossly insufficient. As was the case with many rapidly industrializing countries, environmental and resource management considerations played virtually no effective role in the industrialization and urbanization, and the new Mongolia has been left with the inheritance of a loss and depletion of natural resources and severe degradation of environmental conditions, principally in urban areas.

For centuries the traditional Mongolian pastoral system apparently maintained the rangelands in a productive state, and these conditions remained until about 1989. However, with the economic collapse since that time, combined with the dissolution of the former rural administrative structures, there has been a breakdown in the traditional pastoral system. Since 1989 the number of families owning livestock has about doubled, and the concentration of livestock near settlements has led to significant degradation of the rangeland in these areas. Traditionally, there was relatively little crop cultivation in Mongolia because of the arid conditions and adverse climatic regime. However, starting in the 1960s a program to open virgin lands for wheat production led to a massive increase in area under cultivation, much of which has since been abandoned to blowing dust and sand.

Independence was accompanied by severe external economic shocks, especially the withdrawal of soviet aid, the dissolution of the CMEA which accounted for 95 percent of Mongolia's exports, and adverse terms of external trade. Mongolia's GDP declined between 1989 and 1993, with a cumulative loss in national income of about 20 percent, decline in real private consumption per capita by a third, and decline in real investment by two-thirds. Inflation accelerated reaching 330 percent in 1993. New donors have been assisting Mongolia since 1991, and the government has tightened fiscal and monetary policies and introduced a series of economic reforms. It appears that the worst of the country's economic contraction may be over, but money remains in extremely short supply and the continuing critical economic conditions have resulted in very limited funding for infrastructure, institution and program developments in the area of natural resource management and environmental protection, very greatly reducing the capability of the new government to rectify the environment and resource problems it had inherited.

The Constitution adopted in 1992 specifically included several key environmental provisions, and to deal with the environmental and resource problems the new government established institutional structures including the Ministry of Nature and Environment, developed new environmental legislation, and has sought environmental and natural

resource assistance from donors. However, the extreme financial constraints facing the new country very severely limit the government's possible actions, and most particularly limit the possibilities for implementation of environmental laws, regulations and other measures. And at the same time, many in government perceive environmental considerations as separate from the urgent requirements for development, and environmental protection often is seen in terms of a tradeoff with developmental priorities. The result is that the government has a good institutional and legislative start for environment and resource management, but as yet it is weak, there is very little enforcement or implementation, and the incentive structure for industries and people to internalize and act on environmental concerns remains to be put in place.

In the face of these conditions, the country's principal priorities for environment and resource management are:

**1. Urban Air and Water Pollution:** Over half the population of Mongolia is at immediate risk from urban air and water pollution, so actions to improve the situation are of the highest priority. Actions for reducing air pollution involve reducing emissions from power and heating plants and household stoves and use of energy efficient technologies. Reducing vehicle emissions are less immediately urgent, but important. Highest priorities for water pollution include improving sewage and waste removal, improve and expand waste water treatment facilities including mitigation of Tuul River pollution, provision of sanitary facilities and waste disposal in the gher communities, and improving monitoring of water quality. The provision of safe water supply is linked with the pollution issues, and among the other actions required are reduction of leakage and wastage of water in urban areas, and effective and equitable assignment of costs.

**2. Urban Solid Wastes:** Urban solid waste collection and disposal is wholly inadequate, posing serious health and other risks which require high priority actions, including improving the solid waste collection vehicle fleet, enhanced recovery of recyclable wastes, and evaluation of disposal options and development of sanitary disposal sites to handle domestic and industrial solid wastes incorporating appropriate environmental controls.

**3. Land Degradation:** In view of the strong dependence of Mongolia's economy, food supply, and other sectors on land resources, halting and reversing the ongoing processes of overgrazing, soil erosion, desertification and other forms of land degradation are a high priority for the nation. Actions include those in the National Plan of Action to Combat Desertification, control and reversal of overgrazing near settled areas, and restoration of certain particularly critical abandoned cultivated areas.

**4. Water Supply:** There is an urgent need to improve water management and conservation. The highest priority actions include: complete the drafting of new water law with regulations, approve and implement it; and improve the supply and reduce the wastage of water in urban areas through replacement of electric pumps and other capital works,

development of a public awareness program on conserving water; an emergency leak repair programme, the introduction of water meters and a graduated steeply rising tariff for excessive per capita consumption of water.

**5. Institutional Strengthening and Capacity Building:** The critical need to strengthen the institutional environmental framework, and to build the needed staff capacity, underlies and is absolutely essential to achieving effective action on all environmental and natural resource management issues. Consequently, it is essential to the environmentally sustainable development of Mongolia, and consequently institutional strengthening and capacity building are of the highest priority. Institutional actions involved include strengthening the communication and coordination between MNE and line ministries and strengthening MNE's enforcement powers, along with strengthening the EIA procedures and implementation. Capacity building largely involves completing and implementing the Capacity 21 Programme being undertaken with assistance from UNDP. The development and application of Environmental Economics is closely linked with these issues. Management of the nation's environment and natural resources requires development of effective economic incentives and related instruments appropriate to the new free market economy.

**6. Environmental degradation from mining and petroleum extraction activities** is severe in some limited areas, so while it only involves a small area and limited population, the effects are sufficiently severe that it is regarded as a high priority. The principal priority actions involve assuring the long term safety of the Erdenet tailings dam, and dealing with the environmental degradation from tailings dust and water pollution from mining operations and oil leakage and associated problems from oil extraction operations.

Other issues which are considered to be of less urgency than the above highest priority issues, but which still are emphasized include **Natural Disasters, Public Awareness and Education, and Forest Resources**. In addition, **Biodiversity**, the Mongolia's natural heritage, provide the basis for development of the potentially important ecotourism industry. Biodiversity is considered to be important, but in view of the existing biodiversity projects, additional actions, except in the case of species in danger of extinction, are considered to be less urgent than the above priority issues.

The full range of environmental issues are detailed in Parts I, II, and III of the Plan of Action which follows.

Mongolia is at a turning point in its history politically, economically, in terms of international relations, and also with respect to the management of its environment and natural resources. The decisions and initiatives taken (and to a large extent the degree and types of assistance provided to Mongolia by the international community) regarding environmental issues at this crucial point in its history will have a profound influence on the state of the environment and of natural resources in Mongolia throughout the country's new phase of development.

**COORDINATED BY**  
**THE MINISTRY FOR NATURE AND THE ENVIRONMENT**

**ACKNOWLEDGEMENTS**

Development and preparation of the Mongolian National Environmental Action Plan (NEAP) was carried out under the direction and with the active participation of Dr. Z. Batjargal, Minister for Nature and the Environment. A Working Group for preparation of the NEAP was composed of staff from his Ministry including: Ts. Adyasuren, J. Tsogtbaatar, G. Sumiya, S. Jargalsaikhan, L. Dolgormaa, Ch. Tsanjid, O. Bumyalagch, D. Gantigmaa, N. Oyun-Erdene, D. Enkhtuya, Kh. Ikhanbai, and others.

In order to assure the widest participation of the Government of Mongolia, preliminary meetings were held with many ministries and drafts of the NEAP were circulated to all of the ministries involved. Review of NEAP drafts and other forms of assistance were received from the following ministries and organizations: Ministry of Demography and Labor, Ministry of External Relations, Ministry of Finance, Ministry of Food and Agriculture, Ministry of Energy, Geology and Mining, Ministry of Health, Ministry of Infrastructure Development, Ministry of Science and Education, Ministry of Trade and Industry, Mongolian Academy of Sciences, National Development Board, and the State Administration of Civil Defense.

Comments and advice were also received from the Standing Committee on Environment of the State Great Khural (Parliament) of Mongolia, and the Mongolian Association for Conservation and Environment.

This action plan is great importance to the Government of Mongolia, and the Government wishes to express its appreciation to the World Bank for its assistance and support in the development of the NEAP, including provision of the services of Dr. Lee Talbot.

## LIST OF ABBREVIATIONS

|   |       |
|---|-------|
| ASIAN DEVELOPMENT BANK  | ADB   |
| GLOBAL ENVIRONMENT FACILITY   | GEF   |
| LOCAL GOVERNANCE<br>(City, District, Aimag, Som)  | LG    |
| MINISTRY OF CULTURE   | MoC   |
| MINISTRY OF DEMOGRAPHY AND LABOR  | MDL   |
| MINISTRY OF EXTERNAL RELATIONS  | MER   |
| MINISTRY OF FINANCE   | MoF   |
| MINISTRY OF FOOD AND AGRICULTURE  | MFA   |
| MINISTRY OF ENERGY, GEOLOGY AND MINING  | MEG&M |
| MINISTRY OF HEALTH  | MoH   |
| MINISTRY OF INFRASTRUCTURE DEVELOPMENT  | MID   |
| MINISTRY OF JUSTICE   | MoJ   |
| MINISTRY OF NATURE AND ENVIRONMENT  | MNE   |
| MINISTRY OF SCIENCE AND EDUCATION   | MSE   |
| MINISTRY OF TRADE AND INDUSTRY  | MTI   |
| MONGOLIAN ACADEMY OF SCIENCES   | MAS   |
| MONGOLIAN RADIO AND TELEVISION  | MRT   |
| NATIONAL DEVELOPMENT BOARD  | NDB   |
| NON-GOVERNMENTAL ORGANIZATION (exclude<br>commercial, private or public companies,<br>include trade associations) | NGO   |

|                                       |      |
|---------------------------------------|------|
| STATE ADMINISTRATION OF CIVIL DEFENSE | SACD |
| STATE CUSTOMS ADMINISTRATION          | SCA  |
| UNITED NATIONS DEVELOPMENT PROGRAMME  | UNDP |
| UNITED NATIONS ENVIRONMENT PROGRAMME  | UNEP |

## **INTRODUCTION**

### **Background**

A National Environmental Action Plan (NEAP) is an environmental planning process which has been designed to link environment and development. It is intended to provide a framework for integrating environmental considerations into a country's overall economic and social development. The NEAP identifies the main environmental problems and issues facing a country and provides a realistic plan of action for how the country will deal with the problems. The plan should provide a clear description of the actions involved, including identifying who will take the action, when the action should be taken, and what are the estimated costs. Although a NEAP involves a plan, it is not simply an effort to develop a plan. The end product is not only a paper, but a long-term process of the definition, development and implementation, which integrates environment into a country's development. The NEAP document itself is intended to be a "living document" which should be reviewed periodically and updated in response to changes over time. The process of developing the NEAP is intended to help create awareness of environmental issues and needs within government and the general public, and it is intended to enlist their active concern and support for the resultant action plan.

Mongolia initiated its NEAP process in 1993 within the Ministry for Nature and Environment. Two factors led to the Ministry's action: The Ministry recognized the need to formulate an integrated plan for the environmentally sound, sustainable development of Mongolia, and the governing body of the International Development Association (a component of the World Bank Group) now requires that countries which receive IDA assistance should prepare a NEAP.

The present NEAP document is the result of intensive work by a Working Group within that ministry, along with review and input from other ministries of the Government of Mongolia. The MNE group also received technical review comments on an early draft from environmental specialists from outside organizations, including the World Bank and the UNDP.

This action plan covers actions required in the next 15 years, to the year 2010.

### **Organization of the Action Plan**

As a background to the plan itself, an Overview provides a summary of the country and its environmental and natural resource situation. The Overview section is followed by the statement of Mongolia's Environmental Objectives.

The next four sections of the NEAP constitute the main body of the action plan.

The Plan - Actions to Address Environmental Issues, introduces the plan of action

itself and presents the overall priorities.

**Part I: Principal Environmental Issues** provides the detailed background descriptions and analyses of the main environmental issues and the key actions required to deal with them. Part I is divided into four subsections as follows:

1. **Environmental Protection** which primarily deals with pollution, covering air, water and solid wastes, toxic and other hazardous materials, and climate change.
2. **Management of Natural Resources** which covers land resources, water resources, forest resources and mineral resources.
3. **Conservation** which covers biological diversity and protected area management.
4. **Natural Disaster Mitigation**

**Part II: Social and Economic Dimensions** It describes the specific actions which are called for within each of the social and economic sectors of Agriculture, Energy, Industry, Geology and Mining, Transportation, Tourism, Health, and Combating Poverty.

**Part III: Other Mechanisms and Responses** presents specific actions under the headings of: Institutional and Legislative Framework; Application of Environmental Economics; Capacity Building; Environmental Monitoring and Ecological Information System; Public Awareness and Education; Public Participation; Strengthening the Role of NGOs; International Cooperation; and Implementing the NEAP.

A final section, **Annex 1**, provides a **Summary Table of Highest Priority Actions**.

Within Parts I, II, and III, for each environmental issue or problem there is a **Background** description of the issue, followed by **Actions Required**. Where the actions are considered to be of highest priority for implementation in the short term, they are identified as **Actions Required: First Priority**. The first priority actions may be followed by **Other Actions Required** which are of lower priority and are for medium or long term implementation. Where no actions are considered to be of highest priority, the actions are designated as **Actions Required**.

For each action, the ministries or other organizations which are responsible for **Implementation and monitoring** the action are listed. This is followed by a **Cost estimate** for the action. In many cases these estimates are for the total costs over a 15 year period (i.e., for the duration of the NEAP, to the year 2010).

## OVERVIEW<sup>1</sup>

Mongolia is a relatively large, sparsely-populated country. It has a land area of 1.56 million square kilometers which is roughly half the size of India, but it supports a population of only approximately two million people. With a population density of approximately 1.4 persons per square kilometer it might seem that natural resources would be in abundant supply and that environmental degradation would be limited.

This initial impression is deceiving. The climate of Mongolia is harsh. The little precipitation the country receives is unequally distributed both temporally (the majority of precipitation occurs during a three-month period in the summer) and geographically (the north of the country receives most of the precipitation, the southern part is semi arid or desert), and is largely lost to evapotranspiration and to river flow out of the country. Historical climatological data strongly suggest that the Mongolian climate is gradually growing drier. Separated from the moderating influences of the oceans, Mongolia also experiences great extremes in temperature; wide temperature fluctuations in both diurnal and annual temperatures are common. Because of the country's latitude and high elevation, average temperatures are quite low; below freezing over a large part of the country. Mongolia also has a long season of very low winds and temperature inversions during the winter months, and periods of intense winds in April, at the end of the cold, dry season.

All of these climatic factors combine to significantly limit the availability of renewable natural resources in Mongolia. Abundant water supplies exist only in certain areas in the north of the country. The rates of humus production, vegetative regeneration and growth, and livestock productivity are very low throughout the country in comparison to other countries in the region. Natural ecosystems are relatively fragile, highly susceptible to degradation by human activities, and slow to recover. In the south desertification is a problem; disturbed areas often become permanent sandy desert area.

Mongolia's endowment of renewable natural resources is therefore limited. At the same time, Mongolia's population growth rate is one of the highest in Asia: 2.5 percent per year in the 1990s. There is a strong trend toward urbanization of the population (well over half the population now lives in urban centers), and the country has undergone rapid economic development and industrialization in the past three decades. The accelerating growth in the population, therefore, has been matched by increase in the per-capita rate of natural resource consumption. The sustainable rates of use or loss of renewable natural resources, including surface water, ground water, forest, soil, fishery and rangeland

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<sup>1</sup> This section is largely drawn from the Mongolian National Report to the United Nations Conference on Environment and Development, updated with information from the World Bank and UNDP. More detailed information about Mongolia and Mongolian environmental conditions may be found in the Mongolian National Report, the National Plan of Action to Combat Desertification in Mongolia, the World Bank Country Economic Memorandum for Mongolia, and the UNDP Development Co-operation Reports.

resources, have already been exceeded in some areas; this situation is likely to become more widespread if current trends continue, and measures to conserve and manage natural resources are not instituted and implemented.

Mongolia's economy developed rapidly from essentially an agricultural economy based primarily on nomadic animal husbandry in the 1950s to an economy in which industry accounted for 34 percent of national net material product, other material sectors (aside from industry and agriculture) accounted for 46 percent, and agriculture accounted for 20 percent of net material product in 1989. Light industry (such as textile, tanning, metal finishing, woodworking, food processing), mining, and energy industry have developed, primarily at several industrial centers such as Ulaanbaatar (the capital), Darhan, and Erdenet.

Because of the strong emphasis placed by government during recent decades on industrialization and economic development, the approach to environmental management and to natural resource use was largely exploitative. In common with most other centrally planned, command-driven economies, particularly those of the former Soviet Union, environmental and resource management considerations played virtually no effective role. Inadequate attention was given to planning natural resource utilization, to the development of sustainable natural resource use policies, to resource restoration and protection, and to resource quality protection. This led not only to the loss and depletion of natural resources, but also to the degradation of environmental quality. Industries and population centers were developed without environmental safeguards. Atmospheric, surface water, and soil contamination is concentrated primarily around urban centers, and is locally quite significant, in many cases exceeding health-based criteria.

Housing, transport, solid waste management, domestic wastewater management facilities, and other infrastructure development did not keep pace with the growing demand created by the rapid economic development, industrialization, urbanization, and population growth in Mongolia prior to 1990, and with the subsequent economic collapse they have fallen even farther behind in most cases since then. This has a direct impact on environmental quality and natural resource use. Substandard housing in urban areas account for disproportionately large shares of urban air, water, soil and groundwater contamination. Inadequate transport infrastructure results in the concentration of pressures on natural resources near markets and settlements, and reduces the viability of resource management planning in a country characterized by sparse renewable natural resources distributed over large land areas. It also reduces the viability of environmental protection activities such as centralized waste management and recycling. Inadequate waste management facilities likewise fail to prevent contamination of air and water, and in the degradation of land resources.

Mongolia's GDP declined for four years in a row between 1989 and 1993. The cumulative loss in national income amounted to 20 percent, real private consumption per capita declined by a third, and real investment by two-thirds. Inflation accelerated, reaching

330 percent in 1993, and exports and imports fell by more than half between 1990 and 1993. These changes were associated mainly with severe external shocks, especially the withdrawal of Soviet aid, the dissolution of the CMEA, which accounted for 95 percent of Mongolia's exports, and unfavorable terms of trade. To attain macroeconomic stability, fiscal and monetary policies were tightened; and to stem economic decline and spur growth, the Government introduced fundamental reforms to liberalize domestic and international trade, free domestic factor markets, privatize public assets, and improve private incentives to save and invest. New donors have been assisting Mongolia since 1991. The worst of the country's economic contraction may be over. Real GDP contracted by only 1.3 percent in 1993, and on the basis of available data, is projected to have grown at the rate of over 2 percent in 1994. The annual rate of inflation peaked in January 1993 (420 percent) and has generally declined since then (in August, 1994 it was about 68 percent).

As discussed above, prior to 1990 the centrally-planned development led to very substantial resource and environmental degradation. Since that time the critical economic conditions have resulted in very limited funding for infrastructure, institution and program development in the area of natural resource management and environmental protection, very greatly reducing the capability of the new government to rectify the environment and resource problems it had inherited. And at the same time, faced with the overwhelming economic problems, government has not perceived environment as a high priority.

The most urgent environmental and natural resource issues faced by Mongolia today are urban environment, especially air quality, water supply and waste disposal; land degradation; water resources; and the underlying and critical need for institutional strengthening and capacity building. Other environmental issues include locally severe environmental degradation from mining and petroleum extraction, natural disasters, and natural heritage (including biodiversity).

The air quality issue in Mongolia is essentially an urban issue. Primary sources of urban air pollution are the soft coal-fired cooking and heating stoves of individual dwellings, the large, soft coal-fired thermal electric powerplants, industry and vehicles. Urban air quality problems are exacerbated by the annual occurrence of a stationary temperature inversion over the urban areas, lasting from late fall to early spring, and accompanied by low winds. Air pollutant levels during this temperature inversion period frequently reach levels exceeding health-based criteria in many urban areas.

A significant portion of the land resources in Mongolia are currently degraded as a result of overgrazing, deforestation (including loss of forests to fire and insect damage), erosion and desertification. Crop cultivation is an important cause of soil erosion. Mongolian climatic conditions make high levels of soil loss associated with tilling of the soil almost inevitable; this loss is aggravated by the inadequate use of soil protection techniques. Between 1960 and 1989 the area under cultivation increased greatly (estimates range from 300 to 900 percent), mostly in the form of vast wheat fields, many of which (estimated at over 60 percent) have since been abandoned and are subject to wind and water erosion.

Climate change, involving a gradual reduction in annual precipitation, appears to be a contributing factor to desertification and wind erosion, and a wide variety of increased economic activities ranging from overland vehicular traffic and improper waste disposal to mining, all are causative factors in or contribute to land resource degradation.

A rapid rise in water resource demand combined with increased levels of economic activity in key watersheds has resulted in the reduction of lake levels, river flow levels, and water table levels, and the negative influence on water flow regimes over a large part of the country. Domestic and industrial wastewater discharge has at the same time caused significant levels of contamination of surface waters (the incidence and severity of ground water contamination is unknown).

Mongolian territory includes the ranges of numerous species listed as threatened or endangered by the Mongolian Red Book, the most well-known of which are the snow leopard, Gobi bear, saiga, wild camel and Argali sheep. Concern regarding biological diversity is based on the facts that a large number of endangered, threatened, rare and endemic species, plant and animal, are present; the current level of knowledge about these species, their ecology and status is inadequate; only a small proportion of their known ranges is protected; and habitat damage, legal and illegal hunting appear as significant threats. Mongolia's biodiversity, both in terms of species and ecological systems, represent resources of both national and global value and concern. The biodiversity resources, along with the spectacular scenery and both present and past cultural heritage, provide a rich potential for tourism.

Existing environmental institutions and laws in Mongolia contain many of the components required to carry out effective environmental protection and natural resource management. The Constitution adopted in 1992 specifically included several key environmental provisions, including the following:

"The citizens of Mongolia shall be guaranteed to enjoy the ... right to healthy, safe environment, right to be free from environmental pollution and ecological imbalance" (section 2.16.2).

"It shall be a sacred duty for every citizen to work, protect their health, rear and educate their children and protect the nature and environment" (section 2.17).

"The government ... shall exercise the following powers: ... to undertake measures on the protection of the environment and rational use and restoration of natural resources" (section 3.38.4).

Mongolia, having undergone a transformation from a socialist to a democratic form of government, and from a centrally-planned to a free-market economic system, is at a turning point in its history politically, economically, in terms of international relations, and also with respect to the management of its environment and natural resources. The

decisions and initiatives taken (and to a large extent the degree and types of assistance provided to Mongolia by the international community) regarding environmental issues at this crucial point in its history will have a profound influence on the state of the environment and of natural resources in Mongolia throughout the country's new phase of development.

## **MONGOLIA'S ENVIRONMENTAL OBJECTIVES**

Mongolia's overall environmental objectives are encompassed within the Environmental Mission Statement which has been prepared for the Ministry of Nature and Environment. This statement has been derived from elements of national legislation, the Government's Program of Action, the Rio Declaration, the Explanatory Note of Mongolian Government to UNCED, the accepted articles of the Agenda 21, the UN ESCAP Regional Strategy on "Environmentally Sound, Sustainable Development", and Conventions on Biodiversity and Climatic Changes. The Mission Statement comprises the following ten elements grouped into five major categories:

### **I. Environmental Quality Protection**

1. Protect Environmental Quality;
2. Restore Degraded Environmental Quality;

### **II. Natural Resources Conservation**

3. Conserve and Avoid Wasteful Use of Non-Renewable Natural Resources;
4. Maintain and Improve Renewable Natural Resources;
5. Protect and Preserve Unique and Significant Natural Resources and Areas;
6. Restore and Improve Conditions of Degraded Natural Resources;

### **III. Sustainable Development**

7. Assure that Economic and Social Development is Sustainable Through Adequate Attention to Environmental Considerations, and Improve Environmental Quality and Natural Resource Uses through Sustainable Development;

### **IV. Institutional Coordination and Public Participation;**

8. Improve Management and Assure Coordination between Elements of Central and Local Government;
9. Assure Community and Public Participation and Cooperation;

### **V. Informed Environmental and Economic Reviews.**

10. Identify Real and Full Costs of Environmental and Resources Uses and Assure that Such Costs are Borne by Users and Beneficiaries ("Users Pay").

**THE PLAN:**  
**ACTIONS TO ADDRESS MONGOLIA'S ENVIRONMENTAL ISSUES**

The body of the Action Plan is presented in three Parts, which constitute the framework for integrating environmental considerations into Mongolia's economic development. Part I presents the principal environmental issues, Part II discusses the social and economic dimensions, and Part III discussed elements of the mechanisms of the nation's response. Following these Parts, Annex I provides a summary table of the highest priority actions.

It is clear that Mongolia faces a broad array of environmental challenges, virtually all of which are important and virtually all of which should be addressed quickly. However, the country faces such severe constraints on available funds, facilities and personnel that it is not realistic to present a plan which calls for priority attention to all challenges, and which cannot realistically be carried out. Consequently, priorities have been determined and the actions are presented essentially in order of those priorities.

In cooperation with donors Mongolia already has some important environmental programs underway or in process, such as the Action Plan to Combat Desertification, Capacity 21, and the Mongolia Biodiversity Project. Reference is made to such ongoing activities in the following list of actions. Where appropriate (as with the Desertification Plan) the ongoing program is incorporated and is considered to be a section of this NEAP.

Highest priority is given to urban pollution, water supply, land degradation, and institutional and capacity building. Urban pollution including air, water, and solid wastes, is particularly urgent because it has immediate effects on the health and welfare of over half of Mongolia's population. In a largely arid land, Water Supply is the key to health and development. Land degradation, primarily overgrazing and erosion from cultivated lands, is urgent because it affects the welfare and productivity of most of the nation's land base and the direct livelihood of a significant part of the population. Institutional and capacity building are particularly urgent because they determine the capability of the nation to implement its environmental programs and enforce its environmental legislation and policies. Closely linked with these issues is the need for the Application of Environmental Economics to develop economic incentive measures appropriate to the new free market system.

Next priorities include issues of hazardous waste from mining and petroleum extraction, which are serious but affect relatively limited areas, natural disasters, and forest resources. Development of public awareness and participation is needed to provide the essential public support to government efforts. Issues of natural heritage and associated tourism development are of somewhat less immediate priority but are very important in the longer term.

## **PART I. PRINCIPAL ENVIRONMENTAL ISSUES**

### **1. ISSUES INVOLVING POLLUTION**

#### **1.1 AIR POLLUTION**

##### **Background:**

Atmospheric conditions and air resources of Mongolia seriously affect the general development and environmental quality of settlements. Severe cold and aridity constrains development and maintenance of renewable resources. Aridity and high spring winds suspend and transport dusts and smoke across much of northern China to the Yellow Sea. These conditions combine with other activities to promote the expansion of the Gobi Desert, which in turn increases sources of dust and blowing sands.

Closer to settlements, the winter, spring and fall weather conditions commonly cause stable air stratification and inversions, especially where valleys confine the lower air strata, as at Ulaanbaatar and Erdenet and some western aimag centers.

Ulaanbaatar, at 1350 m. altitude, is located in the valley of four mountain ranges which rise to 1650 to 1949 m. altitude. Due to its location the city experiences many temperature inversions. At least 80 to 96 percent of these inversions occur during the months of October to April when air temperatures are from 7.5 to 11.7 degrees C. and land temperatures are from minus 21 to minus 39 degrees C. The average depth of the inversions is 650 to 920 meters. The dry environment of the country results in approximately 26 dust storms occurring at the city each year.

The winds at Ulaanbaatar usually travel from a west to northwest direction with speeds decreasing to 1 to 2 meters per second. Among the factors which influence air quality in the city are poor planning and the use of coal as a fuel source with few pollution control devices. The thermal power stations are located at the west end of the city, as is the main gher district which is at a higher elevation than the rest of the city. This results in the air emissions of the power plants and the coal and wood heated gher travelling over the city, where they are often trapped by the inversion conditions.

The total volume of air discharged per hour during the winter months from the three thermal power stations is 4.5 million cubic meters. The contaminants present in the discharged air include 4.14 tons of ash and 6,700 kg. of sulphur oxides.

48 percent of Ulaanbaatar's population live in gher, Mongolia's traditional housing unit. The wood and coal fuel stove used for cooking and heating the gher has no pollution

control devices. It is estimated that 190,000 tons of coal and 160,000 cubic meters of wood are used each year as the fuel source. From these sources, toxic substances such as carbon monoxide are emitted into the atmosphere and because of the stoves' short smoke stacks, they are present in the living area of the ghers where they affect the health of the occupants.

Another source of air pollution in Ulaanbaatar is the 143 coal-fired boiler heating stations. These stations use 235,900 tons of coal per year and contribute to air pollution by means of exhaust stack emissions, along with dust and particulates from the open storage of coal. High particulate levels are further heightened by high suspension and resuspension of dust from dirt roads and streets.

Ulaanbaatar's transportation planning only considers use and usually underestimates or fails to consider the consequences of transportation on the environment, along with the importance of environmental protection. In the last two years the number of private motor vehicles has doubled as Mongolians import old vehicles that operate inefficiently and lack the appropriate air emission control devices.

From the cars operating in Ulaanbaatar, 46,400 tons of toxic substances are discharged per year.

In Ulaanbaatar in 1994 the total pollutants emitted into the air was 302,000 tons greater than the total in 1990. The results of air monitoring completed by the MNE show that during the last years the concentration of dust and carbon monoxide were 20 to 40 percent greater than the permissible levels established by the MoH on the basis of the World Health Organization standards. In the past five years the daily average concentration of sulphur dioxide was 1.8 to 3.6 times greater than permissible air level concentrations; the daily average concentration of nitrogen dioxide was 1.2 times greater than permissible levels; and the daily average concentration of the carcinogen benzopyrene was found to be two times the permissible level.

Laboratory analysis of the snow at Ulaanbaatar indicates a high metal content with 386.47 micrograms per liter of lead; 220.04 micrograms per liter of copper; and 46.87 micrograms per liter of zinc.

The air monitoring data as well as the snow analysis data indicates that the area of Ulaanbaatar has a high level of air pollution. It is suspected that the air pollution of the city increases the rate of respiratory disease of the general population, particularly children of 14 years and under.

**Action Required; First Priority:**

Over half the population of Mongolia is at immediate risk from air pollution, so actions to monitor and reduce urban air pollution are of the highest priority. Actions

involving power and heating plants and household stoves are covered below in Part II.2 Energy. Actions involving vehicle emissions are under Part II.5, Transportation.

## **1.2 WATER POLLUTION AND WATER QUALITY**

### **Background:**

The available monitoring data pertaining to water resources in Mongolia are limited, covering a small number of parameters and locations, and only the most recent few years. Most data are for river water near settlements within the Selenge River basin, and for various lakes. No ground water monitoring data are available.

The available data do not, therefore, support a thorough analysis of water quality throughout the country. However, these data indicate that water quality degradation in the form of bacteriological contamination is locally quite severe and that chemical contamination is significant in some Mongolian surface waters.

Mongolia has a relatively large, sparsely-populated territory. However, industrialization, intensive agricultural practices and urbanization over the past three decades have led to the depletion of water resources and to the degradation of water quality in many water bodies.

The discharge of untreated or inadequately treated waste water into the environment is the basic type of pollution deteriorating water quality. At present the principal sources of water pollution in Mongolia are industrial discharges, domestic effluents, run-off water of urban areas and run-off from agricultural areas.

According to 1991 statistics, the total discharge of waste water was 185.5 million cubic meters, of which 46 percent comes from sewage, 45 percent from industrial waste water, and 8 percent from rural areas. The treatment rate of total waste water was 58 percent. By 1993 this figure had dropped to about 40 percent. While most cities have existing treatment plants, many are inadequate and do not have denitrification capability. It is estimated that over half the existing waste water treatment plants are not functioning properly. The domestic waste water in rural areas is mostly discharged into the environment without any treatment.

The Selenge river basin has a relatively high density of population (over 50 percent of the country's total population) and is relatively industrialized. As a result the water quality is decreasing and the pollution level is relatively higher than other river basins. The main pollutants are suspended substances, oxygen consuming organics, heavy metals, petroleum, phenols, nitrogen and phosphorous.

The Tuul river flowing through Ulaanbaatar shows increases of COD, BOD, nitrogen

and heavy metals which exceed water quality criteria yearlong.

Actions Required; First Priority:

Action: Urban water pollution is of direct significance to the health of over half the Mongolian population and consequently action to improve the situation is of the highest priority. Among the actions required are: Improving monitoring of water quality (both chemical and bacteriological); Providing sanitary toilet facilities and waste disposal for the gher communities; Improving the sewage and waste removal capabilities in the non-gher parts of the cities; Improve and expand the waste water treatment facilities. The provision of safe water supply is linked with the pollution issues, and among the other actions required are reduction of leakage and wastage of water in urban areas, linked with installation of water metering devices and effective and equitable assignment of costs. Estimated costs are US\$ 20 million.

Action: Tuul River pollution mitigation. There is a project sponsored by the Dutch Government on mitigation measures for the Tuul River (which flows through Ulaanbaatar). The project will develop a Tuul River Pollution Mitigation Strategy/Action Plan and will implement some pollution reduction measures quickly. Implementation is scheduled to start in April of 1995. Estimated costs are US\$ 200,000.

Other Actions Required, Medium Term:

Action: Pollution identification and mitigation in remote settlements: Provision of a mobile laboratory which can do chemical and bacteriological analyses of wells and surface water supplies for remote settlements; Identification and implementation of mitigation measures where pollution (including mineralization, etc.) exists. Implementation and monitoring would involve the MNE, MoH and LG. Estimated costs are US\$ 180,000.

### 1.3 SOLID WASTES

Background:

Solid wastes from the cities pose two problems, collection, and disposal. Lack of equipment or break-down of existing equipment has left the main cities with insufficient capabilities for solid waste collection and transport. It is estimated that in Ulaanbaatar less than 70 percent of solid waste generated is collected and disposed of in official dump sites. As a result there is some pile up of solid waste, and much is dumped in storm ditches and drains, creating problems there. There is also much less waste collection in the gher areas than in the central cities. Wastes which are collected are transported to designated waste dumping sites on the outskirts of the cities. In Ulaanbaatar there are three sites situated on hilly terrain roughly 10 km. from the city center.

Waste disposal usually involves dumping at sites without properly defined boundaries, where there are no arrangements for fee collection with consequent low revenues for companies involved, where there is inadequate containment, no adequate groundwater protection exists, nor usually, burial, and no control or management of dumping. Wastes are commonly burned, and where the sites are close to settlements the burning contributes to air pollution. The sites pose a serious risk to health and to the contamination of surface and ground water resources. The present procedures also represent an economic waste since analyses of the wastes indicate that 70 to 80 percent of the waste contents are potentially recyclable.

**Actions Required: High Priority:**

The immediate actions required include (i) maintenance, reconditioning and where necessary, strengthening of existing solid waste collection vehicle fleet; (ii) review and development of opportunities for enhanced recovery of recyclable wastes from the waste stream; and (iii) evaluation of disposal options including the question of economic incentives, and development of sanitary disposal sites to handle domestic and industrial solid wastes incorporating appropriate environmental controls. There is also need to develop master plans for waste collection and disposal for each metropolitan area. Estimated costs are US\$ 250,000.

## **1.4 TOXIC CHEMICALS AND HAZARDOUS WASTES**

**Background:**

It is estimated that Mongolia receives 7276 kinds of different chemical substances totalling 377,428 tons for use in the agricultural, industrial and domestic sectors. The amount of these chemicals imported each year is increasing. At the same time, the agencies in Mongolia that are responsible for toxic chemicals do not have adequate strict procedures for the storage, handling, transportation, distribution, and the use of these substances. This, combined with the improper use and disposal of the chemicals increases the risk of workers' health and safety being affected.

Recent analyses indicate that 52,593 tons of chemicals are discharged into the environment per year. This total includes 58 different chemicals emitted into the air, 790 into the water, and 602 in the soil.

Diagnostic medical institutes and scientific research institutes that use radioactive materials do not take the proper precautions regarding the storage, transportation and use of the materials. This has resulted in radioactive materials contaminating the environment and expensive clean-up costs. Mongolia requires a regulatory framework and training for

the proper handling, transportation, use and disposal of radioactive materials and toxic chemicals.

The Government of Mongolia is starting to do some work in this area and the Ministry of Nature and Environment has started to develop an inventory of toxic chemicals that are used within the country as well as a procedure for the registration of toxic chemicals that enter the country.

**Actions Required:**

**Action (short term):** Complete and maintain up to date the inventory of toxic chemicals used within the country; and develop and implement a registration procedure for import and handling of toxic chemicals. Implementation and monitoring would involve the MNE, MTI, MFA and MoH. Estimated costs are US\$ 150,000.

**Action (medium term):** Develop a regulatory framework, and establish related training programs, for handling, transportation, use and disposal of radioactive materials and toxic chemicals. Implementation and monitoring would involve MNE, MTI, MFA, and MEG&M. Estimated costs are US\$ 10,000.

**Action (medium term):** Develop a master plan for the disposal of hazardous wastes; establish standards; Identify location or locations for disposal; Implementation and monitoring would involve MNE, MoH, MTI, MFA, and LG. Estimated costs are US\$ 50,000.

## 1.5 CLIMATE CHANGE

**Background:**

Climate change studies in Mongolia represent only the beginning of work in this area, but they clearly demonstrate that Mongolians should be concerned about climate change resulting from anthropogenic greenhouse gas emissions. These studies suggest that during the last 50 years the average temperature of the Mongolian territory has increased about 0.7 degrees C. These temperature increases are stronger in winter and in the mountain areas of western and northern Mongolia than in the Gobi and steppe areas. The maximum temperature increases of nearly 3 degrees C were observed in winter, but summer temperature is projected to decrease, in contrast to the global and regional averages.

The yearly precipitation has decreased from the 1940s to about the mid 1980s, but has since exhibited an increasing tendency in most areas, except the Gobi desert area. The severity and frequency of agricultural drought in the Gobi desert area, and also floods due to rain in the central and northern parts of the country may increase with climate change.

### Actions Required:

Climate change is not an issue which is subject to priority action in Mongolia, other than monitoring of conditions and provision of warnings to the public, which are covered under Part I. 4. Natural Disasters.

Action: Inventory, assessment and mitigation of activities which create greenhouse gases in Mongolia, in collaboration with the U.S. Environmental Protection Agency; and development of a Mongolian Climate Change Action Plan with assistance from the GEF and other donors. Implementation and Monitoring involve MNE, NDB, MFA, and MEG&M. Estimated costs are US\$ 1.5 million.

## 2. NATURAL RESOURCE MANAGEMENT ISSUES

### 2.1 LAND RESOURCES

#### 2.1.1. Land Management:

##### Background:

Mongolia's land area is about 1.56 million square km. and the population density is 1.4 persons per square km. Based on these statistics alone it would seem that natural resources would be in abundant supply, that environmental degradation would be limited and land management not a high priority. However, the characteristics of Mongolian land and climate combined with the past land use have led to significant environmental degradation and have made improving land management a high priority for the nation.

In general, land cover in Mongolia can be broken down as follows: 76.5 percent used for agricultural land (of which approximately 0.8 percent is cultivated, 1.6 percent used for haymaking, and 97.6 is pastureland); 0.3 percent occupied by city and settlements; 10.4 percent for state special needs (which includes land allocated for the state security and defence purposes, special protected areas, roads, and communication network of national importance); 9.7 percent forest and shrubland; 1.1 percent area covered by water, and 1.7 percent unused or which is not suitable for usage.

The Land Use Law enacted by the parliament in 1994 (which is effective from April, 1995) will change legislative rights to land use. Today all Mongolian land is owned by the state. Under the new law entities such as political, state, non-governmental, and religious organizations and citizens may possess and use land. The Constitution declares that private

land shall be owned by citizens of Mongolia. Land is classified by the basic purpose and type, and the responsibility for land management lies with the central or local government.

#### Actions Required:

Action: Develop and implement land use plans for each somon and aimag. Implementation and monitoring involves MNE, MFA, MID and LG. Estimated costs are US\$ 600,000.

Action: Place land use planning experts in local government, and provide the necessary education and in-service training for them. Implementation and monitoring involves MNE, MSE, MFA and LG. Estimated costs are US\$ 2 million.

Action: Develop and implement legislation and regulations to establish land use fees, and establish a land restoration fund from the revenues. Develop the needed land restoration technologies. Implementation and monitoring involve MNE and the institutes of the MNE and MFA. Estimated costs are US\$ 300,000.

### 2.1.2 Land Degradation and Desertification

#### Background:

Soil erosion, desertification and other forms of land resource degradation are considered high priority issues in Mongolia, in view of the strong dependence of Mongolia's economy and food supply on agriculture and the reliance of other sectors, including mining, on land resources. The area degraded is growing annually.

Wildfires are an important problem in the dry season. Approximately 150,000 ha of forest, and additional, large areas of grassland are burned each year.

The development of strip mines and the deposition of overburden, spills and tailings all degrade land resources. Domestic and industrial construction and other forms of waste are currently deposited on the soil surface in overly-large, designated dumping sites on the outskirts of cities and towns.

The edge of the southern arid region of Mongolia is moving northward at a rate of 500 meters per year.

Causes of desertification can be divided into two groups: Natural, which include limited humid period, low precipitation rates, high wind velocities and duststorms; extended dry and hot weather spells. And anthropogenic factors such as overgrazing, road construction, depletion of natural vegetation and soil cover and industrial impacts. These

have reduced the productivity of rangelands, changed vegetation composition and depleted wildlife.

One index of the advancing desertification is provided by the frequency of days with dust storms. Increasing dust storms are considered to be due to human activities (such as overgrazing). There were 17 days of dust storms in 1960; 19 in 1965; 33 in 1970; 44 in 1975; and 56 in 1980. Another index is provided by the area covered by sand, which has increased by 38,000 ha between 1941 and 1990.

#### Action Required: First Priority:

Reversing land degradation is one of the nation's highest priority environmental actions. UNEP has funded the preparation of a draft project proposal for combatting desertification and land degradation in Mongolia, the National Plan of Action to Combat Desertification. This is a large, comprehensive document assessing the needs on a country-wide basis, and it is at present in process of being widely reviewed and refined and revised on the basis of comments received. The proposal entails the development of an action plan spelling out the measures to be taken in the short, medium and long term. UNDP will seek funding for the project when the comprehensive project has been sub-divided into well-defined components suitable for cost-sharing. In view of the high level of effort being expended on this large project, rather than duplicating key areas here, the National Plan of Action to Combat Desertification will serve as the Land Degradation and Desertification section of Mongolia's National Environmental Action Plan.

### 2.1.3 Rangeland and Overgrazing

#### Background:

Much of the country is rangeland, and estimates vary as to the amounts which are degraded, primarily through overgrazing. For the 1994 World Conference on Natural Disaster Reduction, the Government of Mongolia estimated that 76 percent of the nation's rangelands were subject to slight desertification, 20 percent to moderate desertification, and 4 percent to severe or very severe.

Grazing pressure is greatest near settlements and as a consequence these areas are the most degraded. By all accounts the traditional methods of livestock management maintained most of Mongolia's rangelands in relatively good condition. In the last few years, however, there has been a substantial increase in the number of herders. The number doubled between 1990 and 1994. This has had the effect of bringing many herders who are not familiar with or guided by the traditional grazing systems. Combined with the move toward markets which normally are in settlements, the result has been a very significant

change in herding practices and a concentration of grazing pressure around settlements.

Another key factor promoting overgrazing has been the change from the former socialist system to free market, and from the central command type government to a democratic one. One effect has been a breakdown in the former system of governmental grazing management at the local level.

Hydrologically, degrading grasslands lead to increased nutrient and sediment runoff from the bared soils. Without grass and organic materials the snow and moisture retention character of the soil degrades and seed germination and plant growth more difficult each succeeding year. The combination of loss of vegetation and soil reduces the productivity of the rangelands, which, in the face of increased numbers of herders and concentrated livestock, leads to ever more severe overgrazing.

#### Action Required: First Priority:

Action to control and reverse the overgrazing near settled areas is a high priority both because of the nature of the present problem, and because of the potential for the problem to become much larger and more serious if action is not taken soon. Overgrazing is a major focus of the National Plan of Action to Combat Desertification, so the relevant parts of that plan, including consideration of existing donors' programs such as that of DANIDA, will serve as the Rangelands and Overgrazing component of this NEAP.

#### 2.1.4 Cultivated Lands

##### Background:

Until about 1960 the area under cultivation in Mongolia remained a very small proportion of the country's land area. However, since that time an aggressive agricultural program, including a "virgin lands" program to spread primarily wheat farming to vast areas of steppeland was undertaken. The area under crops tripled in 30 years, and the total lands which have been cultivated at present is around 1.3 million ha. Dryland farming is the prevailing practice. A considerable area is taken up by livestock feeds and fodder crops.

The "virgin lands" program had many of the same characteristics of the "dust bowl" catastrophe in the United States. Vast areas of grasslands were plowed and their soil-holding cover of grass destroyed. After a few years of productivity, wind erosion took over, the productivity dropped, and many of the lands were abandoned. In Mongolia the problem is exacerbated because spring tilling coincides with the season of intense wind, and most cultivated areas are devoid of trees or other wind brakes. In 1994 the Mongolian National Plan of Action to Combat Desertification estimated that over 93 percent of the sown area is prone to wind erosion. Estimates vary, but between half and two thirds of the lands opened in the "virgin lands" program have been abandoned and are continuing to erode.

In addition, poor irrigation practices have reduced fertility of soils and increased salts in the upper soil horizons. At the same time, irrigation from groundwater lowers groundwater tables which reduces recharge of rivers and lakes. Direct irrigation from rivers and streams further reduces river flows and recharge of surrounding local groundwater tables. These trends reduce both the quality and yields of water resources for irrigation and adversely affect soils.

**Action Required; First Priority:**

**Action:** Develop and implement restoration programs (of planting grass, shelterbelts, other plants along with soil erosion and drainage controls) for certain particularly critical abandoned cultivated areas. The objective is to retard the degradation on the large areas of abandoned cultivation which are subject to the greatest erosion and are degrading most rapidly, and in the process, damaging the productivity of adjacent lands or subjecting adjacent settlements to excessive blowing dust or sand. Implementation and monitoring: MFA, MNE. Estimated costs: US\$ 150,000.

**Action:** Improve the cultivation on currently cultivated areas which are subject to particularly serious erosion. Crop alternation, fallow strips, contour plowing and shelter belts are possibilities. The focus is to maintain or improve productivity on key areas where it appears there is significant danger of losing needed productivity and abandonment of the lands. Implementation and monitoring: MFA, MNE. Estimated costs: US\$ 300,000.

**Other Actions Required:**

**Action:** Develop a realistic master plan for agricultural development on the arable lands of Mongolia, based on land capability under the existing climatic conditions and trends (e.g., the drying trend), water availability, and recognition of the very severe limitations which Mongolia's environment places on cultivation. One objective is to avoid attempts at cultivation which will fail and cause further environmental degradation (e.g., further "virgin lands" type projects which destroy the grass cover and fragile soil structure, creating dust bowl conditions). Another objective is to avoid seeking to place irrigated agriculture in areas where such irrigation will lead to overpumping and lowering the water table. Estimated costs are US\$ 200,000.

**Action:** Improve the water use in irrigated agricultural lands to conserve water resources and reduce land degradation from salinization, waterlogging, etc.; Introduce improved irrigation methods; monitor water use; Give special attention to problems of salinization, alkalization and waterlogging; Provide training for staff and extension assistance for farmers. Estimated costs are US\$ 1.5 million.

Implementation and monitoring of all actions involving cultivated lands would be the responsibility of MFA, LG, and MNE.

## 2.2 FOREST RESOURCES

### 2.2.1 Forest Management

#### Background:

Forests, primarily larch, pine and birch, cover 8.1 percent of the territory of Mongolia. These important resources are found primarily in the wetter, largely mountainous areas of the north and west. The forests are recognized as being very important for protection of soil, rangelands, water resources, wildlife, and for climate amelioration, as well as for forest products. However, they are being reduced at an accelerated rate.

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

In the northern forests commercial logging is practiced. Unfortunately, clear cutting of all trees is the standard practice. In areas of such a harsh climate, clearcutting may lead to greatly reduced regrowth and productivity. In many areas there is no regrowth as such and replanting is the only way to try to regain the wood resources. A regime of inventory and assessment was established but progress has been relatively slow, and only a small part of the forest has been covered each year. There are foresters at the key aimag centers, but reportedly much cutting is done without any formal management.

#### Actions Required (medium to long term):

Action: Develop and implement a master plan for forest management in Mongolia. Among the actions which this will require are: Developing a forest information and monitoring system; Development or revision of forest law, regulations and standards; Adopting modernized techniques and equipment for forest inventory; training forest managers; and insuring local participation and support. Implementation and monitoring would involve MNE and LG, and the cost estimates for revision of laws, etc., are \$1,600.; for modernization, \$47,000.; and for training, \$7,000.

Action: Make logging sustainable and environmentally sound. This includes establishment and enforcement of cutting rotation and cutting areas; stopping clear cutting in mountains; stopping cutting in key watershed areas; use of animals for wood skidding; make full use of trees cut (find uses for what is now wood waste and off cuts). Implementation and monitoring would involve MNE and LG. Estimated costs are US\$ 15,000.

Action: Reduce the demand for timbers by shifting from wood ties to other

materials (e.g., concrete) for railroad use. Estimated costs are US\$ 150,000.

**Action:** Seek to reduce export of logs and sawn wood (recognizing the value to the country of export income, but also recognizing the limited stocks of forests in Mongolia. Implementation and monitoring would involve MTI and MNE.

**Action:** Seek new sources of fuel for rural areas where use of wood fuel is denuding the forests. One possibility is to develop ways to use pulp, bark, and livestock dung. MNE and LG would have primary responsibility.

**Action:** Develop better forest fire detection and fighting capabilities, including the use of horse-mounted fire fighting groups, and the preparation of forest fire lines in vulnerable areas. Implementation and monitoring would be by MNE and LG. Estimated costs are US\$ 250,000.

**Action:** Conduct a study to determine the real extent, status and trends, and costs of insect infestation in Mongolian forests; and to seek to identify mitigation measures if on careful assessment insects are found to be a true problem. Implementation and monitoring would involve MNE and universities. Estimated costs are US\$ 150,000.

**Action:** Develop tree planting programs to establish tree lines along transportation routes where the climate is suitable, and to plant trees in and around cities and other settlements. Implementation and monitoring would involve MNE and LG. Estimated costs are US\$ 250,000.

### **2.2.2 Deforestation**

#### **Background:**

It is estimated that 1.5 to 2 million cubic meters of timber was cut from Mongolian forests during the past 20 years. Officially, 10,000 to 14,000 ha of forests are harvested annually, versus 5,000 ha which are reforested. However, it is estimated that in the past 20 years only 9 to 15 percent of logged over areas have been replanted. And even where there is replanting, the success ratio may be very low (see below). In addition to logging, as noted above, cutting trees for fuel wood is widespread.

Estimates vary, but insect infestations and forest fires also are reputed to destroy substantial areas of forest each year. 3 million hectares have been damaged by fires in the last 20 years, and every year 20,000 to 30,000 hectares of forestland are damaged by disease and insects. It is probable that logging practices contribute to these losses. For example, forest litter and fuel provided by the unused parts of the cut trees provide fuel for an

increased intensity of fires.

There is substantial wastage of the trees which are cut for commercial purposes, and considerable wood is left on the clear-cut forest floor. Some wood is used internally and much is exported to China or Russia. In 1993 10,000 cubic meters of logs and 68,000 cubic meters of sawn wood were exported.

**Actions Required:**

The actions listed in the previous section, 2.2.1 Forest Management, apply equally to the deforestation issue.

**2.2.3 Reforestation**

**Background:**

Reforestation programs were started in the 1970s with forest nurseries established at the aimag centers. Today there are more than 40 such nurseries and 20 million seedlings and 7 to 8,000 young plants are reported planted annually. In 1994 this amounted to 4,900 ha. of forest replanted, at a cost of \$200,000.

However, the survival rate of seedlings is very low. With good care survival is considered to be less than 25 percent, and under open field conditions it is doubtless very much lower. The reasons include poor genetic quality of the seedlings and particularly, lack of good care following planting. One of the principal problems is with livestock grazing. Where livestock are allowed to graze in replanted areas, virtually all seedlings are eaten.

**Action Required (medium to long term):**

**Action:** Enlarge and improve existing forest nurseries and establish additional ones where needed; improve the genetic make-up of nursery stock. Implementation is primarily MNE and LG.

**Action:** Implement the regulations which require reforestation after logging, and protect newly reforested areas from livestock grazing. Implementation and monitoring involve MNE, MTI and LG.

## 2.3 WATER RESOURCES

**Background:**

Water resources in Mongolia are spread irregularly both in space and time. In the central region there is substantial water, partly in the form of large, fast flowing streams. However, in the desert south, western and eastern provinces the water resources are much scarcer and are generally of poorer quality with increasing salts and diminishing water levels in groundwater tables, streams and lakes. Surface water in much of the country is uncertain and much of it only in intermittent streams following the scarce rainfall. Consequently, much of the water used throughout the country is from subsurface supplies.

In the Gobi and nearby southern areas the ground water is hard and has high mineralization. These conditions have serious effects on the health of the human population there. More than 80 sums (villages) in 16 aimags have severe problems with water quality, with the water containing calcium, magnesium, chlorine, and sulphates which exceed safe limits for drinking.

There is an urgent need to improve water management, coordination, research and monitoring activities throughout the country. For example, chemical analyses have been conducted for water in only about 14 percent of the country's 20,000 bored wells. Chemical analyses have not been conducted for the water in about 20,000 dug wells. It is believed that water has been contaminated in 70 to 80 percent of these dug wells. In addition, inadequate bacteriological analyses have been conducted for the water in engineering wells in the settlement areas. Water resources management, monitoring and controls have not been effective in maintaining water quality and supplies, and generally have only documented the losses of the resources reserves and quality.

Human uses of water resources have been of relatively low intensity until the last 50 years. The concentration of population in urban areas, development of more intensive agriculture, industry and power generation have all vastly increased the demands on the country's water resources. As these uses have increased the water quality has declined due to soil erosion, siltation, untreated runoff and discharges, deforested watersheds, and poor agricultural practices.

Many water supply projects include much leakage and wastage from the distribution system while inefficient supply systems generate higher flows which overwhelm sewage treatment systems. It is estimated that in Ulaanbaatar, the wastage of water in the high rise apartments amounts to 60 percent of the total used. In addition to loss of the water resource, this wastage also overloads the sewage system and more than doubles the electricity needs for operating the water supply pumps.

Agricultural, rural residential and industrial uses of groundwaters in the Gobi, western and eastern Mongolia are withdrawing groundwater and lowering levels and increasing salinization. Lowering groundwater tables reduce subsurface watering and losses of vegetation along with the drying up of shallow lakes and streams.

### Actions Required: High Priority:

**Action:** Complete drafting of new water law for submission to Parliament; develop regulations for implementation of the law; put the law into effect; Establish training programs for the personnel required to implement law. Implementation and monitoring would involve MNE, MoJ, LG, and MFA. Estimated costs are US\$ 25,000.

**Action:** Actions to improve the supply and to reduce the wastage of water in urban areas include: replacement of electric pumps and other capital works (as recommended by the Japanese JICA Phase I Study); a public awareness program on conserving water; an Emergency Leak Repair Programme (recommended by the World Bank); the introduction of meters for at least each partment block in Ulaanbaatar; and a graduated steeply rising tariff for excessive per capita consumption of water. Estimated costs are US\$ 2 million.

### Other Actions Required (medium to long term):

**Action:** Undertake research to identify the location and estimated amounts of groundwater, giving priority to areas where local communities do not have adequate water; Establish a monitoring network based on wells, etc., of the amounts and quality of groundwater; Develop regulations and standards for sustainable use of groundwaters. Implementation and monitoring would involve MNE, MEG&M, MoH, and LG. Estimated costs are US\$ 800,000.

**Action:** Establish regular monitoring of the quantity (using weirs, etc.) and quality of surface waters; Develop regulations and standards for sustainable use of surface waters; Examine the feasibility, including environmental impacts, of controlling water flow (i.e., to obtain more use within Mongolia of waters which now flow out of the country); Research the possibilities for recharging ground waters, especially in the steppe and Gobi areas (e.g., by impoundments of flood waters). Implementation and monitoring would include MNE, MEG&M, MFA, and LG. Estimated costs are US\$ 200,000.

**Action:** Obtain or develop equipment to demineralize and soften water for rural water supplies, especially in the Gobi and steppe areas where water quality is an important threat to health. Estimated costs are US\$ 150,000.

## 2.4 MINERAL RESOURCES

### Background:

Over 80 kinds of over 6,000 mineral resources have been described in Mongolia. At present over 600 mining sites have been discovered and over 200 are in use. The Geological Survey has mapped mineral resources at 1:200,000 scale over 79.5 percent of the territory

of Mongolia. As mineral exploitation has intensified, especially with uranium, phosphate, copper, molybdenum, coal, gold and building materials, there have been severe, although somewhat localized, impacts on the environment.

In 1994 the State Great Khural passed a law on mineral resources which requires that mining operations have a scientific basis and they give due attention to environmental protection. Training for mine workers and inspectors is also required. A mineral royalty law is to be submitted in 1995.

**Action Required:** The actions required for environmentally sound management of mineral resources are covered under the section on Mining in Part II.4 below.

### **3. CONSERVATION**

#### **3.1 CONSERVATION OF BIOLOGICAL DIVERSITY**

##### **Background:**

In terms of both species and ecosystems, Mongolia's biodiversity is of significance globally as well as nationally. Mongolia recognizes a series of international obligations to conserve its biodiversity which include the Biodiversity Convention and the designation of the whole country as a UNESCO Man and Biosphere Reserve. Nationally the biodiversity in the form of rangelands and forests provides the basis for its agriculture and much of the welfare of its peoples. Wildlife provide food and a variety of other animal products. Mongolia's wildlife and wild scenery can provide the foundation for an ecotourism industry which, if properly developed, can be of very great economic value to the nation. But biodiversity is a fragile resource, and much of it and its value to Mongolia will be lost unless effective conservation measures are put in place.

The range of geographical zones, including highland, taiga, steppe and desert, have predetermined the diversity of Mongolia's flora and fauna. Ten percent of all Mongolia's rare plant species are indigenous to Mongolia while ten percent of all vascular plant species are endemic to Mongolia.

The Mongolian Red Book lists both endangered and threatened flora and fauna. Endangered wildlife includes the red dog, the wild horse (Takhi or the Przewalski horse), the Mongolian saiga, the saiga and the wild camel. Some of the threatened species listed include the snow leopard, the reindeer, the Mongolian gazelle whose population has been reduced an estimated 25 percent since 1950, and the Altai wild mountain sheep. Of the total number of animal species listed in the Red Book; 7 mammals, 6 birds, 2 amphibians, 4 reptiles, and 2 fishes are listed as endangered and 16 mammals, and 13 birds are considered threatened. A number of plant species are also listed as endangered or threatened.

Mongolia also has an abundant fisheries and aquatic life, Mongolian rivers and lakes are diverse and provide suitable habitat for rare and endangered species along with species highly suitable for sport and commercial fisheries.

Wildlife resources are widely exploited in Mongolia. Current wildlife and game management practices are considered inadequate, particularly in view of the importance of wildlife resources to the Mongolian economy (particularly for ecotourism) and way of life. A decrease in the distribution and numbers of many commercial and game species has been observed.

The declining wildlife population in Mongolia is due to increased pressures on wildlife populations from illegal hunting and wildlife trade, uncontrolled or permissive tourist hunting, the indiscriminate eradication of predators (which was even supported by government); depleting water resources, desertification; the destruction of habitat areas due to deforestation, overgrazing, urbanization, industrialization; rodent pesticide application.

The Mongolia Biodiversity Project, supported by the UNDP and GEF, is a wide ranging effort aimed at strengthening and developing sufficient institutional and human capacity to enable Mongolia to sustainably manage and conserve its biodiversity resources. The project is now in its implementation phase.

**Action Required (short term):**

**Action:** Continue implementation of the Mongolia Biodiversity Project and broaden the base of support within Government and the public. Particular areas for emphasis in implementation include: Integrating biodiversity conservation in landuse and socio-economics; Establishment of Conservation areas and wildlife management programs; reintroduction of the wild horse (Takhi); Training of professional staff and public education and awareness programs; Development of ecotourism as an alternative income generating opportunity for people affected by conservation measures; Strategic national planning, including preparation of a National Biodiversity Action Plan; and preparation of biodiversity conservation legislation.

Implementation and monitoring involves MNE, LG, universities, and MAS. The estimated cost is US\$ 1,500,000 for Phase 1, through 1995, which is already covered under the Project. Estimated costs for the remainder of the project are US\$ 11 million.

### **3.2 MANAGEMENT OF PROTECTED AREAS**

**Background:**

Mongolia stands at the ecological cross-roads between Siberia, China, and Central Asia and between the interior Asian desert extending into Central Asia and forests of the north. As an ecological and zoogeographic transition, a rich variety of wildlife and plants are found in Mongolia. However, many important plant communities, wildlife, aquatic habitats, and even some complete, small ecosystems are on the verge of extinction or substantial losses due to human activities (grazing, poor irrigation, cultivation and displacements, timber and firewood cutting, mining, urban expansion, and direct hunting). Proposed agricultural, mining, roads, rural electrification, and hydroelectric development projects will further expand existing disturbed areas and threaten large areas in virtually all regions of Mongolia where current development disturbances have had relatively little impact.

Existing degraded lands have been largely abandoned while lands under cultivation, mining, logging, and other disturbing land uses are not being restored. Such conditions and disturbances begin the process of expanding degradation as watersheds and lakes degrade due to wind and water erosion and siltation. Fires and other factors affect surrounding less disturbed habitats and ecosystems.

Mongolia has many rather unique ecosystems which are fragile and subject to losses from direct and indirect disturbances of development. Desert and alpine lakes and springs and their dependent wildlife and waterfowl have been damaged by water diversions and extractions, by cutting of woody vegetation for fuel, and by overgrazing of vegetation and erosion/siltation. These direct effects destroy limited habitats and food sources for birds, small mammals, larger wild grazers, and other animals which form the base of the food chain for wolves, eagles, and leopard. Without these prey, the predators turn to sheep and other livestock which brings reactive local hunting of the predator. The cycle of destruction then follows.

Mongolia has recognized the importance of many wildlife species and has sought to protect them through protected areas scattered across the country. Some parks and reserves and inaccessible lands maintain a relatively healthy habitat and ecosystem. Some of the oldest established nature reserves of any country in the world are found in Mongolia. Twenty eight established nature reserves occupy approximately 6.8 percent of Mongolia's land. Although these areas are managed, the degree of management is greatly affected by limited resources. Some unique ecological areas exist outside of the existing protected areas. The MNE has set a target of 30 percent of the country to be under some form of protection (ranging from national parks to areas where traditional land uses are continued) in order to sustain Mongolia's existing range of wild species and ecosystems. With the opening up of Mongolia to international travellers, national parks and other protected areas can provide the basis for ecotourism, and as such they can prove to be of very great economic value to the country. Realizing this potential will require very careful planning and management to assure that the tourism itself does not damage or destroy the ecological values which draw the tourists and which are such an important part of the nation's natural heritage.

Establishment of protected areas and the supporting staff, institutional and other considerations are covered under the Mongolia Biodiversity Project described above.

Action Required (short term):

Action: Continue implementation of the portions of the Mongolia Biodiversity Project which focus on protected areas, including a national inventory of ecosystems and species which is to form the information base for developing a national system of protected areas which includes representatives of the full range of Mongolian ecosystems and for establishing priorities for protection. Also continue implementation with German technical assistance, a program for providing development assistance for the populations in the zones around protected areas.

Implementation and monitoring is by MNE, LG, MFA, MTI, MoJ, and MoF. The estimated costs for 1995 activities are included within the Mongolia Biodiversity Project presently funded by the UNDP and GEF. The estimated costs for 15 years are US\$ 19 million.

#### 4. NATURAL DISASTERS

Background:

Natural disasters occur often in Mongolia and cause great damage to natural resources, property, livestock, wild animals and human life. This situation is a main negative factor for the country's economic sustainability due to the lack of economic capability for restoration of the damages which are caused. Natural disasters and phenomena which cause huge damages include: blizzard, "Zud" -- harsh winter with heavy snowfall, forest and steppe fires, flood, earthquake, dust storm, and moving sand/desertification. Due to these disasters significant damages have been caused to the national economy, and the natural and urban environment have been seriously degraded.

Activities to reduce and combat natural disasters are classified into:

- Assessment;
- Operational warning and information system;
- Activities for disaster reduction.

Assessments are of two types: hazard assessment and economic vulnerability assessment.

There is a lack of study, analysis and assessment of natural disasters in Mongolia. However, certain preliminary study results can be considered. The occurrence of blizzards

with severe and moderate intensity accounts for 39-51 percent of all cases. In addition this, three types of flood, i.e., rain floods, snow-melt floods and debris flow/mud stream occur in Mongolia.

All told 1100 forest fires occurred in the past 15 years and approximately 3 million ha. of forest were destroyed. Some 56 percent of the entire territory of Mongolia are considered as vulnerable to the forest/steppe grassland fires. During the last five years certain types of disasters have occurred 110-180 times. The estimated annual damage due to the forest and steppe fires are on the order of 10 billion tugrug.

According to the preliminary study some 20 percent of the population and 25 percent of the livestock are located within the zone of regular blizzards and the blizzards occur 5-20 times every year. As a result, blizzards destroy property worth some 200 million tugrug. In addition, some 20 people freeze to death each year. Over 40 percent of the population and 80 percent of the livestock are located within the area of severe winter with heavy snow. During the heavy snowfall which occurred in 1993 in Bayankhongor, Gobi-Altai and Zavkhan aimags over 800 thousand head of livestock were lost and there was 1.4 million tugrug worth of damage.

Floods cause great damage to the economy. A rain flood of the Tuul River in Ulaanbaatar in 1966 killed over 100 people and caused damages estimated at about US\$ 7.5 million. A debris flow in 1982 in Ulaanbaatar in 1982 killed over 20 people and caused US\$ 0.5 million in damages. Agricultural losses in Mongolia total 6-7 billion tugrugs annually due to the Gan/droughts and desertification.

The mountainous central and western Mongolia are the sites of many earthquakes and periodically some damages occur, particularly in the smaller villages. Numerous 5 plus (and one 7 plus in 1993) seismic tremors in the central and western areas would suggest that other more damaging earthquakes may occur within the more developed north-central areas of Mongolia.

Information System for Natural Disaster Warning: A national network for observation and information of hydrometeorological phenomena was established in 1936. Technology and equipment of the Hydrometeorological Network are outdated and 70 percent of the existing observation stations are in need of equipment and instruments. There are 10 stations for seismological/earthquake observation which cannot implement full programs and the technology of information processing and transmission is still backward.

There is no special observation tower and equipment for watching forest fires. Natural disaster information is transmitted through the hydrometeorological communication system and there are many cases of missing data and lag in real-time transmission due to the high channel rent for the state communication network and inadequate energy sources in local settlements.

Special criteria for forecasting and warning was developed based on the intensity of natural disaster and is used in accordance with the approval/resolution N68 of the Government in 1993. Hydrometeorological disaster forecasts and warning notices are disseminated to the public through radio, TV, and the special warning service system of Civil Defence. However, if people are not able to receive the information in real-time they cannot take timely preventative measures.

Disaster Reduction Activities: Although some measures for reducing and combatting disaster hazards are undertaken, they are irregular and there is inadequate preparedness for prevention. There is low public awareness and inadequate knowledge and understanding of the hazard reduction potential because there is no propaganda and training activities for this subject. There is insufficient budgetary support and there are no special funds. There is no international cooperative activity, concrete project or programme being implemented on disaster reduction in Mongolia.

#### Action Required:

Action: Develop and implement a master plan for disaster preparedness and disaster hazard reduction. Among the components of the plan would be hazard assessment; provision of early warning; public awareness and information; training of staff; updating, equipping and improving the national network for observation and information on hydrometeorological phenomena and exploring the possibilities of expanding it to cover other hazards. Implementation and monitoring would involve SACD, MoF, MFA, MFE, MoH, LG, and MNE. For disaster reduction activities the cost estimate is US\$ 4.5 million. For estimated costs of other components see below, Part III.4 Environmental Monitoring System.

## PART II. SOCIAL AND ECONOMIC DIMENSIONS

### 1. AGRICULTURE

#### Background:

Mongolia is basically an agricultural country, although more than half the population lives in settlements of at least 500. The population increase (double by 2015) will most likely concentrate in the settlements and major urban and employment centers. Therefore, in general, agricultural resources and activities must provide for ever increasing populations from virtually the same basic resources and must increase productivity through intensification of grazing and cultivation.

The existing basic agricultural resource is grazing lands which supports more than

28,000,000 animals used for food, fiber, and transport, although irrigated and dryland farming have expanded up until the last few years. Unlike many southern asian countries, Mongolia's cold, long winter, low rainfall, and short growing season reduces productivity and resiliency of the grazing and cultivated lands to respond and recover from severe winters, droughts, wild fires, and poor cultivation practices. In addition, the weather pattern is not favorable for most cultivation, since the early spring when crops are planted is the dry season, with very strong winds to aggravate the desiccation.

As in other sectors and activities, distribution of agricultural resources and uses are not evenly distributed and are seriously and adversely affected by concentrations along transportation routes, around market centers, water sources, and supporting winter grazing grounds. These factors lead to severe overgrazing and desertification in marginal areas and rapidly declining productivity of grazing lands. Similarly, cultivation practices in both dry and irrigated areas tend to destroy the natural fertility and productivity of the soils and reduce productivity. Increasing losses of productivity in all agricultural sectors are further exaggerated by lack of equipment and parts, fuels, electricity, skilled technicians, and immediate needs for sustenance and sales of equipment and materials for scrap values.

Poor irrigation practices reduce fertility of soils and increases salts in the upper horizons. At the same time, irrigation from groundwater lowers groundwater tables which reduces recharge of rivers and lakes. Direct irrigation from rivers and streams further reduces river flows and recharge of surrounding local groundwater tables. These trends reduce both the quality and yields of water resources for irrigation and adversely affects soils. Salts-related soil losses are further increased by poor irrigation efficiencies for supply and application rates, while little concern is expressed for leaching water for salts removal through drainage. Where drainage is employed, drainage water returns to channels, rivers, and lakes.

Actions Required: The actions required for environmentally sustainable agriculture are covered in the section on Land Resources, Part I.2.1 above (2.1.1, Land Management; 2.1.2, Land Degradation and Desertification; 2.1.3, Rangeland and Overgrazing, and 2.1.4, Cultivated Lands).

## 2. ENERGY

### Background:

Mongolian energy resources are very large and can sustain Mongolian needs for many centuries; unfortunately they are predominately coal with very limited potential for commercial or exploitable petroleum and hydroelectric energies. Solar and wind energies are abundant but not commercially or practically suitable except for remote locations. Development of energy resources is inhibited by existing old inefficient, poorly maintained/repared, and poorly operated supply facilities which are combined with

inefficient, impractical demand/consumption facilities and activities.

The energy sector is a very high priority development sector in Mongolia. The energy sector consists of fuel and power generation subsectors. The principal primary fuel is domestic coal and imported oil. Coal and oil are also the primary source of energy for heating and for generation of electricity. However for domestic heating and cooking uses, coal, wood and animal dung are the primary energy sources.

Mongolia is rich in coal reserves which are estimated at about 50 billion tons. The total installed capacity of the power stations is 984 MW. The central power systems cover 36 percent of the territory of Mongolia and serves about 50 percent of the population.

The main problems in the energy sector are the rapid increase of demands, the difficulty of covering peak consumption, and needs for innovation with existing facilities.

Significant environmental impacts associated with the energy sector are coal mining-related pollution, air pollution and waste disposal in urban areas. The principle environmental issues in the energy sector are as follows:

- a) Poor energy-environmental management skills;
- b) Inefficient combustion or obsolete existing techniques and technology, and the potential use of alternate energy sources;
- c) To promote an environmentally beneficial mix of power sources and conservation of energy;
- d) Monitoring and control of emissions; and
- e) Waste management.

Direct electricity conservation by largest users and the general population is an very high priority and should be supported by positive assistance programs in addition to pricing structures.

Actions Required, High Priority:

Integrated National Energy-Environment Planning

The Ministry of Energy, Geology and Mining has already begun a course of planning for future energy development in Mongolia. In many ways, the Ministry's approach already attempts to incorporate environmental quality features while providing for future energy capacity and security. But advanced methods for planning and analyses are still not fully introduced, and there is poor coordination with the Ministry of Nature and Environment.

**Action:** Develop and implement Environmental Master Plan for Energy sector nationally and by regions, and revise the Energy and Coal Master Plan and other action plans which deal with it; develop staff capability to undertake energy-environment management (training decision makers at the central planning agency, MEG&M and MNE); extend the national energy planning function to include environmental consideration and introduce advanced analytical tools for planning activity.

**Implementation and Monitoring:** MEG&M, MNE; **Estimated Cost:** US\$ 150,000.

**Action:** Training staff on EIA; develop sectoral EIA Guidelines; enforcement of EIA requirements for Energy projects.

**Implementation and Monitoring:** MEG&M, MNE; **Estimated cost:** \$20,000

**Update Existing Generating Facilities and  
Improve Environmental Protection and Reduction of Emissions**

Update existing power generation facilities by advanced technology and install complex treatment and emission control equipment, at the same time train staff on environmental management skills.

**Action:** Conduct EIA study of improvement projects; require installation and maintenance of complex treatment facilities and emission control equipment; training staff on environmental management skills. Implementation and monitoring involve MEG&M and MNE. Estimated costs are US\$ 500,000.

**Other Actions Required:**

**Action:** Inventory boilers and limit number of boilers and increase the number of users connected to the central system; conduct study to install advanced design stoves, treatment and emission control equipment. Create an organization (or company) with adequate capabilities to provide effective maintenance for the boiler systems.

**Implementation and Monitoring:** MEG&M, MTI, MID, LG. **Estimated costs** are US\$ 1 million.

**Action:** Develop and implement coal preparation methods (washing and forming briquettes)

**Implementation and Monitoring:** MEG&M; **Estimated cost:** \$400,000

**Improve Environmental Protection  
and Reduction of Emissions from Household Sources**

**Action:** Design and produce efficient stoves; conduct a study to assess dissemination of fuel for household (gas and liquid).

**Implementation and Monitoring:** MEG&M, MTI, LG; **Estimated cost:** \$300,000

**Action:** Conduct a study to identify the possibility to partially centralize heating households in urban areas: devise a practical program to assist improvements of efficiency and complete combustion in boilers and household stoves.

**Implementation and Monitoring:** MEG&M, LG, MTI; **Estimated cost:** \$200,000

**Action:** Energy conservation in Industrial plants and in households: Conduct an energy survey and implement demand side management; conduct a study to support improvement of equipment and efficiency of its use, and the potential for domestic production of more energy-efficient equipment; revise and upgrade construction standards; utilize differential measure of electricity and heating for users (introducing meters, etc.) and implement load management; develop packages/program of financing and economic incentives.

**Implementation and Monitoring:** MEG&M, MoF, MTI; **Estimated cost:** \$700,000

**Action:** Improve public awareness on conservation of energy.

**Implementation and Monitoring:** MEG&M, MRT; **Estimated cost:** \$50,000

**Other Actions required:**

**Conservation/Demand Side Management**

There is a large potential to conserve energy in Mongolia. Inefficient consumption of energy in industry and households, and relatively high loss of energy in distribution systems and in power stations.

**Actions:** Improve efficiency of fossil fuel use: Develop and complete coal cadastre (maps); implement coal quality control at the mines; introduce coal improvement methods.

**Implementation and Monitoring:** MEG&M; **Estimated cost:** \$200,000

**Action:** Energy conservation at the Power Plants: Revise the standards for use of energy in power stations; revise construction standards for transmission lines and reduce loss of energy; install regulators.

**Implementation and Monitoring:** MEG&M; **Estimated cost:** \$100,000

### **Implementation of Waste Management**

The energy sector in Mongolia faces lack of waste management and many hectares of land have been degraded by ash disposal and oil or wastewater.

#### **Action Required, First Priority:**

**Actions:** Develop solid and hazardous waste management in energy sector; train staff on waste management skills.

**Implementation and Monitoring:** MEG&M, MNE; **Estimated cost:** \$100,000

#### **Other Actions Required:**

**Action:** Conduct a study to investigate the possibility of ash reuse; reassess the use of water and waste water discharges in existing plants and improve recycling.

**Implementation and Monitoring:** MEG&M, MNE; **Estimated cost:** \$150,000

### **Source Monitoring and Emission Control**

Source monitoring has not been introduced in Mongolia. MNE is conducting ambient monitoring.

**Actions:** Implement Source Monitoring: Develop emission/discharge standards; utilize complex emission/discharge control equipment; power generation stations should be required to continuously monitor their air emissions and certain parameters; train staff on environmental monitoring and management.

**Implementation and Monitoring:** MNE, MEG&M; **Estimated cost:** \$200,000

### **Practical Development of Alternative Energy Sources and Introduction of New Technologies**

The most effective method of resolving existing and improving future environmental quality in Mongolia may be to maximize the use of alternate, non-polluting energy sources and new advanced energy technology that can be implemented on a cost effective basis. A variety of alternate energy sources are potentially available, each at different stages of development. Many may only be feasible for smaller installations in rural areas or small towns. The MEGM is already actively pursuing some of these technologies such as solar and wind but in fact due to high cost and poor maintenance, implementation has not been very successful.

Actions (long term): On the basis of on-going study of alternate energy sources (solar and wind) prepare plans for installation of pilot units at the most optimal sites; provide financial support for production of solar and wind energy units, including needed accumulators; provide training for users on maintenance skills. Implementation and monitoring involve MEG&M, MNE, and MTI. Estimated costs are US\$ 1 million.

Action: Hydroelectric Program: Implement small (without reservoir hydroelectric projects at sites located on the basis of studies; conduct complex study of identification of the hydro resources of the country; develop EIA guidelines for hydro projects. Implementation and monitoring involve MEG&M and MNE. Estimated costs are US\$ 5 million.

Action: Cogeneration and advanced technology: Conduct a study to a) assess the potential of cogeneration or byproduct such as fuel cell or compressed air energy storage and waste burning; b) transfer new advanced technology such as magnetohydrodynamics; c) investigate clean coal technology and liquid fuel from coal; d) investigate the potential of biogas (e.g., from methane).

Implementation and monitoring involve MEG&M and MTI; Estimated cost: \$100,000

### 3. INDUSTRY

#### Background:

The industrial sector was developed rapidly during the past 25 years in Mongolia. During this period large-scale state-owned food, construction material, light and heavy industries were founded. Many of those industries were located in the three largest cities, Ulaanbaatar, Darkhan and Erdenet. Since 1990 the state owned industries have been privatized and industrialization has been moving toward small and medium sized businesses.

Industrial development in Mongolia, like so many other sectors and activities, is in the midst of major economic, market, and organizational changes experienced by few other countries. Most factories and major industrial type sources (power stations, wastewater

treatment plants, railroads, etc) have a vast backlog of old equipment in poorly maintain conditions, and with few spare parts and appropriate tools. Some factories have moved through the transition but remain dependent upon other poorly developed factories for supplies of raw materials.

Virtually all factories and other major facilities experience a significant declines of activities and productivity in October/November when winter comes and lasts until April when activities must resume and increase. Such dislocations seriously affect efficiencies and retention of trained staff to operate and maintain waste treatment facilities and environmental controls. Energy requirements change radically from day-night and summer-winter which leads to inefficient peak/bottom loads and needs for stockpiling coal or other fuels for winter operations. Similarly materials must also be stockpiles for the winter period or for the spring startup.

Basic inefficiencies of old, outdated technologies and of difficult scheduling leads to major generation of unnecessary wastes and poor treatment of wastes before discharge to sewers, rivers, land, or air. Current taxation-economic measures require income taxes based on gross rather than net incomes which heightens typical industrial reluctance to pay for items which do not increase production rates or quality.

As indicated before, most industries are concentrated in the north-central (Ulaanbaatar-Erdenet-Dharkhan-Sukhbaatar corridor and other scattered centers in the east (Choibalsan) and west (Hovd). Industrial emissions and wastes commonly become mixed before site treatment or pre-treatment and offending plants can not be distinguished and inspected and made to comply with general healthful, environmentally sound requirements. As each plant developed separately, little or no integration of energy and materials conservation and recycling has occurred. However, during the next ten years many new plants will be constructed, and they can be used to bring integration to closely placed plants and those which may be able to reuse/recycle or co-treat/co-disposal. Several such opportunities have been identified and such integration has proven to be cost-effective, protective of the environment, and conserving of resources. Similar applications should be attempted in the sectoral programs and master plan development for all new projects.

The principal environmental issues in the industrial sector are:

- a) Inadequacy of planning and institutional tools for industry development and the need to implement industry-environment management;
- b) Lack of waste management;
- c) Poor maintenance of existing treatment facilities; and
- d) Lack of environmental management and emission control in industry.

**Actions Required:**

**Integrated Industry-Environment Siting and Planning**

The industrial development policy of the Mongolian Government is to develop small and medium size, advanced technology industries based on domestic input.

**Actions:** Develop and implement environmental master plan for industry sector and revise existing master plan and other action plans which deal with it; Develop staff capability to undertake industry-environment management (training decision makers in the central planning agency, MEG&M and MNE); extend the national industry planning function to include environmental consideration and introduce advanced analytical tools for planning activity.

**Implementation and Monitoring:** MEG&M, MNE, MTI, NDB; **Estimated cost:** \$100,000

**Action:** Implement Industrial Siting Management: Limit development of new industry in Ulaanbaatar city; prohibit single/poorly supported industrial development in high value areas; encourage industrial development and waste processing in degraded areas; Develop industrial siting concepts including estates.

**Implementation and Monitoring:** MTI, LG; **Estimated cost:** \$40,000

**Action:** Strengthen Environmental Impact Assessment of Industry Projects: Train staff on EIA; develop sectoral EIA Guidelines and criteria for industrial development projects.

**Implementation and Monitoring:** MTI, MNE; **Estimated cost:** \$20,000

**Other actions required:**

**Strengthen Environmental Protection Activity at Existing Industry.**

There is poor maintenance of treatment facilities and lack of waste management in the existing industry. There is also weak environmental management and emission control.

**Action:** Enforce ecological passport requirement for industry; develop permit system for industrial pollution; develop package of financial and economic incentives; establish clean technology information service.

Implementation and Monitoring: MTI, MNE; Estimated cost: \$100,000

Action: Improvement of Treatment Facilities: Require initial or otherwise adequate treatment of discharges; require regular maintenance of existing treatment facilities.

Implementation and Monitoring: MTI, MNE; Estimated cost: US\$ 1.5 million.

#### Solid and Hazardous Waste Management

Action: Develop and implement waste management programs.

Implementation and Monitoring: MTI, MNE, LG; Estimated cost: \$500,000.

Action: Found Co-disposal and Co-treatment combines.

Implementation and Monitoring: MTI, NDB, LG, MID. Estimated Cost: US\$ 1 million.

#### Source monitoring and emission control

Action: Develop and upgrade emission/discharge standards; Develop a monitoring program for waste discharges (installing monitoring equipment as necessary); provide training for staff; develop package of financial and economic incentives to reduce emissions and encourage recycling of wastes.

Implementation and Monitoring: MNE, MTI, MEG&M, MoF, LG, MID; Estimated Cost: \$150,000.

## 4. MINING

### Background:

Mining is an economically important sector in Mongolia. Copper, alluvial gold, bedrock gold and silver are some of the largest mineral deposits. Among the largest mining operations are those for copper at Erdenet and alluvial gold in Zaamar and Tolgoit. In addition, coal mining is of major importance both economically and for the power and heating of all the major settlements.

The environmental assessment regulations prepared by the Ministry of Nature and Environment apply to mining, and the ministry has reviewed mining projects which have been submitted to it. Recommendations have been made relating to mine operating procedures and environmental protection, but enforcement and monitoring has been limited. This has resulted in mining occurring without adequate controls and enforcement of existing laws for protection of environmental quality and restoration of destroyed lands.

The Ministry of Energy, Geology and Mining has stringent environmental regulations and conducts environmental impact assessments. At present there is very little mine site restoration, but there is recognition of the need to do so when finances permit.

In general, environmental assessment regulations formerly did not cover mining. Some mining is now subject to such assessments, but not all. And monitoring is not carried out. Most mining is not carried out with environmental controls either for the operation or restoration of the disturbed lands.

The main environmental issues of the mining sector include tailings dust contamination of adjacent residential, industrial and agricultural areas; the discharge of aqueous effluent to watercourses which damage rivers and streams, and soil erosion and the lack of land restoration following exploration, mining and processing activities. These issues will become exacerbated with the imminent start of additional large industries, oil operations, coal and gold mines.

Among the specific environmental issues in this sector is the question of the geotechnical stability of the Erdenet tailings dam particularly in relation to seismic events. and oil leakage in the southern oil fields.

#### Actions Required; First Priority:

Action: Conduct the research needed to determine the geotechnical stability of the Erdenet tailings dam, and undertake necessary actions to assure the long term safety of the operation. Implementation and monitoring of this and the following two first priority actions involve MEG&M and MNE. Estimated cost is US\$ 200,000.

Action: Determine the extent and magnitude of tailings dust contamination and water pollution from mining operations, and undertake necessary actions to deal with the problem and achieve environmental restoration where needed. Implementation and monitoring involve MEG&M, LG, and MNE. Estimated costs are US\$ 80,000.

Action: Assess the extent and magnitude of environmental damage from oil leakage and other activities associated with oil exploration, and institute the necessary programs to control the problems and make necessary restorations. Implementation and monitoring involve MEG&M, MID, MNE, and LG. Estimated costs are US\$ 200,000.

### Other Actions Required:

**Action (short to medium term):** Develop additional environmental standards and regulations where needed for waste management, pollution control and restoration of mining sites; Implement regular monitoring of enforcement; Develop relevant training programs for regulatory personnel. Implementation and monitoring involve MEG&M, MNE, and LG. Estimated costs are US\$ 50,000.

**Action (medium term):** Develop funding for restoration and environmental management through bonding, environmental performance bonding, and compensation schemes and taxes, licensing; Monitor compliance with strict enforcement of regulations (suspension of license when there is non-compliance). Implementation and monitoring involve MEG&M, MNE, and MoF. Estimated costs are US\$ 120,000.

**Action (medium term):** To increase funds available for environmental management and restoration, improve the recovery of commercial mineral resources (e.g., more modern equipment, processes and technologies); Obtain more in-country value added (i.e., economic benefits to Mongolia from further processing and product finishing within the country rather than exporting raw materials for processing elsewhere) through incentives and export restrictions on unrefined or unfinished products. Implementation and monitoring involve MEG&M, MNE and MoF. Estimated costs are US\$ 450,000.

**Action:** Establish laboratory facilities as necessary at areas of high mining activity, to facilitate monitoring and environmental assessment. Implementation and monitoring involve MNE, MoF, MID, and MEG&M. Estimated costs are US\$ 300,000.

## 5. TRANSPORTATION

### Background:

Formal transportation activities in Mongolia are limited with facilities being restricted to the central corridor, with railroad, from China to Ulaanbaatar to Russia, and from Choibalsan to Russia. Railroads and paved roads connect Ulaanbaatar to Erlin, Dharkhan, Sukhbaatar, and Erdenet. Air travel directly connects Ulaanbaatar to China, Russia and the aimag centers.

Current roads, railroads and airports focus development on urban centers and the main transportation corridors which does not allow for even and sustainable development in the provinces. The majority of industry is concentrated along the railway lines as there is little industrial development that requires road transport.

Vehicle traffic between cities is limited and few roads or corridors outside of the urban areas carry more than a few (100 or so) commercial and private vehicles per day. Outside of the aimag centers there are few rural roads. Because of this vehicles such as trucks and small automobiles travel across the grasslands causing rangeland degradation and damage to pasturelands. In some areas there are at least 120 dirt track roads that branch off the main road.

The number of private automobiles has doubled in the past two years, largely concentrated in Ulaanbaatar. Since most of the cars purchased are old used ones, they have substandard or no emission controls, so they make a disproportionate contribution to the air pollution in the cities.

Actions Required; First Priority:

Action: Incorporate environmental considerations fully in the Transportation Master Plan and develop a comprehensive transportation policy which incorporates environmental considerations. Implementation and monitoring involves the MID and MNE, and present funding is from the ADB. Cost estimate is US\$ 1 million.

Other Actions Required:

Reduce Air Pollution from Vehicles

Action: Inventory and evaluate air pollution sources from vehicles; develop a system to monitor motor vehicle pollutants; establish automatic air pollution monitoring station in Ulaanbaatar; establish emission standards for motor vehicles; develop a system of auto emission pollution taxes; reduce or prohibit lead compounds in motor vehicle fuel; Implementation and monitoring of the different actions would involve variously MNE, MID, MoF, MoH, and NDB. Estimated costs are US\$ 1 million.

Improvement of Road Quality

Actions: Improve roads within cities. Implementation and monitoring involve LG and MID. Estimated costs are US\$ . . . million.

Action: Improve rural road standards to restrict traffic to established roads (i.e., to reduce the damage to lands from the multiplication of dirt tracks). Implementation and monitoring involve LG, MID and MNE. Estimated costs are US\$ 50,000.

## **6. TOURISM/ECOTOURISM**

### **Background:**

Tourism, primarily ecotourism, appears to offer a potential for a major contribution to the economy of Mongolia if that tourism is carefully developed and managed. At present there is very little tourism for several reasons. Transportation to Mongolia is not easy nor inexpensive. Most hotel and other tourist facilities are not up to international standards. It is relatively difficult to get information on tourism in the country. Arrangements for transportation within the country are almost non-existent. In spite of this, some travellers do come and a few small companies cater for ecotourists or adventure tourists.

However, tourism in Mongolia is developing in an uncontrolled manner with no governmental policy. There is no network of hotels or transportation facilities, and there is a shortage of professionals in the field of tourism. The Ministry of Trade and Industry, which has responsibility for tourism, recognizes the need to develop an overall policy for tourism. Since tourism is primarily carried out by private companies, there is question within government as to what role government should play.

There is a clear need for development of regulations to seek to assure that tourism does not damage the fragile natural environment, nor have negative impacts on the cultural environment. Equally it is important to assure that a tourist industry as it grows brings benefits to the local people as well as the tourist firms themselves.

Among the environmentally related issues are:

- a) To develop a tourism policy;
- b) To develop and implement the tourism law;
- c) To develop an ecotourism strategy for Mongolia;
- d) To conduct an inventory of the nation's natural and cultural heritage which would serve as goals for ecotourists;
- d) To develop and implement tourism regulations, especially for protected areas;
- e) To establish a Mongolian Tourism Council.

### **Actions Required: First Priority:**

**Action:** Establish a National Tourism Council for Mongolia. The Council has been

proposed by a coalition of Mongolian tourism companies, government officials and NGOs. Implementation and monitoring would involve MTI, MNE, NDB, and NGOs. Estimated costs are US\$ 300,000.

Other Actions Required:

Action (short term): Develop a comprehensive tourism policy with a comprehensive tourism law (target, June, 1995), and an ecotourism strategy for Mongolia (target, October, 1995), along with environmental regulations particularly for the tourism use of parks and protected areas. Implementation and monitoring involve MNE, and NGOs.

Action: Undertake a national inventory of the nation's natural heritage (parks, reserves and other areas which are significant for their biodiversity, outstanding natural scenery and phenomena) and cultural heritage (cultural, historic and scientific sites, monuments and areas) which can serve as goals for ecotourists. Implementation and monitoring would involve MNE, MoC, LG, universities and MSE. Estimated costs are US\$ 190,000.

Action: Develop sources of funding, for example, from certain fees, for environmental management and maintenance of conservation areas used by tourism (an "ecotourism fund"). Implementation and monitoring involve MNE, NDB, MTI, MoC and MoF. Estimated costs are US\$ 120,000.

Action: Establish ecotourism circuits using a network of protected areas and cultural sites; develop environmental management strategies to avoid damages. Also develop ecotourism infrastructure in protected areas. Implementation and monitoring involve MNE and MoC. Estimated costs are US\$ 280,000.

Action: Conduct EIA for proposed tourism developments and establish carrying capacity for tourist areas. Implementation and monitoring involve MNE. Estimated costs are US\$ 450,000.

Action: Develop and implement a plan for providing tourist information/interpretation programs for natural and cultural heritage conservation and tourist management in each provincial and major national site. Implementation and monitoring would involve MoC, MNE, MSE and universities. Estimated costs are US\$ 21,000.

## **7. URBAN DEVELOPMENT AND HEALTH**

### **Background:**

The severe climate of Mongolia and the sensitivity of the environment demands that greater consideration be given to the potential adverse impact of human activities such as town and urban planning. It also requires that planning give more consideration to the health, comfort and efficiency of the people who live in the urban areas.

In the capital city of Ulaanbaatar there exist many factories, cultural and scientific institutes, organizations and some of the country's most developed infrastructure. There are outstanding research institutes, employment opportunities and cultural activities. As a consequence there has been a striking migration from the rural areas to the city. The population of Ulaanbaatar grew from 118,400 in 1950 to five times that in 1994.

The greatly increased population has brought with it many environmental challenges. The increased quantity of wastewater discharged into the Tuul River has negatively affected the river's water quality. Water samples taken between 1970 and 1994 have shown constantly decreasing water quality, indicating that the current level of pollutants and contaminants is greater than the rivers natural purification capabilities.

Land use activities such as the sand quarry as well as other human activities increase soil erosion and contribute to the high amount of dust pollution in Ulaanbaatar. The quality of soil has also decreased, along with the vegetation which survives in the city. The city lacks policies that require reclamation of quarry land and use of soil conservation practices.

Ulaanbaatar has 26,000 outdoor toilets and 27,000 outdoor receptacles for the collection of wastewater, most of which are located in the gher neighborhoods. The city also has several dumps which collect a total of 900,000 cubic meters of industrial and domestic waste per year. Ulaanbaatar and other cities do not have a waste management plan, they lack systematic method of solid waste collection, transportation and disposal, or a solid waste classification system.

The need for a waste management plan for Ulaanbaatar is apparent as the rate of waste cluttering the streets and accumulating outside of city apartments and buildings has increased due to economic problems and absence of a systematic method of collection. The dominant solid waste stream of paper, ash and scrap steel could be recycled if the appropriate collection and handling systems were in place.

### Actions Required:

The actions required to deal with the environmental aspects of urban development and health are listed above under Part I.1, Issues Involving Pollution, and particularly section 1.1, Air Pollution, section 1.2, Water Pollution, section 1.3, Solid Wastes and section 1.4, Toxic Chemicals and Hazardous Wastes, and section II.2, Energy.

Action: Conduct a study and assessment to identify industries, etc., which have negative influence on human health (e.g., through emissions or discharges). Estimated costs are US\$ 50,000.

Action: Improve the outdoor toilets and waste receptacles in the gher areas. Estimated costs are US\$ 20,000.

## 8. COMBATING POVERTY

### Background:

The Government of Mongolia is engaged in a major Poverty Alleviation Programme, based on a document drafted in May of 1994. The program takes a decentralized approach giving responsibility to local government structures for implementation and monitoring of poverty alleviation activities and formulation of provincial policies in this area.

Development which does not take environment into account is not likely to succeed initially, or to be sustained in the long run. Consequently, environmental considerations should be an integral part of the overall poverty alleviation effort.

One of the areas where the program may have a particularly significant relation to environmental concerns is in its focus on poverty in the rural areas. There are three parts of the rural poverty alleviation program:

- 1) Development of small and medium sized enterprises for processing agricultural products in rural areas and improvements in the marketing of animal products;
- 2) Policy reform regarding land tenure and support for herds organizations;
- 3) Restocking of poor families with an inadequate number of livestock.

The sustained success of each of these initiatives will depend in part upon how effectively environmental considerations are integrated in their planning and execution.

Action required (short term):

Action: Continue to participate in the development, implementation and monitoring of the Governments Poverty Alleviation Program, to assure that environmental considerations receive adequate attention and are integrated in appropriate components. Implementation and monitoring involves MDI, MoF, NDB, MNE. Estimated costs are US\$ 500,000.

Action: Develop opportunities for unemployed people to work on environmental clean-up and nature protection activities. Implementation involves MNE, MDL, and LG. Estimated costs are US\$ 1.5 million.

### PART III. MECHANISM AND RESPONSE

#### 1. INSTITUTIONAL FRAMEWORK

Background:

Governments are organized in sectors such as agriculture, infrastructure, and energy. Environmental considerations, however, cut across virtually all sectors of government. Environmental issues such as soil erosion can impact a large number of ministries ranging from finance and planning to agriculture and health. Therefore, effectively dealing with the environment requires coordination between the ministries. This poses government with a very difficult problem, because no ministry wants to be coordinated, and such coordination is not normally characteristic of government ministries or agencies. This is as true of industrialized nations as it is of developing ones. Yet without such coordination, a government cannot effectively deal with environmental issues. Stated another way, the success of most governments in facing their environmental problems is in direct relation to their success in developing functional coordination through effective institutional mechanisms for the environment.

Operations within the Ministry of Nature and Environment and those between the MNE and other ministries and organizations are adversely affected by the lack of missions, goals, schedules, management, and quality controls and assurances. Concepts have not been changed to those of service to the Public, product/goal orientation, meeting schedules, and productivity and efficiency. Organizational structures are often very flat with Vice-Ministers and Ministers involved in day-to-day operational issues; this reflects both the desire to keep authority and to avoid responsibilities for all decisions and to avoid conflicts between departments and divisions within the formal and informal structures.

Cooperation and coordination between the MNE and capital works sectoral ministries often is difficult and often requires direct Ministerial discussions. Visibility and

exposure to public review and discussion is minimized along with possible comments and criticisms from other related ministries. Many may view exposure of projects and funding as possible sources of competition for very limited funding in the near-future and may use secrecy and confidentiality to avoid loss of funds and prestigious projects.

The MNE has received a general identification with forests and wildlife and has difficulties moving into the realm of capital projects review, evaluation, and permitting through the EIA and related processes. Except for MEG&M, capital works ministries sometimes (often?) do not identify projects to the MNE until "finished" and may not even submitted them for review, environmental assessment and permission. The MNE has initiated information gathering regarding all projects in all ministries and private companies but is often met with reluctance and hesitation at best.

From the integrating approach of MNEs mission for the Government, the MNE has a unique comprehensive overview of environmental quality, conservation of resources, and sustainable development which most other ministries do not enjoy. Furthermore, the MNE has policy and economic valuation experience.

In 1994 and 1995 MNE conducted a review of the nation's environmental legislation, identifying where additional laws were required. As a result MNE has developed a package of environmental laws which have been or are being submitted to Parliament.

Actions Required: First Priority:

Action: Strengthen the coordination between MNE and other line ministries, and strengthen MNE's enforcement powers. This involves two areas: inter-ministerial linkages and provision of adequate authority. For the linkages each ministry should establish or strengthen an environmental unit which oversees the environmental performance of the ministry and is the primary point of coordination with MNE. In most governments, establishment of a high level (usually ministerial) environmental policy body has helped provide both authority and coordination. Since Mongolia is a small country, strengthening an existing or planned institutional arrangements may be more efficient than creating a new institutional structure. The government is committed to establishing a Agenda 21 Network under the UNDP Capacity 21 Programme, and this should be developed without delay and used to strengthen the environmental authority and coordination functions of MNE. Existing Environmental laws and those under preparation should be reviewed and amended if necessary to assure they provide sufficient authority and enforcement powers to MNE. Implementation and Monitoring involves MNE, UNDP, and line ministries. Cost estimate is US\$ 1 million.

Action: Strengthen the environmental impact assessment (EIA) procedures and implementation. With assistance from the ADB, MNE has developed comprehensive EIA guidelines; these need to be communicated to other ministries and implemented for all

projects. Develop training for EIA preparation staff, and monitoring of EIA compliance. Implementation and monitoring involves MNE and the line ministries. Cost estimate is US\$ 600,000.

**Action:** Strengthen MNE's monitoring and overview of government environmental performance. Implementation and monitoring involves MNE. Cost estimate is US\$ 1 million.

**Action:** Continue development and implementation of new environmental legislation, and pay special attention to possibilities to create economic incentives for the enforcement of environmental laws. Implementation and monitoring involve MNE, Parliament, MoF and MoJ. Cost estimate is US\$ 500,000.

## **2. ENVIRONMENTAL ECONOMICS**

### **Background:**

The abrupt change over from a socialist, centrally-planned economy to a democratic free market system created an urgent need for the application of environmental economics. The new system requires that there be efficient economic incentives for sustainable environmental and natural resource management, coupled with effective economic disincentives to deter environmental abuses. However, when it took over the new government had basically no experience or expertise in valuation of resources, payment systems for their use, economic disincentives to their abuse, or even mechanisms for the most cost/effective methods of resource management and protection. Consequently the government is faced with the needs to (1) establish the values and costs of environmental resources and uses; (2) develop a system to apply these values and costs; (3) create the necessary legislative and institutional basis; and (4) obtain the capacity in terms of trained personnel to carry out these tasks.

There is a need to develop mechanisms for economic valuation of natural resources such as forests, water, rangelands and wildlife. But the value of a forest is far greater than simply the price which the logs will bring, so there is also a need for valuation of other aspects of environment, such as ecological services (such as the maintenance of watersheds, soils, and ground waters), so that realistic costs can be assigned for their use and for damaging them.

There is also the need to apply environmental valuations to the development of taxation and fee systems for environmentally-related activities, and there must be a legislative framework within which the application of resource and environment economics is carried out.

### Actions Required:

Action (short term): Continue implementation of the Canadian-Mongolian project on environmental economics which involves applied studies on environmental economic systems and incentives; and on the basis of the results, develop and implement proposals for environmental financial mechanisms and methodologies. Monitoring and implementation would be MNE and NDB.

Action (short term): Undertake economic-ecological assessment and valuation of the various natural resources and other environmental services and resources to establish a payment system for their possession, use and consumption; and the cost basis for establishing compensation which should be paid for abuse or damage of the resources or related environmental services. On the basis of these valuations, establish and implement an economic costing and compensation system. Implementation and monitoring involve MNE, MFA, MEG&M, and LG. Estimated cost is US\$ 5,000.

Action: Develop and implement legislation and related standards and regulations which provide the legal basis for economic management of environment and resources, and for regulation of payments for environment and resource use. This should be done on a sector by sector basis. Implementation and monitoring involves MNE and MoF. Estimated cost is US\$ 50,000.

Action: Develop and implement a "polluter pays" fee structure for air, water and soil pollution, so that the fees provide compensation for the environmental and health damages caused by the pollution. Implementation and monitoring involves MNE, MoH and MoJ. Estimated cost is US\$ 15,000.

Action: Develop information and methodology for determining and applying the most efficient and cost effective ways to use and protect environment and natural resources. Implementation and monitoring involve MNE, NDB, MEG&M, LG and MFA. Estimated cost is US\$ 20,000.

### 3. CAPACITY BUILDING

#### Background

Capacity building in this sense refers to human capacities, i.e., the supply of well trained people to carry out each of the environmentally-related tasks. Mongolia has made revolutionary changes in its economic and political system and it is accomplishing them in a remarkably short period of time. It has an instant requirement for a very large number of well trained people, but there has been no opportunity to develop cadres of such trained people. Consequently, the need for such capacity stands out as a major obstacle for the

government to overcome if it is to accomplish its ambitious and indeed, essential objectives.

Developing the needed capacity to deal with environmental issues is particularly difficult, and it remains a particularly urgent need. There are several usual ways in which such capacity is developed. Formal education is a longer term method. When suitable courses are not available at Mongolian universities or other schools, some students could be sent abroad. But it is usually more cost effective to bring professors or other teachers to develop needed courses in the country.

There is also a need for in-service training for existing staff of many ministries. Short courses and various types of in-service training, including bringing on counterpart expatriate staff, can help build the necessary capacities. It is very important that this process be seen as a short term one, so that the expatriate staff do not become barriers to development and deployment of local capability.

In addition to central government, similar needs exist at the aimag and even the sum levels. And with the development of the private sector, there will be a need for increased environmental capabilities also in the private sector.

#### Actions Required: First Priority:

Action: Complete and implement the comprehensive and ambitious Capacity 21 Programme which the Mongolian Government has created with assistance from UNDP. This direct follow-up of the 1992 Rio UNCED Conference is centered around human development, i.e., training of people and building the capacity of the country to achieve environmentally sustainable development. The programme involves training at both central government and local government levels, as well as public awareness and education. Implementation and monitoring involves MNE, NDB, UNDP, MSE, and line ministries. Cost Estimate: An initial amount of US\$ 1.5 million is budgeted under UNDP and the Government.

#### 4. ENVIRONMENTAL MONITORING AND ENVIRONMENTAL INFORMATION SYSTEM

##### Background:

Basic information is an essential foundation for virtually all environmental activities. To manage rangelands effectively requires knowing what is happening to the range itself, and also requires related information about livestock numbers and herders movements and other activities. Effective forest management requires knowledge of the makeup, status and trends in the forest areas (including forest fires, insects and disease), along with related

information about the people involved and their activities (fuel gathering, grazing, logging, etc.) which affect the forest.

In the same way information on pollution of air, water and land is essential as a basis for effective pollution control or prevention activities. But one time information is not enough. There is a need to monitor environmental conditions, including, for example, the pollution abatement activities of a mine or power plant. It is not enough to pass regulations; it is essential to monitor whether or not they have been implemented; and beyond that, to monitor the effect of that implementation.

Combined with the need for information about specific environmental parameters is the need for background information on weather and other natural factors, including natural disasters.

Consequently, an environmental information system is a basic need for Mongolia. Some of the data can come from remote sensing. Some from new information networks. A geographic information system provides the best means for combining and analyzing such data.

Each ministry has a need for its own information, and ideally, the environmental information system would bring together information from various ministries as well as provide information to them. Consequently, there needs to be compatibility between the various components. There also needs to be efficiency. At present, for example, there are three remote sensing and image processing centers. For a country such as Mongolia, equipment, operating funds and expertise are in very short supply, and it is inefficient and uneconomical to have duplicate facilities.

#### Actions Required:

Action: Develop a national environmental monitoring system for sustainable development. This will involve developing a plan for a national monitoring system based on the current Hydrometeorological Network; procurement and installation of monitoring equipment in 21 aimags and training for their use; Implementation of the integrated system for natural disaster and ecological condition observation, which involves data gathering and its use (assessment, quality control, processing, conveying the information to decision makers, and others; public dissemination as appropriate, including provision of early warnings). See also Part I.4, Natural Disasters, above. Implementation and Monitoring involves MNE, MSE, and NDB. Cost Estimate: Including the disaster warning components, US\$ 5.8 million.

Action: Develop an ecological data base, which, with the monitoring system above constitutes a national environmental information system. The data base is to be developed within the Biodiversity Project and particularly its GIS capabilities (funded by UNDP and Japanese Government). Development involves an overall plan, defining the types of

information and form and methodology and technology for storage and retrieval; Connection to the Global Resources Information Network and data exchange; Arrangements for access to data and distribution to users.

Implementation and Monitoring: MNE, MSE, NDB

Cost Estimate: US\$ 5.7 million.

## **5. PUBLIC AWARENESS AND EDUCATION**

### **Background:**

Environmental education in Mongolia is just beginning and requires major leaps to assure development of awareness, knowledge of complex ecosystems, and comprehension of the magnitude of the tasks ahead. However, Mongolia's long tradition of "living with nature" allows for many forms of education which can also be directed at future technical and intellectual requirements in both the near- and long-term future of development, environmental protection, resources conservation, and sound economic sustenance. Formal education in Mongolia is quite comprehensive, mongolians have a high educational level and there is a national TV network.

Unfortunately public funding for education is in decline and many families will not be able to continue their childrens' education through university levels. Existing educational and media staff are fully capable of rendering imported programs into Mongolian. Because of the character of many environmental programs, video and audio media from other countries with similar weather and environments can provide many suitable programs for use in Mongolia which should include many agricultural methods programs which support agricultural and environmental improvements. Many industrial environmental programs may not have applicability to Mongolian conditions.

### **Required Actions; First Priority:**

Action: Review existing environmental programs to determine what needs to be done to avoid duplication or overlap and what additional public awareness and public education efforts are needed. The Capacity 21 Programme, Mongolian Biodiversity Program, Plan of Action to Combat Desertification, and others all have important public awareness and education components. On the basis of this review, develop a master plan for environmental public awareness and education, showing what components are already under way and which ones require new or additional funding and effort.

The master plan should include, among other components, the following: Educational curricula and materials for incorporating environment and concepts of environmentally sustainable development in preschool, secondary schools, and advanced

schools; Environmental training programs for teachers at all levels; Development/improvement of environmental programs at Darkhan College; Establishment of environmental management and technology departments/curricula at appropriate universities and training institutes; Conduct regular, periodic training short courses for environmental inspectors and other environmental personnel; support and strengthen existing environmental periodicals (e.g., of MNE, MACNE, and the Green Party); Import or produce educational materials (audio, video, books and lectures) and create a special program for environmental radio and TV programs; Develop programs to disseminate information on Mongolian traditional cultural knowledge and attitudes about environment. Implementation and Monitoring: MSE, MNE, NDB, LG, NGOs, MRT and universities. Estimated cost is US\$ 2 million.

## **6. PUBLIC PARTICIPATION**

### **Background:**

The entire Governmental structure of Mongolia has changed radically during the last five years although many administrative patterns of a controlled economy and development persist especially when dealing with the "public". Poor coordination and cooperation exists amongst most ministries and reflects the problems in not only allowing but encouraging direct public view, comments, and participation in the missions of the MNE and all others. The Environmental Assessment process throughout the world has attempted to incorporate public concerns to varying degrees, although in its developed form, direct participation is encouraged and developed at many different milestones in the process to assure that the project review process has been exposed to public view and comment and that the public's concerns have been responded to.

The high education levels of many urban Mongolians will assist in the development of a positive participation and improvement, while many Mongolians with lesser education may be directly affected by development, environmental degradation, and loss of local resources either by their own activities or those of others. All people must participate in the sustained development of Mongolia, and the EIA process combined with the needs of conservation and environmental protection will involve many communities of many different background and can be a vital carrier for participation, direct action, improved conservation, and general realization of the environmental/resources issues that will face them in the next few years.

Many Mongolians may still hold inherent distrust of governmental activities particularly on the basis of past experience with real or expected abuse from bureaucrats. And some government staff still may not conduct themselves in manners that will improve the image of Government and its service to the people and public. New ways must be found through public participation to demonstrate that the Government is open, attentive,

desiring to improve, and at the service of all the people.

**Required Actions (short term):**

**Action:** Review environmentally-related Government laws, policies and regulations, and amend them as necessary to assure that adequate public participation is encouraged or mandated. Special attention should be given to EIA procedures and environmental project development and implementation. Widely publicize the opportunities for public participation in governmental environmental affairs (e.g. in radio and TV). Implementation and monitoring involves MNE, all other ministries, and NGOs. Estimated costs are US\$ 100,000.

**Other Required Actions:**

**Action:** Assign and initiate public affairs activities to vice ministers of all ministries which have environmental and natural resource activities and responsibilities, or to vice-ministerial level officers of other organizations with similar activities and responsibilities. These individuals would have the responsibility for encouraging and facilitating public participation in the review and decision making process and the development and implementation of environmental and sustainable development policies and activities. The officials would establish direct contacts with the public, interest groups and local authorities. Consequently, public communication would be a major responsibility of the position. Implementation and monitoring would involve Parliament, MNE, NGOs, LG, MoJ, and line ministries. Estimated cost is US\$ 10,000.

**Action:** Implement a program for regular encouragement and facilitation of public and NGO initiatives in environmental activities, such as tree planting, river cleaning, and soil protection. Implementation and monitoring involve MNE, NGOs, and LG. Estimated cost is US\$ 500,000.

**Action:** Organize symposia, workshops, conferences and other meetings on environment, impact assessment and projects to encourage maximum public participation. Implementation and monitoring involves MNE, NGOs, MRT, and LG. Estimated cost is US\$ 100,000.

## **7. STRENGTHENING THE ROLE OF NGOS**

**Background:**

Throughout the world the non-governmental organizations (NGOs) are playing crucial roles in dealing with environmental issues. While they are apart from government, they may assist government in many ways while at the same time monitoring the actions of government regarding environment. Normally, they have much closer links with the general

public than government, and they provide a way to convey governmental environmental policies and programs to the public, while at the same time they may bring the public's concerns to the attention of government. Because of the key role of NGOs, bilateral and multi-lateral development assistance organizations (such as USAID and the World Bank) are increasingly working with them.

At present there are very few environmental NGOs in Mongolia. However, there is a great need for them in environmental monitoring, environmental education and awareness raising, conducting environmental projects, and monitoring and lobbying government but also assisting it in its environmental efforts.

The present NGOs include the Mongolian Association for the Conservation of Nature and the Environment (MACNE), the Green Party, the Mongolian Childrens Center, the Mongolian Green Movement, the Mongolian Society for Environmental Law, the Mongolian Solongo Foundation, the Mongolian Women's Federation, and The Mongolian Youth Federation.

#### Required Actions (short term):

Action: Strengthen NGO participation in environmental activities such as implementation of public awareness, review of government programs, regulations, and EIA, and implementation of appropriate governmental environment projects. This requires a review of such programs to determine where there are opportunities for NGOs to participate, and then actively seeking such participation. Implementation and monitoring MNE, MRT, NGOs, and LG. Estimated costs are US\$ 500,000.

#### Other Required Actions:

Action: Support and strengthen NGO environmental periodicals such as Baigal (MACNE newspaper) and Ertungs (Green Party newspaper), involving MNE and the NGOs. Estimated costs are US\$ 100,000.

Action: Encourage/assist development of an NGO Council (when there are enough environmental NGOs to warrant such action. MNE would have responsibility with the NGOs. Estimated costs are US\$ 30,000.

### 8. INTERNATIONAL COOPERATION

#### Background:

Although several ministries, including the MNE, have International Cooperation Departments, at a national level Mongolia is still developing its international cooperation in regard to environmental issues.

Actions which Mongolia has taken include participation in the UNDP sponsored Action Plan to Combat Desertification, the UNDP Agenda 21 following up Mongolia's participation in the Rio UN Conference on Environment and Development, and a series of environment-related programs with bilateral and multilateral donors.

One of the constraints to more active international cooperation is the limitation of capacity. Most ministries have limited staffs which are more than fully occupied with the pressing business of day to day government, and taking a more active international role will require additional staff commitments. This limitation particularly affects the Ministry of Nature and Environment which has a relatively small staff which has very significant demands on its limited time.

Among the other actions which Mongolia can take when it has the capability is joining the major international environmental conventions and treaties in the field of environmental protection and key related development issues.

#### Required Actions (short term):

Action: Review existing Governmental activities in international cooperation in environmental affairs and, bearing in mind present Governmental capacities, determine where additional initiatives/actions are needed, particularly in terms of international environmental conventions and agreements (e.g., CITES, Migratory Birds and Animals, Desertification, World Heritage); Initiate action for Mongolia to become a party to appropriate international activities. Implementation and monitoring involve MNE, MER, NDB, and MTI. Estimated costs are US\$ 500,000.

Action: Elaborate National Agenda 21, and when approved, initiate implementation. Implementation and monitoring involve MNE and NDB. Estimated cost is US\$ 800,000.

#### Other Required Actions:

Action: Conclude agreements with neighboring and other states on environmental protection; Develop cooperation with international organizations and foreign states to combat natural disasters; Develop international cooperation to sustain ecological security; Jointly cooperate in the implementation of environmentally sound and sustainable development activities and policies with UN and other international organizations and states; Actively participate in international cooperation on demographic and social issues. Implementation and monitoring involve MER, MNE, NDB, and MDL. Estimated costs are US\$ 500,000.

## **9. IMPLEMENTING THE NEAP**

### **Background:**

The Mongolian NEAP is intended to provide a framework for integrating environmental considerations into the nation's economic and social development. Experience throughout the world has shown that where countries do not take adequate account of environmental factors in their development activities, those activities often are not successful or sustainable over time. Consequently it is most important that the actions in this action plan are actually carried out. These actions involve virtually all of Government, and the Cabinet and Parliament need to be kept informed of government's progress. Consequently, the government's progress in implementing the NEAP should be monitored and Cabinet, Parliament and the public should be kept informed.

A NEAP is intended to be a "living document", in that it should be updated and changed as necessary to meet changing conditions, new information or new environmental challenges, and when portions of the action plan have been accomplished. Consequently, there is a need for a mechanism to accomplish this periodic updating.

### **Actions Required:**

**Action:** Monitor the implementation of the NEAP and provide annual reports to Cabinet, the Parliament, and the public on the status of implementation, any particular problems which have arisen, and in as far as is practicable, on changes in the status of Mongolia's environment. Monitoring and implementation would be accomplished by MNE, NDB and MoF.

**Action:** Prepare amendments to the NEAP and submit them to Cabinet for approval when successful implementation, changing conditions or new information require additions to or changes in the NEAP. Monitoring and implementation would be accomplished by MNE in cooperation with the other ministries involved in the NEAP.

## ANNEX 1

### SUMMARY TABLE OF HIGHEST PRIORITY ACTIONS

#### **1. Urban Air Pollution**

**Action:** Conduct EIA of power generation improvement projects; require installation and maintenance of emissions treatment facilities and emission control equipment; provide staff training on environmental management skills. Implementation and monitoring: MEG&M and MNE. Estimated costs: US\$ 500,000.

**Action:** Develop and implement Environmental Master Plan for Energy sector and revise the Energy and Coal Master Plan; develop staff capability for energy-environment management; Implementation and Monitoring: MEG&M, MNE; Estimated Cost: US\$ 150,000.

**Action:** Train staff on EIA; develop sectoral EIA Guidelines; enforce EIA requirements for Energy projects. Implementation and Monitoring: MEG&M, MNE; Estimated cost: \$20,000

**Action:** Design and produce efficient stoves; conduct a study to assess dissemination of fuel for household (gas and liquid). Implementation and Monitoring: MEG&M, MTI, LG; Estimated cost: \$300,000

**Action:** Examine partially centralizing heating for urban households; improve efficiency and complete combustion in boilers and household stoves. Implementation and Monitoring: MEG&M, LG, MTI; Estimated cost: \$200,000

#### **2. Urban Water Pollution**

**Action:** Improv monitoring of water quality (both chemical and bacteriological); Provide sanitary toilet facilities and waste disposal for the gher communities; Improve sewage and waste removal capabilities in the non-gher parts of the cities; Improve and expand the waste water treatment facilities. Reduce leakage and wastage of water in urban areas, linked with installation of water metering devices and effective and equitable assignment of costs. Estimated costs: US\$ 20 million.

**Action:** Tuul River pollution mitigation (Dutch Government project). Estimated costs are US\$ 200,000.

#### **3. Urban Solid Wastes**

**Actions:** (i) Maintenance, reconditioning and where necessary, strengthening of existing solid waste collection vehicle fleet; (ii) review and development of opportunities for enhanced recovery of recyclable wastes from the waste stream; and (iii) evaluation of disposal options including the question of economic incentives, and development of sanitary disposal sites to handle domestic and industrial solid wastes incorporating appropriate environmental controls. Estimated costs: US\$ 250,000.

#### **4. Land Degradation**

**Actions:** Complete and implement the National Plan of Action to Combat Desertification which will serve as the Land Degradation and Desertification, and Overgrazing sections of Mongolia's National Environmental Action Plan.

**Action:** Develop and implement restoration programs for certain particularly critical abandoned cultivated areas. Implementation and Monitoring: MFA, MNE. Estimated costs: US\$ 150,000.

**Action:** Improve the cultivation on currently cultivated areas which are subject to particularly serious erosion. Implementation and Monitoring: MFA, MNE. Estimated costs: US\$ 300,000.

#### **5. Water Supply**

**Action:** Complete drafting of new water law; develop regulations and implement the law; Establish training programs for the personnel required. Implementation and monitoring: MNE, MoJ, LG, and MFA. Estimated costs: US\$ 25,000.

**Action:** Improve the supply and reduce the wastage of water in urban areas include. Estimated costs: US\$ 2 million.

#### **6. Institutional Strengthening and Capacity Building**

**Action:** Strengthen the coordination between MNE and other line ministries, and strengthen MNE's enforcement powers. Implementation and Monitoring: MNE, UNDP, and line ministries. Cost estimate: US\$ 1 million.

**Action:** Strengthen the environmental impact assessment (EIA) procedures and implementation. Develop training for EIA preparation and monitoring. Implementation and monitoring: MNE and the line ministries. Cost estimate: US\$ 600,000.

**Action:** Strengthen MNE's monitoring and overview of government environmental

performance. Implementation and monitoring: MNE. Cost estimate is US\$ 1 million.

Action: Continue development and implementation of new environmental legislation paying special attention to possibilities to create economic incentives for the enforcement of environmental laws. Implementation and monitoring: MNE, Parliament, MoF and MoJ. Cost estimate: US\$ 500,000.

Action: Complete and implement the comprehensive and ambitious Capacity 21 Programme involving training at both central government and local government levels, as well as public awareness and education. Implementation and monitoring: MNE, NDB, UNDP, MSE, and line ministries. Cost Estimate: An initial amount of US\$ 1.5 million is budgeted under UNDP and the Government.

## **7. Environmental Economics - Economic Incentives**

Action Continue implementation of the Canadian-Mongolian project on environmental economics; develop and implement proposals for economic incentives, environmental financial mechanisms and methodologies. Monitoring and implementation: MNE and NDB.

## **8. Environmental Degradation from Mining and Petroleum Activities**

Action: Determine the geotechnical stability of the Erdenet tailings dam, and assure its long term safety. Implementation and monitoring: MEG&M and MNE. Estimated cost: US\$ 200,000.

Action: Determine the extent and magnitude of tailings dust contamination and water pollution from mining operations, and undertake necessary corrective and restoration actions. Implementation and monitoring: MEG&M, LG, and MNE. Estimated costs: US\$ 80,000.

Action: Assess the extent and magnitude of environmental damage from oil leakage and other activities associated with oil exploration, and institute necessary control and restoration programs. Implementation and monitoring: MEG&M, MID, MNE, and LG. Estimated costs are US\$ 200,000.

## **NEXT PRIORITY ACTIONS**

### **1. Natural Disasters**

**Action:** Develop and implement a master plan for disaster preparedness and disaster hazard reduction. Implementation and monitoring: SACD, MoF, MFA, MFE, MoH, LG, and MNE. Cost estimate: US\$ 4.5 million, for disaster reduction activities.

## **2. Public Awareness and Education**

**Action:** Review existing environmental programs to assess needed public awareness and public education efforts. The Capacity 21 Programme, Mongolian Biodiversity Program, Plan of Action to Combat Desertification, and others all have important public awareness and education components. Develop and implement a master plan for environmental public awareness and education. Implementation and Monitoring: MSE, MNE, NDB, LG, NGOs, MRT and universities. Estimated cost: US\$ 2 million.

## **3. Biodiversity and Tourism**

**Action:** Continue implementation of the Mongolia Biodiversity Project and broaden the base of support within Government and the public. Implementation and monitoring: MNE, LG, universities, and MAS. Estimated cost: US\$ 1,500,000 for Phase 1, through 1995.

**Action:** Establish a National Tourism Council for Mongolia. Implementation and monitoring: MTI, MNE, NDB, and NGOs. Estimated costs: US\$ 300,000.

## **4. Forest Resources**

**Action:** Develop and implement a master plan for forest management in Mongolia. Implementation and monitoring: MNE and LG, and the cost estimates: US\$ 55,600.

**Action:** Make logging sustainable and environmentally sound. Implementation and monitoring: MNE and LG. Estimated costs: US\$ 15,000.

## **5. Transportation**

**Action:** Incorporate environmental considerations fully in the Transportation Master Plan and develop a comprehensive transportation policy which incorporates environmental considerations. Implementation and monitoring: MID and MNE. Cost estimate is US\$ 1 million.

## ANNEX 2

### MONGOLIAN ENVIRONMENTAL LEGISLATION

#### 1. Environmental Laws and Regulations Prior to the New Constitution

The Law of Hunting Preserves. 1041

The Great Summary Law including hunting and environmental hygiene. 1294

General Mongol-Olrod Law governing hunting, land and water. 1620, 1639

Establishment of Bogd Ol Nature Reserve. 1809

Establishment of Khetei Khan Mountain Reserve. 1813

Government Resolution making natural resources State property. 1921

Government Resolution on hunting and fishing. 1922

Government Resolution on Forestry. 1925

Government Resolution on land. 1926

Government Resolution on water resources. 1939

Government Resolution on mining. 1957

Land Law. 1971

Hunting Law. 1973, 1979, 1986

Water Law. 1974

Forest Law. 1974

Public Health Law. 1977

Mining and Minerals Law. 1988

Air Quality Protection Law. 1989

Basic Policy Guidelines of the Mongolian People's Republic. 1990

**Government Resolution: General Regulations for State Inspection of Nature and the Environment. 1990**

**Petroleum Law. 1991**

**Original Land Law drafted (not passed). 1991**

**Amendments to the Civil Code. 1991**

**New Constitution adopted. 1992**

**Subsequent Environmental Laws and Regulations**

**Mineral Resources Law. passed, 1994**

**Land Use Law. passed November, 1994.**

**Protected Areas Law. passed November, 1994**

**CITES (adherence to convention). Submitted to Great Hural (Parliament), pending action.**

**Water Law. " " " " " " "**

**Hunting Law. " " " " " " "**

**General Environmental Law. " " " " " " "**

**Forest Law. " " " " " " "**

**Plant Law. " " " " " " "**

**Toxic Chemical Law. " " " " " " "**

**Natural Resource Taxation Law. " " " " " " "**

**Air Pollution Law. " " " " " " "**

**Tourism Law. Being drafted for submission to Government.**

**Government Resolution on Import and Export. passed 1993.**

**Government Resolution on EIA Procedures. Adopted 1994**