Country Environmental Profile

Mongolia

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An attempt has been made to use as much recent and topical information as possible. Certain judgements on the state of environmental management in Mongolia may prove to be too optimistic or indeed too pessimistic.

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Executive Summary

Mongolia has recently emerged as a fledgling democracy with a market-based economy. The country is poor and facing problems of political and economic adjustment in a modernising world, affecting the nature of aspirations and possible employment opportunities. A third of the population live in poverty, with a GNP of $400 per capita.

The traditional livelihood system is of a pastoral or transhumant mode, involving annual movement from extensive summer grazing areas to winter camps nearer to settlements. Livestock husbandry still employs 40% of the population. The other major sectors are mining, now critical to Mongolia's viable economic development, and forestry which is in serious decline following over-exploitation in Soviet times and poor management.

Special geographic features of Mongolia are its extreme cold climate and vast steppelands and mountains, while the Gobi Desert extends across the southern half of the country covering 40% of the land area. The population density is one of the lowest in the world. There has been a recent rapid urbanisation concentrated on the capital Ulaan Baatar where over 40% of the total population of some 2.5 million now lives. This brings urban environmental issues to the forefront.

In a context of widespread poverty and hazardous climatic conditions, governments and donors have seen the need for Mongolia's natural resource endowment to be better managed. Linkages between poverty and environmental management and good governance are consistently made. Donor organisations have assisted the Mongolian government in raising environmental awareness, undertaking diagnostic studies, developing legislation and undertaking planning studies. However moving policy statements and plans to effective action has proved problematic.

Serious difficulties in achieving transparent and coherent government programme implementation are evident. Newly elected governments have been through a number of national sustainable development planning processes but these have usually not found a life in the next electoral cycle. Donor representatives and independent commentators observe an excess of deference in the Ministry of Nature and Environment (MNE) to the perceived interests of mining, logging and hunting lobbies, as if enforcement of legislation might arrest economic development. User fees and penalties are too low and seriously outdated.

Because of the 'tyranny of distance', together with poorly resourced and trained government staff at district and sub-district levels, it is extremely difficult to monitor let alone enforce legislation on the ground. The responsibility falls on staff of the State Inspection Service (SIS) for overseeing implementation of the law. Resource rents for mining, commercial forestry and hunting are not consistently raised nor are incentives appropriate to encourage local government to implement what is often ambiguous legislation.

In the mining sector EIAs and their management plans area a tool for better control but tend to be narrowly focused on ecological impacts; they are repetitious – written to fulfil an administrative requirement – and are in any case subsequently ignored and in practice unenforceable. There is little or no public consultation undertaken. NGOs are numerous but have very limited resources and are not necessarily well-viewed by government, critical as many are of environmental governance in the country.

Mongolia has special biodiversity interest, yet even rare species are subject to poorly controlled hunting and illegal trapping. The pastoral livelihood system requires that animal populations are in balance with grazing resources. But greater sedentarisation and inadequate provision of livestock support services has led to serious localisedl overgrazing around trading centres. Important land management issues also include damage to topsoil by opencast mining, both in the formal sector and small-scale illegal *ninja* gold mining operations. Mining has harmful health impacts where mercury and other chemicals are used, leading also to downstream water pollution impacts.

In the climate prevailing in the country much coal is burned (for energy and heating). Air pollution is a hazard within the *ger* (tent) or house (wooden shack) and in the street. This problem is greatly aggravated by vehicle pollution in Ulaan Baatar where the situation in the long winters is particularly serious. Other problems of urbanisation are industrial effluents (local tanneries), untreated domestic wastewater and inadequately managed solid waste. Water shortage is a major problem for towns and particularly for Ulaan Baatar where pricing does not adequately reflect scarcity, and availability is especially deficient in the poor *ger*-areas of the urban periphery.

In Mongolia maintaining the subsistence needs of the family is difficult for all but a privileged elite. A number of detrimental activities are indirect results of poverty recourses such as informal mining, illegal and inefficient logging, overgrazing around settlements and in rural-urban migration. There is a new dynamic as the young leave the tough pastoralist lifestyle and seek education and wage labour in and around Ulaan Baatar. Physical and social support infrastructure is not adequate to cope with the new flux; employment opportunity is also now limited in an already over-extended and aid-dependent service sector.

Priority policy areas are identified as: a) revision and updating of existing institutional and legislative frameworks especially in the forestry, water resources, mining and urban sectors; b) reforming and clarifying the land ownership structure to encourage long term management and investment in land, and c) encouraging greater public participation, disclosure of malpractice and information dissemination.

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1. Summary

Sustainable development context

Mongolia is a vast country of mountain, steppe land, and rock desert with a very small population (2.5 million) and one of the lowest population densities in the world. It endures a harsh and dry climate with a long very cold winter and a short summer growing season for agricultural crops.

The traditional way of life has been a pastoral or transhumant mode, involving annual movement from extensive summer grazing areas to winter camps nearer to settlements. The inhospitable Gobi desert extends across the southern half of the country, covering 40% of the land area, where human activity is largely restricted to mining ventures.

The country has many special characteristics apart from the livelihood system and the climate. Not least is its recent history of precipitate emergence from a communist regime to a market-based economy and the associated adjustment problems. Mongolia is a poor country (36% living in poverty, GNP per capita of 400 USD). It is facing a globalising and modernising world affecting the nature of aspirations and employment opportunities.

The economy had been dependent on livestock husbandry (sheep, goats, cattle, horses and camels) and an exploitative forest logging industry for subsistence and foreign exchange earnings, along with Russian financial support to government services. It is now increasingly reliant on the mining sector contributing 50% of foreign exchange earnings. Donor funds provide much of the remainder of foreign exchange needs in its efforts to support Mongolia's rapid economic transition.

Sustainability issues: rural and urban change

Commercial forests have been greatly depleted but what remains of the forest estate (11% land area) is an important source of fuelwood and building materials across the country. Between 36% and 80% of total harvest is reckoned to be illegal and greatly exceeds sustainable harvest levels (FSR, WB 2004). Livestock husbandry is still the predominant mode of subsistence for a large part of the population (30-40%).

In the early transition years of the 1990s there was first a shift into pastoralism, but recently there has been a massive migration of populations out of this sector first to the trading centres, then ultimately to Ulaan Baatar the capital (850,000 according to official estimates, but possible now over 1 million). The rural sector has experienced

difficult times, ameliorated temporarily by high prices for cashmere at the end of the 1990s, but then hit by severe winters in 2000 and 2001. Alternative opportunities have arisen in the formal and informal mining sector and especially in the service sector in the capital.

A harsh climate and fragile landscape has always made the people of Mongolia prone to cyclical hazard. Even today sustainable economic development and human livelihood security presents real challenges. The overall context is one of significant poverty, particularly in rural areas but also among migrants who have settled in and around Ulaan Baatar (and a few other settlements). These migrants, no longer dependent on the wellbeing of the herd as a source of subsistence and an asset cushion in difficult years; they are now completely dependent on wage earnings of household members.

Furthermore, a basic survival need in the climate of Mongolia is the wherewithal to buy coal fuel (or collect fuelwood) for the necessary continuous heating of the traditional tent (*ger*) – or a wooden shack – throughout the long winter months, in addition to securing food and scarce drinkable water. This is the most significant expenditure requirement of migrants recently settled in the so-called "*ger* areas" on the periphery of urban centres. In the case of Ulaan Baatar this population accounts for approximately half of the total population, 400,0000 people in 90,000 households.

Although Mongolian publicity brochures in an incipient tourist market (but with some, albeit limited, potential upside) present an unspoiled destination, there are significant issues of sustainability of resource use and environmental degradation. Nor are these confined to issues of biodiversity or the productivity and carrying capacity of the natural environment such as in rangeland or forest management, or even the rational economic exploitation of finite mineral resource stocks. They include serious urban problems of water and air pollution, with poor sanitation and environmental health. These problems have their origins in the needs to burn coal for heat and energy, uncontrolled water pollution form mining activities and inadequate sewerage treatment and solid waste management.

Administrative weaknesses – natural and man-made

Donor organisations have assisted the Mongolian government in raising environmental awareness, undertaking diagnostic studies developing legislation and undertaking planning studies across the various sectors and in regional planning. However moving policy statements and plans to effective action has proved problematic.

The Ministry of Nature and Environment (MNE) is the pre-eminent policy making body with relevant jurisdiction in environmental management. It is grossly under-resourced but also, in the view of many donor agencies, failing to provide sufficient leadership. The annual budget in 2003 was US$3.7 million while the rolling average donor contribution has been estimated as 15 million while the total spent on environmental projects is estimated as 35 million (ADB 2004). It is the primary conduit of donor funds for biodiversity and forestry projects and those concerned with institutional strengthening in the area of international agreements, environmental law, EIA and land management.

Commentators have detected an excess of deference in MNE to the perceived interests of mining, logging and hunting lobbies, as if enforcement of legislation might arrest economic development. If it were feasible to implement the existing statute law

it would be able to raise considerably more money for its activities and make natural resource development more economically sustainable in the long term.

In the case of small-scale mining development there are many difficulties to resolve and these include the cumulative impacts of land (and soil) disturbance, use of mercury, local water pollution from return flows and opportunity cost of water used in processing, together with occupational health and safety impacts. That open cast mining is counted among important causes of land degradation gives rise to obvious concern.

Having said this enforcement of legislation is inherently difficult because of the vastness of the country and the lack of necessary human, technical and financial resources. The high unit costs of providing the normal range of government functions and services at isolated district (*aimag*) centres, where populations may not usually reach much more than 10-30,0000 is difficult enough, for weaker institutions in the districts to supervise services at the level of the *soum* (or in winter camps) is more difficult still —"the tyranny of distance".

It is indeed in part because of weaker provision and inadequate subsidy and organisation of rural services (for water-point/well maintenance, veterinary supply, collectivised winter livestock shelters and off take arrangements) that the former pastoralist range management system is breaking down. Also new pastoralist households with herds of less than 150 animals proved to be less viable when tested by the hard winters of 2000 and 2001. New aspirations of the young for education and an alternative way of life have led to increasing sedentaristion, as well as overgrazing and long term degradation of pastures surrounding *soums*.

Individuals have turned to poorly regulated forest and mining activities as a subsistence recourse either within their region or outside, while others have sold animals and even herds to gamble on a new future outside the pastoral livelihood system, hoping to escape poverty by migration to urban centres and ultimately Ulaan Baatar, "UB-isation" (ADB, 2004).

Environment and development planning

In a context of widespread poverty and hazardous climatic conditions, governments and donors have seen the need for Mongolia's natural resource endowment to be better managed. Linkages between poverty and natural resource management and good governance are consistently made. However, transparent and coherent government programme implementation to achieve more sustainable economic development and improve human livelihood security is a work in progress. Newly elected governments have been through a number of national planning processes which often do not find a life in the next electoral cycle.

The latest key national policy reference is the 'Economic Growth and Poverty Reduction Strategy' (EGPRS) 2003. Formerly it was the 'Good Governance for Human Security Programme' (2001). Both documents have strong emphasis on environmental sustainability concerns. The UNDP is monitoring achievement towards the Millennium Goals in its Human Development Reports. The latest planning effort is in an application to the 'Millennium Challenge Account' 2005.

In the past Mongolia has had major environmental policy references beginning with the 'National Environmental Action Plan' of 1996 and continuing through numerous internationally inspired plans to the 'Mongolian Action Programme for the 21st

Century' (MAP-21) which included elements of district planning under the aegis of a National Council for Sustainable Development. A Regional Development Plan has also been conceived to plan provincial infrastructure support around identified growth poles.

Reliance on donors for implementation is a primary difficulty and donors have not yet been ready to fund a sector approach such is the weakness of government administration. The current economic climate means that the opportunity cost of poor natural resource management is particularly high in terms of human hardship and it touches directly on the lives of the unemployed and resource-poor —and even the survival of the sick among these. Finite mineral resource stocks and fragile but renewable natural resources (rangelands and forests) must provide sustainable income generating opportunities, investment returns and royalties to fund government services, including a well functioning resource management framework.

A commitment to economic policy instruments which integrate and "mainstream" environmental considerations is not apparent. The scarcity and costs of supply of water and energy are not adequately reflected in their pricing to customers. Additional fees for sewerage waste are not included in water charges, nor are charges for solid waste disposal adequate to fund effective services in urban areas. Likewise fines for pollution in the mining sector (or tanneries) are not at a sufficient level to provide an incentive for better treatment. Resource rents for mining, commercial forestry, hunting and even entry to national parks are not consistently raised or enforced to benefit local and national government; nor are the incentives appropriate to encourage local government to implement what is often ambiguous legislation.

EIA and sector integration

Procedures for environmental impact assessment (EIA) have been developed by the Ministry of Nature and Environmental (MNE). EIA has been ineffectively used as an integrating tool to ensure sound management of natural resource use. Although the procedures have logic and allow for assessments of different levels of detail according to likely risk, the decision-taking and reporting lacks transparency and recommended methodologies are unduly complex. There appears to be insufficient focus on significant issues and on practical aspects of mitigation management (responsibilities, budgeting, scheduling and reporting). Nor are required environmental management plans readily accessible to members of the public.

For evident logistical reasons, budgeted impact mitigation and treatment measures are not easily enforced on the ground by the State Professional Inspection Service (SIS). Service staff are poorly trained and inadequately equipped at district and sub-district levels. More dialogue and consultation with stakeholders in the EIA process would be beneficial. Subsequent press disclosure of poor performance is a useful tool to encourage companies to fulfil their legal commitments and raise their performance, but this requires an openness and potential for scrutiny by outsiders and NGOs. In general EIAs appear to be narrowly focused on "ecological impacts" and often undertaken by those with a more restricted view of sustainable development, excluding the critical economic and social dimensions.

Cultural factors in environmental management

Concepts of sustainable development are not easily rendered into different languages, and English is not so widely spoken among decision-makers in Mongolia. In a traditionally mobile cultural adaptation, developing collective management of distinct space-bound resources by a community is not easily achieved (WB, 2004). Indeed there is apparently no word in Mongolian for “community”. In addition, the Soviet model and legacy has also lead to a reliance on provision by third parties rather than management by mutual contribution and adherence to group rules. Community-based user groups in protected areas are invariably the creation of donor projects.

Local non-specialised NGOs do not have clear constituencies and self-sustaining memberships. They tend to be the vehicle of individuals with an interest to work with donor projects. NGOs are not always well viewed by government and are often created by professionals who because of political realignments have lost their job in public service. WWF Mongolia is pre-eminent and has some political influence. Other national NGOs such as MACNE (Mongolian Association for the Conservation of the Natural Environment) were government created in Soviet times and may be in or out of favour with a particular government. Registered EIA consultancies are seen as better or less good partners to work with by commercial enterprises (eg mining companies) according to political criteria, close ties with government personnel.

Soviet era terminology such as “ecological policy” does not translate well into the understanding of the environment as something to be managed in the interests of sustainable human development, rather than for its own sake as a separate sector. The idea of ‘mainstreaming environment’ is therefore potentially lost, if not seen as bizarre. The word “monitoring” is rendered locally as “control” with all its top-down connotations and expectations. Such nuances of meaning in culturally bound notions may explain some of the difficulties in drafting appropriate enforceable legislation. The idea of privately owned and managed land is a new concept, as are leaseholds which can create incentives for long term management of for instance forest resources.

International co-operation vs. local commitment

Politicians and senior environmental officers are well versed in the international programme of environmental initiatives; they have shown themselves ready to sign up to conventions and partake in GEF and donor supported programmes. Notable is the interest in the International Convention treaty to Combat Desertification, the Convention on Biological Diversity and even the Kyoto Protocol. Involvement in these treaties and agreements helps to promote projects responding to donor concerns and to assist Mongolia to tap into available international funds. However, above all Mongolia needs to tackle as a first priority those issues affecting the precarious livelihoods of its own people.

Mongolia’s contribution to international climate change is trivial but the costs of coal burning can be counted in terms of environmental degradation at source (during extraction), the transport externalities, significant air pollution in Ulaan Baatar under winter temperature inversions and indoor air pollution on health. In respect of the latter promotion of technologies to increase fuel efficient stoves and brickettes represent potential win-win situations where there is no viable alternative to coal burning itself. The control of land degradation and better stewardship of forests can achieve real benefits to Mongolians. Mitigating the transboundary effects of dust

storms is a more esoteric objective but will have *in situ* benefits in rangeland productivity and biodiversity values.

2. State of the environment

2.1 Nature and quality of physical environment

Climate and natural hazards

Mongolia is a huge landlocked country of 1.56 million sq km stretching 2,392 km east-west and 1,259 km north-south. Sandwiched between Russia and China, in Central Asia, it is four times the size of Germany, five times that of France and six times that of the UK. Mongolia has an average elevation of 1,580 metres and, although on a similar latitude to Vienna and Munich, its capital Ulaan Baatar is the coldest capital in the world. Climatic extremes are the norm, with temperatures ranging from -40°C in winter to +40°C in summer. The climate of Mongolia is characterized by a short dry summer and long cold winter season.

In a high pressure zone skies are clear and precipitation is inhibited. Therefore Mongolia (located between approximately 41 and 52 North) experiences a dry and relatively cold climate supporting fragile natural ecosystems. Mongolia has four distinct seasons: winter (end of November to April), spring (April to beginning of June), summer (June to middle of August) and autumn (end of August to end of October). The temperature ranges between -15°C and -30°C (-5°F and -22°F) in winter and 10°C and 26.7°C (50°F and 80°F) in summer. Winters are dry, and summer rainfall seldom exceeds 380 mm (15 in) in the mountains and 125 mm (5 ins) in the desert. The rainy season lasting from mid June to the end of August limits agricultural productivity.

Recent climate change threatens to hasten the prevailing background post-glacial change and thus increasing the country's vulnerability to drought, to receding permafrost and tree-lines, and to increased frequency of *dzuds* (Human Vulnerabilities Report UNDP, 2004). *Dzuds* are very cold and long-lasting winter weather conditions. Mongolia's vulnerability to the occurrence of these events is well known. However, two major *dzuds* in 1999/2000 and 2000/2001, which followed very dry summers (limiting plant growth), severely impacted the pastoral economy. International humanitarian assistance from the EU and others was mobilised and brought to the fore the country's vulnerability to its climate.

The incidence of natural hazards is often referred to as a critical concern for resource management. These include dust storms, grassland and forest fires, drought, and "*zud*", the particularly harsh winters. From 30 and up to100 days a year of dust storms restrict outside work, while desert droughts may last for two to three years. Outbreaks of pests in the forest estate and foot and mouth disease in livestock are also cited as natural hazards to be managed.

Quality of land, water and air

The Mongolian Sate of Environment Report (2002) focuses attention on five identified issues: land degradation, desertification, deforestation, loss of biodiversity and air pollution. These are traditional concerns and, with the exception of air pollution, are

interrelated issues. Other areas of additional and growing concern are urban issues of water supply, water pollution and sanitation, together with solid waste management. Responsible is a history of commercial deforestation, grazing pressure on pastureland and conversion of virgin land to agricultural production leading to soil erosion from wind and rain, together with the various impacts of mining activities.

Mongolia suffers from limited sources of natural fresh water in most areas, while the policies of the former Soviet regime promoted a modernisation which has seen the burning of soft coal in power plants – for which there is admittedly little economic alternative – and a poor enforcement of environmental laws, severely polluting the air in Ulaan Baatar. Mining impacts include effects of high water abstraction rates in a context of water scarcity, land disturbance and the impact of mercury use in gold mining, being both a health hazard to those involved and as a source of serious pollution of naturally restricted rivers and water supplies.

Land degradation

There is much debate about rates of land degradation and wildly different figures are presented. A key difficulty is differentiating man-made from natural degradation. Combating land degradation is seen as a high priority issue by government and this has been largely attributed to overgrazing, but also unsustainable agriculture and mining operations.

Herd numbers grew from 25 million in 1990 to 33 million in 2000 and the number of herder households rose even more rapidly, indicating smaller herds per household. This clearly increased pressure on the carrying capacity of the grazing resource, but there have been a number of different factors affecting the equation. Contributing also to an escalation in livestock numbers was a collapse in market off-take mechanisms with a breakdown of Soviet collective organisation and market channels.

Poorer water well maintenance and sedentaristion has lead to more local overgrazing and possible under exploitation in more remote areas. Because of high prices for cashmere in the 1990s the composition of the herd moved in favour of goats and way from sheep. Goat hooves can be more destructive of the delicate rooting of the grass sward than sheep. The extreme bad winters in 1999-2000 and 2000-2001 lead to a dramatic reduction in the herd and absolute numbers are currently not at unsustainable levels (see ADB and World Bank Monitor, 2003).

In general precipitation is critical to restoring carrying capacity and the idea of serious irreversible degradation has been challenged by researchers. Livestock units (LUs) per km² were calculated to be similar at 39.8 LUs/km² to that in 1940 at 39.7 LUs/km²; they were highest in 2000 at 45.4 LUs/km² and lowest in 1970 at 34.9 LUs/km², (see CEA, ADB 2004).

Households using motorised vehicles (including cars and motorcycles) have risen from 31,600 to 51,088 and loss of land from damage by tracking is considered to be serious. Losses to unrestored open cast mining excavations remains unquantified but is seen as a cause of ‘desertification’, ie irreversible loss of the productive land resource. Unsustained cultivation in arable agriculture (eg wheat) is another critical cause of land degradation.

Land Degradation in 1998 Degree of Degradation	**Land Area (sq km)**	**Percent of Land**
None	21,481	1.7
Low (10%)	320,629	25.4
Medium (20%)	643,061	50.8
High (30%)	260,274	20.7
Very high (50% or more)	18,145	1.4

Source: Quoted by UNDP/GEF, Griffin, p.71, from MNE, *National Report on Biological …*, 1998.

(copied from UNDP, 2004)

Desertification, in terms of land-cover change from vegetated to non-vegetated area, may be relatively minor in Mongolia (UNDP, 2004). On the other hand there seems to have been progressive drying up of lakes and streams in the south, and some damage by moving sand affecting wells and other structures (ADB, 2004).

Deforestation

The recent Mongolia Forestry Sector Review (2004) commissioned by the World Bank, reports that: "Currently available information on the forest resource and on levels of exploitation is highly variable and subject to wide interpretation. This makes it difficult to obtain a reliable picture of the "state of the forest" (p.66). The total remaining forest covers 10.4 million ha in the north, 2.0 million ha '*saxual* forest' and 3.6 million ha of depleted forest (mainly near transport corridors). Statistics on deforestation are confusing but the causes are known to include unsustainable logging (legal and illegal), wildfire, insect and disease infestation, animal grazing, and climate change.

Mongolian forest resources have never been subject to science-based sustainable forest management. Figures for former forest coverage are not readily available and difficulties with definitions of forest areas are a perpetual problem. Through the 1960s to 1990 average official harvest figures were approximately 1,500-2,000 million m^3 per annum, very roughly 50% roundwood and 50% fuelwood. In 2002 official figures recorded a harvest of 620 million m^3, almost all fuelwood (see FSR, 2004).

The above figures are far from reflecting reality where 36-80% of harvest is estimated to be illegal (FSR, 2004) and on which no royalties are raised. Illegal timber is wastefully harvested using old technologies. Conducting illegal activities are former forest officers who have lost their former employments. Other issues in forest management are the many forest fires and problems of disease control. The seriousness of these outbreaks are a subject of debate (see FSR, 2004). Much of the standing forest is poorly managed and over-mature. Legally required replanting after harvest of monocultures are not considered to add value to the forest estate.

Table 5: Estimate of Area and Standing Volume of Mongolian Forests, 2000

	Area ('000 ha)	St. volume (mil m^3)
Larch (*Larix siberica*)	7,527	1,030
Pine (*Pinus silvestris*)	662	71
Cedar (*Pinus cembra*)	985	161
Other conifers	29	4
Broadleaf species (*Betula, Populus, Salix*)	1,199	86
Saxaul (*Haloxylon a.*)	2,029	1
Total	12,431	1,335

Sources: White Book of Mongolian Environmental Situation 2000, Crisp et al. (2003)

(copied from CEA, ADB 2004)

The periodic infestations of Brandt's vole and grasshoppers on the grasslands and Siberian Silk and Gypsy moths in the coniferous forests are natural disasters with serious local impacts, for example approximately 7 million ha of steppe pasture became host to a plague of voles and 400,000 ha of forest were infected by Siberian Silk Moth in 1998 (UNDP, 2004).

Water Resources

Mongolia straddles a major continental watershed aligned east-west across the country. North of the divide, drainage is to the Arctic Ocean via the Lena River and Lake Baikal, and to the Pacific Ocean via the Amur and Yenisei rivers. South of the divide drainage terminates in dry lakes and salt pans with no outlet to the sea.

Aggregate water resources in Mongolia have been calculated at 599 km^3 (UNDP/UNICEF, 2004). Of this 83.7% is in large lakes located in the inter-montane basins of the Altai, Khuvsgul (314 km3), Khentein and Khangai mountain region, 10.5% (500 km3) in glaciers and 5.8% (34.6 km3) in rivers. The average annual precipitation of only 224mm (90.1 percent of which evaporates) varies widely from year to year and from one part of the country to another. The coefficient of variation over mountain steppe is +/– 28% on an average precipitation of 250 mm/year; over desert steppe it is +/– 50% on an average precipitation of 100mm/year (WB 2003). The 9.9% of effective rainfall (ie that does not evaporate) recharges aquifers and provides limited surface water; it is supplied in part by ice melt.

It is this surface water which is essential for human use and the living environment. Water shortage is one of Mongolia's major socio-economic (and ecological) problems. Indeed, water availability per capita is only 17,300 m^3. In the Gobi area it is 4,500 m^3 and in the Northern and Central Areas where most of the rivers and lakes are concentrated it is 46,000 m^3 per capita (MNE, 2002). Though adequate in the north it is clearly a constraint on development in the south and particularly serious in urban areas including Ulaan Baatar, where water supplies are pumped from groundwater.

Little care has been taken over water supply and use. Water supply in pasture areas was improved over the period 1960/90 by construction of many wells to provide water to more than 60 percent of the rangeland, but only forty percent of the existing 48,000 wells are currently functioning. Most wells drilled during the Soviet era were out of production by 1998. Over the ten years 1988/98 alone, the number of water

supply points dropped by 20%. Over the same ten years, the number of livestock increased by 30% (Environment Monitor, WB, 2003).

Water Pollution

Effluent from factories, tanneries, processing plants, households, waste disposal sites and road runoff has polluted the main rivers where people and industry are concentrated, particularly the Tuul, Yuroo, Selenge and Orkhon Rivers. Of 102 centralised Waste Water Treatment Plants (WWTP) built only 35 were in operation in 2002 (WB, 2003).

The ADB CEA 2004 highlights the issue of water pollution by tanneries located in and around UB (in contravention of sanitary restrictions on the movement of animal products into the city). The pollution problem is due not just to domestic waste effluent, but also to the high levels of heavy metal chromium used in the tannery process. (ADB 2004). Tanneries would be better located in special areas with the proper treatment facilities, well outside of and downstream from the city but an effective zoning system is not in place.

Energy and Air pollution

Sources of air pollution include emissions form vehicles, combined heat-and-power plants (CHP), heat-only boilers (HOB) and industry, together with stoves, refuse burning, road dust and sandstorms. Approximately 5.7 million tons of coal and 160 cubic metres of wood are used for energy generation, heating and cooking in Mongolia (WB, 2004). In UB heating is required for 9 months in the year. Three CHP use 5 million tons of coal, 250 HOB plants use 400,000 tons and 70,000 inhabitants of *ger* areas consume 200,000-350,000 tons. In winter each household consumes 5 tons per person of coal.

Between 1995 and 2002 the number of vehicles has grown from 28,119 to 52,000 according to figures quoted in Mongolia Environment Monitor (World Bank, 2004). Some 80% do not meet emission standards contributing 70 tons of pollutants each year. Ulaan Bataar is surrounded by mountains so that in the winter months, under the usual conditions of temperature inversion, levels of pollution remain very high. Though not so high to be a serious risk there is still a risk to general health and a serious problem of asthmatic children in the city. These conditions are aggravated by indoor pollution from coal burning.

Air Pollution in Ulaanbaatar (micro-grams/cubic metre) 1997 to 2002

Substance & Quantity	Daily Mean National Ambient Standard	1997	1998	1999	2000	2001	2002
Sulphur Dioxide: p.15)	50	7	6	6	9	11	10
Nitrogen Dioxide (p.16)	40	8	21	22	30	28	28
Carbon Monoxide (p.18)	1000	500	800	800	1,100	1,000	n/a
Dust	150	131	137	105	124	162	n/a

Mongolia, Ministry of Health, *Preliminary Health Risk Assessment of Environmental Pollution in UB*, 2003.

(abstracted from UNDP, 2004)

According to the Ministry of Nature and the Environment (2003) the sources of air pollution are 44% from CHP; 39% from transport; 9% from HOB and 8% from homes (see also Mongolia Environment Monitor: Environmental Challenges of Urban Development, 2004). Mongolia is reckoned to have the highest Green House Gas (GHG) emissions in the world.

2.2 Living environment: biodiversity values

Conservation context

The highest mountain in Mongolia is the 4,374m Khuiten in the far western Altai range, where glaciers and deep boulder-strewn valleys are reminders of the last Ice Age. In the centre of the country the Khangai mountains form a major watershed, from where rivers flow north to Lake Baikal and west to the Basin of the Great Lakes. Interior drainage to the south has no outlet to the sea. The semi-nomadic pastoral system occupies about 30% of the population. Natural rangeland occupies 1.26m sq. km of the country (80%), of this land area, around 27% is forest steppe and mountain steppe, 30% is dry steppe grassland 43% as Gobi steppe and desert (SoE, 2002 and UNDP, 2004).

In Mongolia the Siberian coniferous taiga forest meets the Asian high-altitude grassland steppes, while the arid expanse of the Great Gobi Desert gives rise to a very distinctive vegetation. In total more than 2,000 species of vascular plants have been identified, 10% of them found nowhere else. 148 mammal, 415 bird, 28 reptile and amphibian, and 78 fish species have been recorded. The Mongolian Red Data Book lists 23 mammals, 19 birds, 4 reptiles, 2 amphibians and 2 fish species as endangered, vulnerable or rare.

Eco-regions

In northern Mongolia, a small number of families still herd reindeer in the traditional manner reminiscent of the Lapps of northern Europe. Forest predators include the grey wolf *(Canis lupus),* brown bear *(Ursus arctos)*, wolverine *(Gulo gulo)*, and Eurasian lynx *(Lynx lynx)*. This high mountain zone is home to two endangered species: the argali or mountain sheep *(Ovis ammon)* which is the largest wild sheep in the world with long spiral horns, and the elusive snow leopard *(Uncia uncia)*.

At yet lower altitudes, a high degree of biodiversity occurs where taiga forest meets the steppes; here, mixed conifer and broadleaf forests are intermingled with lush grasslands. In this zone human populations and small remote settlements are found. The vast steppe lands (high-altitude grassland) are the last significant grassland ecosystems to be found in the northern hemisphere. These virtually pristine seas of grass cover 20% of the country; in central and western areas provide the nation's most important livestock grazing lands.

The steppes were once also home to the last true wild horse, the “takhi” or Przewalski's horse *(Equus przewalskii).* It disappeared from the wild in the 1960s, but captive breeding programmes have allowed two recent re-introductions. In western Mongolia between the Altai Mountains and the Khangai range, the desert steppe

zone includes low-lying areas with saline ponds and pans. Here, salt-loving plants are much sought after by grazing Bactrian camels owned by Mongolian herders.

Further south, and extending into north-eastern China, lies the Great Gobi Desert. Rugged and inhospitable, the terrain includes areas with sand dunes, vast stony plains, broken massifs and rolling hills. Climatic conditions are perhaps the most extreme on earth, with temperatures as low as –40^{o}C in winter and +40^{o}C in summer. An important Gobi plant is the saxaul *(Haloxylon ammodendron)*, an almost leafless woody shrub that can grow up to 4m high. Saxaul "forest" covers large areas of southern Mongolia, protecting the fragile desert soils from wind erosion.

Saxual is a favourite browse plant of the almost extinct wild populations of Bactrian camel *(Camelus bactrianus)*. Other globally threatened animals of the desert zone are the Mongolian subspecies of saiga antelope *(Saiga tatarica mongolica)* whose population is down to a few hundred individuals, the Gobi bear (*Ursus arctos*) and houbara bustard *(Chlamydotis undulata)*. The gobi bear is now virtually extinct.

[The above description is based on information from the WWF website, www.wwf.mn. A more detailed description of eco-zones is presented in Technical Appendix B].

Wetlands

Mongolia joined the Ramsar Wetlands Convention in 1998 and has six sites of international importance designated which cover 630,580 ha. In total Mongolia's wetlands, including marshlands, occupy 1.5 million ha, varying from the cold, deep and very low nutrient Lake Khovsgol to the numerous shallow and temporary salt lakes. There are 3,500 freshwater and saline lakes, 3,811 rivers and streams with a total length of 50,000 km (many with expansive flood plains) and 187 glaciers (Water and Sanitation Report UNDP, 2004).

Mongolia's wetlands have been subject to only low levels of exploitation and thus remain relatively undisturbed. Low population density, especially around the lakes in the semiarid region, and the fact that fish and waterfowl are not traditional food sources, are two main reasons. A history of wildfowl protection dating back to the 13th Century and Buddhist influence from the 16th Century, have reinforced this protection of the wetlands.

However, economic changes are creating new impacts on wetlands. Fishing is increasing to satisfy demand from China. Mining along the Tuul River is raising its concentrations of heavy metals (mainly mercury) and increasing its sediment loads twenty-fold. In some areas, notably Zaamar, the floodplains are literally being turned upside down to find gold. Even the remote and large Lake Khovsgol suffers the occasional abuses of fuel trucks falling through the ice at the start and end of winter when they take a short cut across the ice, spilling their contents into the lake even if the practice has been outlawed. (see WWF).

2.3 Population and culture: livelihoods, culture and welfare

Human population: history and culture

The Mongols gained fame in the 13th century when under Genghis Khan they conquered a huge Eurasian empire. After his death the empire was divided into several powerful Mongol states, but these broke apart in the 14th century. The Mongols eventually retired to their original steppe homelands and later came under Chinese rule so from 1691, Mongolia was part of the Manchu Empire. After the fall of the Manchus in 1911 'Outer Mongolia' declared independence and with Soviet help a revolutionary government seized power in 1921.

In 1924, the Mongolian People's Republic was established and Stalinist one-party rule by the Mongolian People's Revolutionary Party (MPRP) lasted until 1990. Following a popular campaign of mass demonstrations calling for political and economic reform, the first multi-party elections took place. The ex-Communist Mongolian People's Revolutionary Party (MPRP) gradually yielded its monopoly on power. The Democratic Union Coalition (DUC) defeated the MPRP in a national election in 1996. Since then, elections returned the MPRP overwhelmingly to power in 2000 and ended in a split vote in 2004.

Mongolians account for over 90 per cent of the population. There are 20 ethnic Mongolian groups, and many people of mixed ethnic origin. Some ethnic groups can be distinguished by their dialects. Khalkh Mongols make up the largest group. The non-Mongolian population consists of Kazakhs, Tungusic speakers, Russians, and Chinese.

Some 40% of the population still live in the countryside, primarily working as livestock herders, while the remaining 60% live in Ulaan Baatar and small towns spread throughout the country. The second largest settlement is Darkhan, an industrial centre near the Russian border in the north followed by Erdenet (75,000 inhabitants), a copper mining centre also in the north. Sainshand (in the south-east) and Choibalsan (in the east) remain important regional centres for meat packing and serving the regional livestock community. Dalanzadgad in the south is the centre of cashmere production in the Southern Gobi area (see Mongolia Environment Monitor, 2004).

The pastoral system of livestock herding still provides a livelihood for 30% of the population. The official relative shares of the economy in 2000 were 36% agriculture, 22% industry and 42% services. Mining, the fastest growing industry, can support economic growth, but with major implications for natural resources sustainability and environmental quality (National Statistical Office, SD Indicators, 2003).

Migration, urbanisation and poverty

From 1990 to 1998 the population of Mongolia grew at an average rate of 1.4% per year, Ulaan Baatar grew at an average rate of 2.5% per year (20.3% over 8 years). During the same time the total population of the seven other urban centres decreased by 2.2% per year (17.6% over the 8 years). Thus, not only is the proportion of the country's population living in urban areas increasing, it is also becoming more concentrated in Ulaan Baatar, hence "UB-isation".

This tendency has become even more acute in recent years. From 1989 to 2002 the population of Ulaan Baatar grew by 41%, and is expected to reach 1.1 million in 2010 and almost 1.6 million in 2020 (Office of Mayor of Ulaan Baatar, 2004). In 2002 alone

Ulaan Baatar grew by 22% following the *zud*s. Attempts at regional planning to allay this trend and provide improved regional infrastructure may have a logic but also a very high cost per citizen outside Ulaan Baatar.

Under the previous Soviet regime the cost of road transport was effectively subsidized through a centralised input distribution and marketing system. Likewise there was better social provision of health and education to districts across the steppes. Because of the poor quality and lack of added value to livestock products, transport costs are potentially high for herders and their agents.

Further to this there is a movement closer to trading settlements with a concentration of livestock around these with a spiral of greater concentrated activity, overgrazing, ecosystem damage, lack of viability and poverty. This ends with emigration out of the rural livelihood system, sometimes to mines for men and very often Ulaan Baatar, particularly among the young and those with a family foothold in the capital city.

These developments have been influenced by other factors causing temporary changes. In 2000 and 2001 there were the extreme winters with temperatures of 40 below zero, as well as an outburst of foot and mouth disease leading to unprecedented loss of livestock. From 1990 to 2000 the domestic product increased by only 1% p.a. Given an annual population growth of 1.3%, income per capita declined and poverty rose significantly in this period to 36% of Mongolians living below the poverty line. Since 2000 the income per capita has increased again.

In 2002-2003 the Household Income Expenditure Survey /Living Standards Measurement Survey (HIES-LSMS) was undertaken. This survey showed that there were important divides between rural and urban populations in terms of poverty. Overall 900,000 Mongolians were categorised as living in poverty with a slightly lower percentage (30%) of these living in urban areas. Poverty decreases as one moves east across the country and increases westwards.

The survey estimated according to its criteria that the consumption of the average person in the country is 11% below the poverty line, indicating that most of the consumption is by the richest quartile. Poverty and the breakdown of traditional society is also associated with alcoholism and gender-based anti-social behaviour. Children find themselves supporting older and infirm relatives who are unable to work, or even finding themselves living as itinerants on the street.

When average per capita income dropped through the 1990s it caused many who had lost their livelihoods and formal sector employments to exist outside the main economy by recourse to illegal forest work, informal illegal mining, and illegal hunting (UNDP, 2004).

3. Environmental policy, institutions and legislative framework

3.1 Environmental policy and legislation

Sustainable development policy

Since the start of the recent political and economic transition period the government of Mongolia has subscribed to the international global environmental agenda which has brought in a host of bilateral and multilateral donor agencies assisting Mongolia to develop its own framework of policy and legislation.

A National Environmental Action Plan was elaborated in 1996 and updated in 2000. A State Ecological Policy was produced in 1997, National Plan of Action to Combat Desertification (NPACD), Biodiversity Conservation Action Plan, National Plan of Action for Protected Areas all developed by the Ministry of Nature and Environment (MNE). Likewise, the Mongolian Action Programme for the 21st Century (MAP-21) included elements of district planning under the aegis of a National Council for Sustainable Development.

The primary development philosophy reference is the Good Governance for Human Security Programme (2001). The most recent and important national policy reference is now the Economic Growth and Poverty Reduction Strategy (EGPRS) 2003. Both documents have strong emphasis on environmental sustainability concerns. The UNDP is monitoring achievement towards the Millennium Goals in its Human Development Reports. The most recent undertaking is a proposal in application for the US funded Millennium Challenge Account 2005. Significant sums of money could be forthcoming through this source of funding. The fundamental criterion for eligibility is an open democracy —Mongolia has this if not 'good governance'.

Taken together it can be seen that Mongolia has no shortage of plans, along with an array of diagnostic and pilot studies, almost all donor-funded. Progress on implementation is constrained as indicated but there would be a significant opportunity to translate the above "action" plans into a reality. Although much of the budgeted bid tender is not in the environmental management sector it will be of critical interest to see whether the government, if successful, is ready to free up resources and better fund environmental management monitoring and control activities from its own funds.

The recent UNDP Study on Ecological Vulnerabilities and Human Security in Mongolia (July 2004) lists government elucidated concerns on ecological security as covering the following areas for policy and management intervention.

- Conservation by using ecologically safe technology and standards.
- Prevention of devastation of environment due to poverty.
- Elimination of air, water and soil pollution in urban areas.
- Making stricter the norms of labour and environmental protection.
- Implementing measures to fight desertification, drought and severe winter, and to reduce their consequences.
- Concluding bilateral and multilateral agreements to prevent, compensate for and eradicate trans-boundary transfer of radiation, chemical contaminants, acid rain.
- Restoring and disseminating knowledge about traditional nature conservation practices.
- Setting aside 30% of Mongolia's territory as unique areas to be protected.

The economic and social policy of the government is focussed on the strategic goal of poverty reduction by means of macroeconomic stability and private-sector led growth. However, the economic potential of Mongolia is relatively limited owing to the lack of resources. The most promising, currently under-utilised business segments are probably to be found in tourism and in processing agricultural and mineral resources. Moreover, the public sector remains oversized; high state consumption and continued subsidies for state enterprises result in a crowding out of the private sector by high interest rates on the financial markets.

Mongolia has received considerable support from international and bilateral donors to assist its transformation process and necessary reconstruction as well as to alleviate emergencies. Measured as contributions per capita (2002: USD 85) or as a share of GDP (2002: USD 208 and 21% respectively), external aid has reached a very high level. In order to avoid an increasing dependency on donor funds the country now has to mobilise its own resources and establish a framework conducive to internal and external private sector investments. Successful economic development should be the best guarantee for lasting democracy.

National planning initiatives

The Mongolian Action Programme for the 21st Century *MAP-21* initiative included many important natural resource management initiatives but has been seen to be repetitious and lacking in prioritisation (UNDP, 2004). The next major policy plan was in the *Good Governance Program (2001)* whose priorities for intended actions are presented in Technical Appendix C. The major current reference is the Economic Growth Support and Poverty Reduction Strategy – EGSPR (2003) which identified initiatives to assist risk management.

Economic Growth and Poverty Reduction Strategy, 2003

Identified Environmental Management Needs

- Implementing land reform
- Planning, financing and management of rural environmental protection actions
- Rehabilitating land and wetlands destroyed by over-exploitation
- Implementing existing land and natural resources laws and regulations
- Guiding land utilization by use of differential fees related to land productivity, water availability, fertility and location
- Adopting measures to leave pasture fallow to enable recovery
- Strengthening regional international capacity to cope with disasters
- Improving forest management
- Planting trees in green belts and urban areas, and establishing forest parks
- Increasing local participation in prevention/response to forest and steppe fires
- Increasing participation in prevention of and response to natural disasters
- Improving implementation of EIA law, and monitoring mitigation actions
- Improving capacities for environmental management.

Further to this a *Medium-Term Regional Development Strategy (2003)* proposed a reorientation of investments to bolster development in the regions and reduce differences in social and economic advantage between regions so as to arrest rural to urban migration and particularly reduce the dominance of Ulaan Baatar. It has not become operational because funds have not been secured. Indeed, the economic reality of independent regional growth centres counterbalancing the dominance of Ulaan Baatar cannot be assumed.

Legislation on natural resource use

The basis of environment legislation in Mongolian is the Law on Environmental Protection (1995) which sets out three principles which guide all environmental and natural resource laws in Mongolia: a) prevention of adverse impacts; b) creation of favourable environmental conditions for human life, labour and recreation; and, c) ensuring the development of a sustainable economy. The law establishes the requirement to conduct natural resource assessments and assigns the requirement for monitoring to environmental inspectors and forest rangers.

Other relevant legislation affecting land use is:

Mongolian Law on Land (1994) defines six land zones and three types of land tenure rights: a) full ownership, b) possession right, with limited disposal rights, and c) use right. Amendments to the law have allowed limited citizens to own small parcels of land in urban areas. Rights of full ownership and alienation are new to Mongolia. Common ownership prevailed before state ownership in communist times. Modernisation has made new demands for exclusive rights to allow private sector development.

Mongolian Law on Special Protected Areas (1994)

- *Strictly Protected Areas ("Pristine", "Conservation", and "Limited Use")*
- *National Parks ("Special", "Travel and Tourism" and "Limited Use"*
- *Nature Reserves*
- *National Monuments*

Mongolian Law on Buffer Zones (1997)

Mongolian Law on Natural Plants (1995)

See Technical Appendix E for complete list of environmental laws and regulations, following Wingaard and Ogderel (2001).

Protected areas

In 2000 Special Protected Areas covered about 20.5 million ha covering 13.1% of the nation territory (see Technical Appendix D for locations and areas). Plans to increase this to 30% are endorsed by the government but the environmental lobby is more concerned that existing reserves be more carefully managed than to proceed with an extension of land area.

Resource use fees

The following laws enacted since 1995 incorporate fee schedules to raise revenues for resource use:

- Law on Hunting Reserve Payments and on Hunting and Trapping Authorization Fees
- Law on Water & Mineral Water Use Fees
- Law on Natural Plant Use Fees
- Law on Fees for the Harvest of Timber and Fuel-wood
- Law on Land Use Fees.

The principle established in the laws is clear even though the fees charged are unrealistically low. The same use/compensation fee principle is also clear in the Law on Mineral Resources requiring mining companies to deposit with local authorities 50% of the budget for environmental protection, as estimated in the EIA report. Differential taxes on pastureland have been introduced recently.

In addition to resource use fee legislation is the Law on Reinvestment of Resource Use Fees for Conservation (2000) ["Law on Resource Fees"] which provides for recycling of specified percentages of natural resource fees into environmental rehabilitation. The percentages are as follows: natural plants (30%), hunting (50%), land fees (30%), timber and fuelwood fees (85%) and water (35%). Mining revenues are not included in the schedule.

Environmental offences

There is no system currently for pollution charges and only light fines for infraction of EIA regulations and dumping where this is monitored. Fines on the statute book, for example, for offences under the Hunting Law are so derisory as not to be worth collecting were evidence documented. There is a move underway to raise quasi-wastewater discharge fees in urban areas (draft Wastewater Discharge Law, 2004).

Environmental impact assessment

The Law on Environmental Impact Assessment (Revised 22 Nov 2001) is under discussion with a view to further amendments in the area of public participation. The law should have an important role in enduring new projects are in conformity with other relevant laws and that such projects are indeed subject to scrutiny in relation to design, location and proposed management practices and their environmental impacts. Guidelines on Environmental Protection Plans and Monitoring Programmes have been set out in a legal text adapted from Bayasgalan et al (2002).

The experience in implementation has seen mixed results. EIAs are undertaken by consultancies registered by (and with close links to) the environment ministry (MNE). The recommended methodologies are unduly complex and not conducive to being effective aids to decision-making, without sufficient emphasis on significance assessment or elucidation of alternatives. Indeed, EIAs do not seem to be perceived as tools for aiding environmental sound development but rather to simply fulfil an administrative requirement.

EIA statements are reported to be repetitious (UNDP, 2004) and unduly scientific and technical in nature, lacking in development of social criteria, economic externalities

and sustainability factors or management realism. There is also limited consultation and little transparency in a process designed to fulfil procedure rather than to negotiate acceptable compromise (reasonable mitigation) between stakeholders for mutual benefit. Together with restoration and mitigation measures, occupational safety and health should be part of an environmental management plan to be implemented and monitored by the developer, leaving only and inspection or auditing requirement on the part of the national authorities.

The actual EIA process in Mongolia is one where fifty percent of the cost of the estimated environmental management plan budget is deposited with local authorities as a bond or security for incomplete mitigation, restoration or pollution control. This bond is apparently widely treated as what might be seen as a permit fee for pollution or non-compliance. Enterprises therefore have no incentive to expend money on restoration and tend to abnegate a responsibility for environmentally sound performance.

In general; EIAs in Mongolia are too narrowly focused on "ecological" impacts and often undertaken by those with a restricted view of sustainable development, excluding the critical economic and social dimensions of the environment.

International and cross-boundary coordination

Mongolia has signed all the major environmental treaties even if resources for their effective practical implementation is lacking. A list of these treaties is presented in Technical Appendix D which is extracted from UNDP, 2004 from which much of this section is drawn.

Mongolia has six RAMSAR sites ranging in size from 2,500 ha to 321,000 ha, and five other sites under consideration. Mongol Daguur, a 210,000 ha RAMSAR site in Dornod Aimag, forms part of a trans-boundary protected area with Russia and China. Many protected areas, particularly the strictly protected areas, national parks, and forest areas, are located along Mongolia's borders. With China, Russia and Korea, Mongolia is committed to joint protection of the Tumen River Basin because the Kherlen and Khalkh Gol rivers in the east of the country feed the Amur River which ultimately flows into the Pacific.

Major Environmental Issues in the Tumen River Basin
(Extracted from UNDP. 2004)

Environmental Issue	Natural Causes	Human Causes
Land degradation (loss of topsoil and fertility, desertification and erosion)	➢ Extreme temperature fluctuation ➢ High winds ➢ Low precipitation ➢ Thin topsoil ➢ Slow plant growth-rate ➢ Steep slopes ➢ Fires	➢ Overgrazing in some areas where livestock density exceeds land carrying capacity ➢ Livestock herd mix (high proportion of goats) ➢ Mining and industry practices ➢ Land cultivation practices ➢ Multi-tracking where there are no roads ➢ Fires
Deforestation	➢ Slow plant growth-rate ➢ Insect infestation ➢ Fires	➢ Destructive and unsustainable logging ➢ Insufficient & poorly managed reforestation ➢ Fires
Biodiversity loss	➢ Same as for land degradation	➢ Deforestation & land degradation (see above) ➢ Excess hunting ➢ Pollution

Wetland degradation	➢ Desertification ➢ Climate change	➢ Same as for land degradation ➢ Livestock density around wetlands ➢ Inappropriate crop irrigation
Poor air and water quality in localized areas	➢ Air temperature inversions ➢ Low rate of flow in rivers ➢ High winds and wind-borne dust ➢ Fires	➢ Air and water pollution ➢ Increased number of mostly old vehicles ➢ Inappropriate use of chemicals and waste disposal

Source: Adapted from: UNEP/GEF, *Tumen River Strategic Action Program…,* 2002, p. 27

Regional co-operation is also promoted with Russia and Kazakhstan on the protection of the Altai-Sayan eco-region in Western Mongolia. A steering committee of representatives from the three countries meets annually (supported by UNDP/GEF) to discuss ways to promote trans-boundary cooperation and could become a forum for implementation of specific programs and actions.

The Trans-boundary Water Conservation Inter-government Agreement between Mongolia and Russia on regional water resources had a successful study phase, but due to lack of funding little else was accomplished. Less satisfactory for Mongolia is the results of a sampling programme of water quality in the Altan River, a small loop of which flows south out of Russia before continuing back into Russia. Because of heavy mining activity upstream the short loop into Mongolia is reported to be heavily polluted (See UNDP, 2004).

A similar agreement with the Russian forestry agency to cooperate on issues such as infestations of Siberian and Gypsy Moth and wild fires does not apparently work well. Russia provides satellite based data and information but action is limited by lack of funds.

Another area of intended co-operation is the programme 'Prevention and Control of Dust and Sandstorms in North-East Asia' funded by ADB. It is aimed at action to mitigate "red" dust storms whose origins are in China and Mongolia. These are semi-natural in origin but have 'downstream' impacts in local nuisance experienced as far as South Korea and even Japan. Mongolia has cooperated since 1998 with UNEP and the Acid Monitoring Network in East Asia and has participated with Russia and China in Tripartite Environmental Ministerial Meetings.

3.2 Environmental management and institutional framework

Institutional arrangements: organisation structures

The Ministry of Nature and Environment (MNE) and related agencies are responsible for the development of law and the administration of policy covering the EIA process, forests and biodiversity (protected areas and wildlife) management. It is mandated to participate positively to steer implementation of obligations under international conventions, to help implement many different ODA funded projects, and to co-operate regionally under various joint agreements.

In 1987 the Ministry of Nature and Environmental Protection was created from merging the Ministry of Forestry and Wood Industry with the Department of Meteorology and Hydrology. IN 1990 a State Committee for Environmental Control was established which was reorganised into the current Ministry of Nature and Environment (MNE). In 2000 and 2003 further reorganisations have taken place and

minor reorganisation is still taking place as the organisation responds to perceived needs.

The main departments are:

- Strategic Planning Department (7) and State Administration and Monitoring Department (4) [two former departments now merged into one]
- Policy Implementation and Coordination Department (5) [mainly responsible for biodiversity issues]
- Sustainable Development and Environmental Department (6) [mainly responsible for EIA]
- Finance and Budget Division (4)
- International Cooperation Division (10)
- Protected Area Division (5) [linked with various agencies at the local level]

A lower tier of agencies in the districts are:

- Water, Forest and Natural Resource Agency (20, plus 365 staff at *soum* level)
- National Agency for Meteorology, Hydrology and Environmental Monitoring (NAMHEM) (70, plus staff at local monitored facilities)

A freestanding Nature, Forest and Water Resources Agency (NFWRA) has been created out of the former Natural Resources Department. The former Environmental Protection (Inspection) Agency enforcement functions have now been transferred to the government of Mongolia's regulatory agency the State Inspection Agency (SIA) which is in the Prime Minister's Office.

Within the SIA has here has been created a Nature and Environment Inspection Department and within it is a section tasked to monitor and enforce the implementation of environmental management plans produced as part of the EIA process (an inspector of environmental impact assessment). The latter has 340 inspectors at the *soum* level. The 21 *aimag* (district) have three to 4 inspectors each and Ulaan Baatar has 18 *aimag* district inspectors and 16 inspectors reporting directly to the UB City government. Other field MNE staff, eg rangers, have been reallocated from their previous roles to protected areas duties.

Unfortunately Mongolia lacks a professional and merit based public service. Public servants are political appointees – liable to replacement when the ruling party changes -- with little or no training or experience relevant to the positions they occupy (World Bank Forest Sector Review, 2004). Public service instability, inadequate pay, and inadequate understanding of the role of the public servant, severely undermine continuity of administration and the ability to implement programmes, particularly in natural resources and fields requiring new technical skills, training and continuity (Human Vulnerabilities, UNDP. 2004). Effective managers are also prized in the private sector and sought by donors for their projects.

Cross sector co-ordination is required with the following ministries:

- Ministry of Industry and Trade (MIT)

- Ministries responsible for transport and mining (former Ministry of Infrastructure, MoI)
- Ministry of Food and Agriculture (MFA) — incl. livestock husbandry
- Ministry of Justice and Internal Affairs (MJIA)
- Ministry of Health
- Ministry of Education
- Ministry of Finance and Economy (MFE)

Other agencies and authorities in these ministries with whom in an ideal world greater dialogue and co-ordination might be expected are: the Coal Agency and Tourism Agency, Mineral Resource/Petroleum in MIT, Sate Reserve Agency in MFA, Sate Border Patrol and Police Department in MJIA, and the Ste Customs Agency (MFE). (See CEA of ADB, 2004).

The new Agency of Land Affairs, Geodesy and Cartography (ALAGaC) now comprises the Former Land Resources Authority of the MNE and unites functions of surveying, mapping and land administration and registration of immovable property.

NGOs

Local NGOs have been co-opted into donor projects. UMENGO (Union of Environmental NGOs) represents many of the specialist organisations and is concerned about environmental governance, while MACNE (Mongolian Association for the Conservation of the Natural Environment) was created by government in Soviet times (see Technical Appendix G for listing of most important groups). NGOs are not necessarily well viewed by government and have limited influence. WWF Mongolia is pre-eminent and is involved in pushing for reforms in legislation. Registered EIA consultancies are seen as better or less good partners to work with by commercial enterprises (eg mining groups) according to political criteria, close ties with government personnel.

Enforcement capacity and financial resources

Increasingly the central government has delegated responsibility for natural resources and environment administration to the a*imags* (province or district) and *soums* (sub-districts). However, staff at this level have even more limited relevant training or necessary equipment and resources to undertake allocated tasks. The ambiguity of national law is also a serious difficulty.

Incentives may also be perverse. For example local administrations are supposed to receive 30% of hunting fees but there is little incentive to raise such revenues on behalf of local government where these fees will be netted out of their next budgetary allocation from the centre.

The MNE is responsible for implementation of environmental and resource management policy but it has inadequate commitment and resources to achieve this task. Policy statements and programmes therefore remain unimplemented beyond those managed in the field by donor organisations. However in forest utilization zones outside protected areas supervisory presence is inadequate to control illegal exploitation (ADB, 2004).

A major assessment of environmental issues of MNE capacity conducted in 2004 and funded by the World Bank found that public service pay is so low there is no sense of accountability for service provision engendered among public servants. The assessment found that while pressures on natural resources grow MNE leadership is inadequate, a result of poor coordination, wasteful use of very limited funds and lack of motivation.

A second area of financial and capacity constraint relates to *aimag* and *soum* implementation of environmental and related regulations (forestry, mining, environmental impact mitigation, environmental quality standards and the Land Law (1994). Government offices at these levels have neither the funding nor the training to do their jobs. Effective management requires wide coordination among different ministries, agencies, provinces and local authorities, researchers, NGOs and the public but coordination and even dialogue is very limited.

Mining companies and forestry companies are supposed to pay license fees and stumpage fees in order to undertake mining and forestry activities. Mining royalties and trophy hunting fees accrue to central government, as also 90% of fines (CEA, ADB 2004, p 51). The total raised by natural resource fees in 2003 was Tg 24.2 billion (about $21.1 million), amounting to 2.5% of government revenue in that year. About 47% was from mining fees.

Table 15: Proceeds of Natural Resource Fees, 1996-2003

Category of income	1996 (Tg mil)	2000 (Tg mil)	2003 (Tg mil)	2003 ($'mil)	Per cent of total
Forest use	155.1	460.4	629.9	547.7	2.5
Water	123.1	200.8	3,150.4	2,739.4	13.0
Land use	493.9	3,224.3	6,077.2	5,284.5	25.1
Mineral resources	2,579.0	3,431.5	11,545.9	10,039.9	47.7
Hunting*	396.3	907.5	2,174.3	1,890.7	9.0
Other	26.4	1.6	636.8	553.7	2.7
Total	3,773.8	8,226.1	24,214.5	21,056.1	100.0

Source: MNE

*Notes: the totals of the table under "hunting" should not be mistaken for the export value of fauna (meat, skins, antlers, live animals, etc.). That value is, first, much higher than the fees paid (e.g. the value of falcon exports alone in 2003 was $1.8 million), and second, the true export value is almost certainly greater than official estimates, according to some local estimates several times greater.

(extracted from CEA, ADB 2004)

According to ADB's CEA (2004) the total available finance for environmental management related activities was $35 million. Of this sum only $4.26 million derives from domestic resources. Clearly much of the total sum is in international staffing and equipment costs of donor projects. The MNE budget itself is $3.69 million of the above sum and a pro-rata allocation by staff numbers of funds available for the SIA gives only $400,000 for its national environmental inspection and enforcement activities. International NGOs are reckoned to be providing about $5 million per year.

With delegation of enforcement functions to the SIA from MNE donor agencies are said to have lost interest in support for enforcement activities (CEA, 2004). Yet the SIA is recognised by WWF and others as a more purposeful organisation than MNE. What is needed is programme support to SIA so that it can show that it can increase knowledge and respect for the law, and in this way help raise resource use fees which will in turn help fund natural resource management so that local government can develop a more sustainable financial structure.

The serious existing weakness with dependency on development assistance is that the current focus continues to be on projects, while the Government needs to focus

on coherent and consistent policy and programme implementation. Meanwhile donors continue to fund planning studies, diagnostic research and demonstration pilot projects outside any framework for budgeted replication and resourced implementation programmes in the natural resource sectors. GTZ have been commendably adept in seeking to work with Mongolians to help rationalise commercial forestry operations and have apparently indicated some willingness to become involved with SIA.

Table 13 : MNE budget, 2003 ($ equivalent)

	Tg bil	$ mil equiv.
MNE administration	1.40	1.22
Local hydrological and meteorological monitoring	2.00	1.74
Natural resource rehabilitation	0.52	0.45
Protected areas	0.32	0.28
Extra-budget resources (Environmental Protection Fund)	0.20 (on average)	0.17
Total	**4.42**	**3.86**

(extracted from CEA, ADB 2004)

3.3 Integration of environmental concerns into the main sectors

Land and pasture management

Different grazing animals are adapted to different rangeland conditions. Camels and goats are better adapted to the dry south, yaks and cattle to northern areas, with sheep and horses distributed more evenly. There are many different rangeland ecosystems based on a varying mixture of fragile grasses, herbaceous and woody ground plants, their total productivity varying over the long-term according to climatic, physiographic and soil factors (see UNDP, 2004).

Over the short-term the weather pattern, particularly the amount of rainfall, makes an enormous difference to grassland productivity from one location to another affecting the health and fertility of the herd. Rangeland biomass production averages about 500 kg/ha per year in the mountain and forest steppe areas; it ranges from 100 to 700 kg/ha per year in the steppe, and is less than 200 kg/ha per year in the Gobi desert and Lakes Basin (National Agency for Meteorology, 2000).

Affecting the productivity of grassland is its ability to recover, a function of livestock density and mix as well as rainfall. Goats are most destructive because they browse close to plant roots, while cattle are less destructive. However, the demand for cashmere has encouraged herders to increase the sizes of their goat herds and the total number of livestock and so increase land degradation, particularly in the Central region and near water sources and settlements.

Reasons for degradation though also include vegetation damage and topsoil erosion abetted by grasshoppers, Brandt's voles, compaction of animals or vehicles, removal by mining or deforestation, and land tillage in the spring when strong winds are common. There is very limited cultivation in Mongolia but its development on a larger

scale in the past has been proved to be ill-conceived and unsustainable environmentally.

As a poverty recourse in the 1990s many took up herding, concentrating their activities around water sources, *soum* and *aimag* centres. In order to reduce overgrazing programmes are need to rehabilitate wells and ensure livestock numbers are more evenly distributed over the rangeland. One response to change has been the development of new property rights in pastures to encourage such management the government is also trying to respond thorough animal insurance policies but these need to be tied to restrictions on livestock numbers to have rangeland benefits.

Education schemes to support children in boarding schools allows continued mobility of pastoral families in undertaking seasonal movements. The World Bank funded Sustainable Livelihoods project includes the mapping of pastureland, stock densities, location of water resources and seasonal patterns of use (at a base scale of 1:100,000). This work may assist in planning rangeland use but communicating information to pastoralists and making it of functional value to different groups requires new modes of cooperative management.

Forest resource exploitation and use

Illegal logging is the major problem in the forest sector. It is associated with wasteful harvesting techniques, under-priced and low quality timber products. Forest fires and insect infestation are also problems and may be linked to the high proportion of mature and over-mature trees in Mongolia's northern forests makes them fire prone but fire suppression only adds to future fire problems by preventing dead and decaying trees from being burnt.

One result is that future fires become even more severe. Costly spraying for insect control may be similarly counter-productive. Sensitive programs informed by both economic and ecological facts, as well as increased public information and awareness, are required for long-term, effective forest management. Based on calculations of annual wood production per ha, the current legal cut from "utilization forest" is 1.3 times the sustainable level. When illegal harvesting is added, the total harvest is four times the sustainable level. A similar pattern applies to the excess harvest of the southern *saxual* forests. The Mongolian forestry sector is rapidly approaching a crisis for which it seems largely unprepared (UNDP, 2004 and FSA WB, 2004).

Key findings of Forestry Sector Review (World Bank, 2004)

Present levels of forest harvest are unsustainable (at four times the annual sustainable cut in the designated utilization zone).

- Between 36% and 80% of the total harvest is illegal on which no royalties are paid and this distorts the domestic price of timber for construction (and fuelwood).
- Market forces and prices are not reflected in the allocation of cutting quotas or in the setting of stumpage fees.
- Fuel-wood currently constitutes 65-80% of total wood harvest.

Recommendations to improve forest resources management

- Introduce market-based instruments to encourage efficient use of wood resources and alternatives to wood consumption.
- Enforce laws and regulations formulated to ensure forest sustainability.
- Allocate forest areas to local communities for them to manage (and provide necessary support) so providing to them a revenue source and ensuring long-term conservation.

Minerals extraction

Mongolia is rich in mineral deposits such as copper, gold, coal, oil, molybdenum, tungsten, phosphates, tin, nickel, zinc, fluorspar, silver and iron ore. Almost all mining in Mongolia is open pit, for example in coal, gold, copper and uranium mining. This requires removal of over-burden and often large quantities of water. Potential harmful chemicals are used in extraction of minerals, for gold in the use of mercury or cyanide, and for copper and uranium in the use sulphuric acid.

Mining is the fastest growing industry, accounting for 15% to 20% of GDP and more than half the value of all exports, mostly copper and gold (SoE/UNEP, 2002). Thirty percent of the country has been licensed for exploration. Potential problem arise because of a lack of enforcement of laws including fulfilment of EIA requirements, implementation of mitigation activities and restoration. The law requires site restoration but it is potentially expensive and not enforced, leaving the unreclaimed land barren and erosion prone.

Spoil tips and overburden erode and cause damage to water bodies. Where chemicals are used in the extraction process, leachate from tailings ponds can be toxic and pollute rivers. The government Mineral Resources Authority is well resourced and has able and well trained staff. However, better control of the activities of mining companies and illegal mining in the south is required to both raise revenue for government and limit damage and exposure of the land to further degradation processes.

The major formal mining operations are in the north, for example at Erdenet for copper and Zamaar for gold mining. Small scale "*ninja"* gold mining on the periphery of such operations and elsewhere can be particularly damaging. They are illegal and operate both placer (alluvial) and hard rock deposits. While the impact of the former is considered to be relatively benign that of the later is very damaging because it relies on the use of mercury for amalgamation and extraction of gold. Mercury exposure causes serious and potentially fatal neurological disorders (see CEA, ADB 2004).

EIA legislation is the main instrument for exerting control of the formal mining sector. Controversy has been raised regarding mining and oil exploration in protected areas.

4 EU and other donor environmental co-operation

Mongolia is notoriously dependent on foreign financial assistance and technical cooperation. Much of the donor finance has been in the area of resource management or more environmentally benign energy production, though this mainly involves rehabilitation of coal-fired power stations. The leading country donors are Germany and Japan, also The Netherlands; USAID has a significant programme in the energy sector. The World Bank and ADB have major programmes in environmental management and urban services.

Previous programmes since 2000 are presented in Technical Appendix H (CEA ADB, 2004). The accompanying Country Environmental Analysis report notes the dependence on the continuation of foreign assistance for natural resource and environmental management activities, contributing more than is made available from the national budget. A listing of projects over the last ten years is annexed to UNDP, 2004.

Approximately $22 million of ODA was provided to the Ministry of Nature and Environment (MNE) for natural resources and environmental projects over the period 2000-2004. The four year cumulative total MNE budget was $13.8 million. Over the decade 1993-2003 the MNE received committed ODA for 93 different natural resources and environment (NRE) projects worth US $42 million. The World Bank has a current programme 'Strengthening Environmental Management Capacity at National and Local Level' to address a range of institutional weaknesses.

Recent contributions of the EU have been in Rural Development, specifically in assistance to the livestock sector and meat marketing industry and in agricultural development, also humanitarian assistance. The main donor environmental cooperation projects which are active are briefly reviewed below. A listing of projects over the last ten years is annexed to UNDP, 2004.

Biodiversity and land management

In view of the difficulties in the rural sector and the attractions of the biodiversity theme to political lobbies in Europe and elsewhere, there has been a particular emphasis on protected areas management including the development of buffer zones managed for multiple objectives. Such projects have attracted $15 million dollars in the ten years between 1993 and 2003 (see Technical Appendix H). The largest projects under this theme have been those supported by GTZ (Germany) and those supported with GEF funds and managed by UNDP.

Two ongoing projects of GTZ are:

- Land Management in Mongolia (€2 million for Phase I: 2005-2010) in cooperation with the Administration of Land Affairs, Geodesy and Cartography (ALAGaC). This project will help to develop a cadastral system for registry of land titles to allow secure ownership rights to be established and assist the development of a land market. Work on the legal framework will also be involved. Project activities are focused on areas with different types of land use in the eastern part of the west region, (Zavkhan province) the northern part of the central region (Selenge and Darkhan-Uul) and two districts of Ulaan Baatar

- Conservation and Management of Natural Resources (5.4 million 2002-2006, with 1.4 million from The Netherlands) in cooperation with Ministry of Nature and Environment (MNE). The project has broad aims to intervene in the domain of NRM including strategy and policy development and monitoring, participatory forest management with local authorities. It is particularly involved in the northern "Strictly Protected Area of Khan Khentii" and the national park "Gorkhi Terelj" and its buffer zone, the southern national park "Gobi Gurvan Saikhan" and its buffer zone.

GEF/UNDP have the following current projects: Biological Conservation and Sustainable Livelihood Options in East Mongolia ($US 6.2 million, 1998-2005); Community Based Conservation of Biological Diversity in the Mountain Landscapes of Altai-Sayan Eco-Region ($US 3 million, 2001-2008), together with a UNDP Gobi camel project.

The World Bank has implemented a major Sustainable Livelihoods project ($18 million over 12 years, in three phases). It is implementing a GEF project on biodiversity loss and permafrost melt at Lake Hovsgol and a suite of other projects covering forestry resources management and studies on wildlife trade, tourism development, fuelwood and well sustainability for or co-financed by the Netherlands Trust Fund for Environment in Mongolia (total value $6 million). The IFC have a successful licensed sport-fishing project in the Eg Uur watershed in the northwest.

A new Swedish programme entitled 'Rural Development and Environmental Education in Mongolia' has recently started and will be managed with WWF participation.

Energy and climate change

Energy projects have been implemented with the Ministry of Infrastructure. This is a particular area of World Bank (also GEF) and ADB activity with major loan portfolios,

including rehabilitation of power stations and supply lines. USAID has also contributed in a major way with grant aid worth US$19.2 million between 1992 and 1992 and a continuing assistance programme in this sector. Japan has also been generous in this sector both through grant aid and loans (see Technical Annexe H).

In the area of renewable energy German assistance has dominated including grants to rural electrification and hydropower rehabilitation (Bogd River). The current GTZ Renewable Energy Programme (€6.11 million 1998-2007) aims to promote the economic utilisation of RE-potentials in rural areas of Mongolia. The focus is on the productive utilisation of RE in order to create income possibilities and local job opportunities. Programme activities are mainly concentrated in the western *aimags* of Zavkhan and Khuvsgol.

The largest donor programme implemented by MNE in this area is that funded by ADB and The Netherlands in Promotion of Renewable Energy, Energy Efficiency and GHG Abatement Projects ($US 5 million, from 2001). JICA has made a major investment ($US 8.5 million) in Improvement of Weather Observations and Forecasting Systems. The World Bank has a current Improved Household Stoves project in *ger* areas to combat indoor pollution by providing support to more efficient stoves and cleaner brickettes. These cut the amount of fuel required, saving costs among poorer families and reducing the health impacts of coal burning within the *ger* (tent) or house.

Urban services: water supply and waste management, cleaner production

This is a traditional area of World Bank support; a current loan is in place for $US20 million (for 2004-2010) with Australian and Dutch co-financing. A World Bank Wastewater Strategy has however been shelved by MNE. JICA and ADB have also been active in the past. JICA have recently undertaken a diagnostic study for improved solid waste management. The Netherlands have funded a programme of Cleaner Production and Waste Water Pollution Abatement Systems ($2 million).

5. Conclusions and recommendations

Current status of environmental management

The WWF notes on its national website that the explorer Marco Polo recorded in the 13th Century that hunting of wild animals in Mongolia during their mating and birthing seasons was prohibited in Mongolia. This shows that Mongolians that a conservation ethic has existed in traditional society. However recent events have transformed Mongolian society. The serious run down of forest resources happened in Soviet times and what is left of the forest resource badly needs more rational management.

Special biodiversity issues are engendered by inadequately controlled hunting and illegal trapping, even of rare species for trophies (even snow leopard and argali) is reported to be a serious problem. This is abetted by trade in animal parts for traditional medicines locally and in China, including the rare Mongolian saiga antelope (down to less than 300 individuals) for their horn and bears for their gall-bladders (WWF).

The pastoral livelihood system is still the anchor of rural society. It necessarily requires that animal population is in balance with the grazing resource. The danger is that local overgrazing (especially of goats for cashmere) can cause irreversible damage to the grasslands and with damage to the protective *saxaul* 'forest' in arid areas can eventuate in a 'desertification' process. However the influence of precipitation is critical while the occurrence of natural disaster in the form of particularly severe winters (*dzuds*) can have a devastating effect on animal numbers and viability of households with smaller herds and lacking in traditional skills or other coping strategies and resources.

Important land management issues include the lack of proper control over the damage to topsoil by opencast mining, both in the formal sector and in the small-scale illegal *ninja* gold mining operations. Mining has also harmful health impacts where mercury and other chemicals are used and potential water pollution impacts. Water shortage is a major problem for towns and particularly for Ulaan Baatar. Because water pricing does not adequately reflect scarcity wasteful use by those with access to running water in flats is a particularly inequitable feature because water is not readily available in poor *ger* areas on the outskirts of the city.

Coal is the main source of fuel both for electricity generation and for domestic heating and cooking. In the climate prevailing in Mongolia much coal is burned and air pollution is a serious hazard both indoors, within the *ger* or house and outside. This problem is greatly aggravated by vehicle pollution. In Ulaan Baatar the situation in the long winter months is most serious because of a valley location surrounded by mountains with the characteristic high pressure air conditions.

Industrial effluents (local tanneries, etc) are not adequately controlled nor is solid waste well managed. The government has limited financial resources for undertaking such activities and is not raising sufficient revenue from mining and other natural resource use. Indeed it is very dependent on foreign aid. Inherently problematic is the

low population density and size of the country making able staff very scarce on the ground and the costs of travel to monitor environmental performance and enforce the law excessively high.

Mongolia is a poor country where one third live in poverty and maintaining the subsistence needs of the family is difficult for all but a small and privileged elite. Some of the more detrimental activities are the result of poverty recourses such as mining, migration to towns and even overgrazing around settlements. Other imbalances arise from the modern economy and the wish of the young to leave the tough pastoralist lifestyle and seek education and wage labour in and around the urban areas. But in the market economy there is now no state safety net.

Future Policy Development

A reference for economic progress in achieving broad sustainable development is provided by the Millennium Development Goals. Goal 7 covers environmental sustainability. The table below illustrates the main critical issues and action areas of response to achieve sustainable improvements in human welfare and the productivity of natural resources for maintaining future generations.

Millennium Development Goals

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

Adapted from Mongolia, *Millennium Development Goals: National Report,* March 2004 and UNDP 2004.

Involvement in any of the generic areas identified above will have value but recommendations must come with a certain caution because there are so many donors involved in Mongolia across the range of potential intervention areas. The World Bank's Country Assistance Strategy (2004) highlights the need for strengthening environmental management through expenditure reforms, increasing participation in EIA and developing more community-based resource management.

The environmental governance agenda has to be high on the list such are the perceived failures within the responsible government authorities, despite many years of support from donors. In the perception of a number of important donors, the government has actually worked against the successful implementation of projects in the last five years (eg Eastern Steppes and urban stoves projects). Indeed, over the same period the MNE has lost much of its professional expertise. It has even been remarked that if the government had been more co-operative it could have accessed more resources and certainly experienced better outcomes from existing projects.

Symptomatic of the misapprehensions between government and donor thinking on environmental management is the currently proposed and high profile Eco Trass or 'Green Wall' project. The government is currently seeking funding to build a green wall 500 meters wide and 2,500 km long to control 'desertification' along the northern edge of the desert zone. Experience elsewhere suggests to commentators that this plan is both ill-conceived and over-ambitious. More mundane and critical areas for policy development are evident.

Priority policy areas are identified as:

- Revision and updating of existing institutional and legislative frameworks especially in the forestry, water resources, mining and urban sectors.

- Reforming and clarifying land ownership structure to encourage long term management and investment in land.

- Assisting the production and dissemination of decision-relevant environmental information and encouraging greater environmental disclosure and public participation.