The establishment of the network Gateway database FAO to natural resource and environment information in Mongolia

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I Introduction

In globalizing era, countries of the world are provided with an opportunity for cooperating in building the capacity of the country and overcoming the constraints facing to food supply and food security due to information technology. Using websites, countries are open to sharing their information, experience on particular subjects, especially making solutions on natural resources today.

Recently our institute has established the Gateway database to natural resources and environment particularly land and water resources of Mongolia in cooperation with UN FAO in 2004.

The purpose of Gateway database to Mongolia is to provide information on the state, condition and trends of rural land and water resources of Mongolia. The objective of Gateway database is to promote improved and expanded knowledge of researchers and decision making for sustainable use of agricultural natural resources of the country.

II Objectives

The main objectives of the presentation are to introduce about Mongolian Gateway database on environment and natural resources to you and also to use some information of Gateway database for RAISE project.

For specific objectives of Gateway database are following:

1) to build the database on sustainable development and environment,
2) to provide with the reliable and accurate information on the natural resource including land and water and economy of Mongolia in implementing process of the project RAISE and
3) to assist the implementation of one of the specific goals to establish and strengthen the network of the early warning systems for drought of the TPN5 programme "Strengthening Capacity for Mitigating Drought Impact and Desertification Control" of UNCCD implemented by the nodal institute ECO ASIA.

Gateway database of Mongolia is a dynamic internet-based network. This database includes the great of information and results of long term research and scientific works/surveys which have been done by Mongolian scientists and researchers and additionally statistical data with their sources respectively.

The Mongolian GATEWAY database has the following categories.

1) Country overview
2) Land resources
3) Water resources
4) Plant nutrition resources
5) Hot spots
6) Bright spots
7) Challenges and viewpoints
8) References/related internet links

1. Country overview

Country overview includes the background information on Mongolia's geographical location and social and economic features, especially on Mongolian climate.

1.1 Geography

Mongolia lies in the heart of the Central Asia between 41° 35′ – 52° 06′ of latitude and 87° 47′ – 119° 57′ of longitude, neighboring with Russia along 3,485 km in the north and with China along 4,676.9 km in the south. Mongolia is divided administratively into main 22 units that are 21 aimags (provinces) and the capital city Ulaanbaatar.

1.2 Population

Mongolia has a population of 2.5 million people. About 57% of the population lives in urban areas. Mongolia's population density, at 1.5 persons per km^2 is one of the lowest in the world. The population is very young-almost 70% are under 35 years of age-due to significant government family subsidies in the 1960s and 1970s, when the growth rate was 2.9% (the highest in Asia) and the population almost doubled in twenty-five years. Since the late 1980s, the growth rate has fallen to an estimated 1.4% in 2001. About 40% of the population is thought to live below the poverty line, however, counter-balancing this sobering statistic, the life expectancy is 64 years and the literacy rate at age 15 is 97%, surely one of the highest in the developing world.

1.3 Economy

Mongolia's economic performance has improved in recent years. GDP is estimated to have grown at 4.0 percent in 2002-higher than in previous years, but well below the target of 5.5 percent needed to meet the country's poverty reduction goals. Also, little headway has been made in reducing income poverty. Both the depth and severity of poverty have increased in recent years, as has the inequality in income distribution. Close to 35.6 percent of the population was below the income poverty line in 1998-marginally lower than the 36.2% recorded for 1995.

The urban sector generates 61.6% of the country's

GDP and conversely, the rural sector only 38.4% in 2002. However, in 1998, urban poverty (39.4%) exceeded rural poverty (32.6%). More than half (57.0%) extremely poor lived in urban areas-26.0% of them in the capital. Whereas, 43.0% of the poor lived in rural areas. GDP in 2003 was apportioned 20% to agriculture, 19.0% to industry and % to services. Out of a total employment force of 1,488.9 people, 41.9% is in agriculture, 11.4% accounts for industry and the rest for other sectors.

Semi-nomadic livestock production accounts for over 70% of agricultural returns, with the balance made up of cold-climate crops such as wheat, barley, potatoes and domestic fodder on the small area of available arable land. The fastest-growing area of the economy is the mineral sector. Mongolia has significant coal reserves, modest oil and gas discoveries, and promising metal production potential (*i.e*. copper, molybdenum, gold, silver, fluorspar, tungsten, zinc, lead, uranium and nickel). 2001 the Erdenet copper/molybdenum operation accounted for over 50% of Mongolia's hard currency earnings.

1.4 Decreased per capita income

The economic reforms and privatization process initiated in the early 1990s have significantly affected Mongolia's economy. Over the period 1990 to 2002 the standard of living of the average Mongolian has worsened. GDP per capita was around 500US$ in 2003.

1.5 Household poverty and vulnerability

Poverty alleviation is regarded as one of the most significant development challenges facing the country. 1998 Living Standards Measurement Survey identified over one third of the population living below the poverty line. Worsening macroeconomic conditions and two successive droughts since then have probably worsened poverty levels. The Participatory Living Standards Assessment conducted in 2000 identified additional problems of rising environmental, physical, and social insecurity and vulnerability faced by Mongolian households. Drought, harsh winters, increasing over-grazing of pastureland, and poor natural resource management practices are believed to have weakened the capacity of poorer urban and rural households to weather economic and environmental shocks.

1.5 Climate

The Mongolian climate characterizes by long lasting cold winter, cool summer, small precipitation, high temperature contrast/fluctuation and relatively high number of sunny days a year.

The January is coldest month with average temperature of -15 °C to -35 °C with minimum of -50 °C. In December 1972, the temperature fall till -56°C at Uvs lake depression and this is the coldest record. The June is the warmest month with average temperature of 15 °C – 25 °C. The maximum temperature can reach 35 °C – 43 °C. The July, 1999 was the most hot month.

According to the latest research there are some environmental changes in Mongolia such as yearly mean temperature has increased to 1.66 °C during last 60 years.

Precipitation varies both in time and space. Annual mean precipitation is 300-400 mm in the Hangai, Hentein and Huvsgul mountain region, 150-250 mm in the steppe, 100-150 mm in the steppe-desert and 50-100 mm in the Gobi-desert. About 85-90 per cent of annual precipitation falls in summer as rain. The mountain range smoothly changes into steppe and desert from north to south. Accordingly the heat and wind resources increase while the precipitation and soil moisture decrease.

2. Land resources

Land resources consists of various information on different sub topics on land resources of Mongolia: physiography, soils, wetlands and inundated land types and land use *etc*. Mongolia comprises 1,564.1 thousand km^2 of land and occupies 17th place by the size of territory and first place by per capita land resources (65 ha) in the world. Per capita agricultural land in Mongolia (53.8 ha) accounts for 20 times over the world's average. Land is classified in 2003 into six categories as stated below:

1) Agricultural land – 73.9%
2) Urban land – 0.3%
3) Roads and Communication land – 0.2%
4) Forest land – 9.3%
5) Water land – 0.6%
6) Land reserve – 15.6%

3. Water resources

It is estimated that the total water resources in Mongolia amount 599 km^3: 83.7% in lakes, 10.5% in glaciers and 5.8% in rivers. The total water use is 0.5 km^3. Water resources are unequally distributed over the country.

The rivers in Mongolia originate from the three large mountain ranges: Mongol Altai, Khangai-Khuvsgul and Khentein. The rivers are divided into three main basins depending on their drainage system: the Arctic Ocean Basin, /AOB/ the Pacific Ocean Basin /POB/ and Internal Drainage Basin /IDB/ of Central Asia. The Arctic Ocean Basin is the largest basin: its drainage area covers about 20% of Mongolia's territory. About 50% of surface water resources originate from this basin.

The open surface water such as rivers lakes and springs are used mostly for domestic and agricultural purposes in rural areas. Industrial use of surface water is not significant. The agricultural water is used for two goals: watering the domestic animals and irrigation agricultural field.

3.1 Irrigation

Irrigation in Mongolia was probably developed under the Huns in the first century AD. Irrigation development appears to have peaked at about 140,000 ha during the seventeenth and eighteenth centuries.

Traditional irrigation methods had been largely abandoned by the end of the nineteenth century. Chinese 'migrants' developed comparatively small-scale schemes on the larger rivers. Modern irrigation development started in the 1950s, and the first modern irrigation scheme was designed in 1955.

In the 1980s, irrigation schemes were characterized by sprinkler systems, generally serving 400-500 ha or more,

primarily for fodder and cereal production and, to a lesser extent, for vegetables and potato production.

The total sprinkler irrigated area has been in steady decline with the privatization of the state farms operating the systems and the subsequent lack of finance. In 1992, only 52 percent of the total area under sprinkler systems, or 22,000 ha, was operational. Of the remaining area, 11,000 ha are classified as abandoned for irrigation purposes, while the other 10,000 ha are defined as non-functional due to failed or missing equipment. Individual irrigators have established plots on schemes as the farming companies have withdrawn from irrigation.

According to updated cost estimates provided by the Ministry of Food and Agriculture, registered irrigation investment averaged about US$1,300/ha at 1993 prices, with infrastructure representing 87 percent of this amount. In 1995, an FAO mission estimated new irrigation establishment costs at approximately US$2,000/ha and rehabilitation costs at approximately US$700-1,000/ha.

During the 1980s, fodder crops accounted for approximately 50 percent of the area irrigated under sprinkler systems; annual cereal crops (mainly wheat), 20-40 percent; potatoes, 5-10 percent; vegetables (mainly cabbage, onions, carrots and turnips), 5-10 percent; and fruit (seabuckthorn, blackcurrant and Siberian apples), less than 2 percent. Unregistered irrigation schemes have focused primarily on potatoes, vegetables and fruit production, with significant areas of fodder production in the west and south. Fodder, cereals and potatoes have suffered from the reduction in irrigation extension. Vegetables, some fruits and early potatoes are the main crops currently grown on irrigation schemes.

4. Plant nutrition resources

This section introduces the key elements of the nutrition in the arable land and pastoral grass. The scientific research is required on the plant nutrition in the future.

5. Hot spots

Hot spots refers to the problems and constraints facing to water and land resources particularly to sustainable agriculture of Mongolia. Here is says that one of the "hottest" spot is soil erosion that have impact on food supply, additionally no introduction of new improved technology into farming and animal husbandry sectors.

For Mongolia the problems are land degradation and desertification due to the country climate circumstances.

The land degradation is affected to the socio-economic of the country. Because of continued land degradation, number of livestock as well as pasture and crop yield are decreasing.

In continental and harsh climate the soil is eroded by wind, water and temperature changes. Especially last years anthropogenic, technological and zoological negative activities contribute the soil erosion. Classifying the soil erosion, 12.9% of total area is heavy eroded, 28.2% middle eroded and 46.5% weakly eroded.

6. Bright spots

Bright spots are about good examples of the programs and projects being implemented for soil conservation and sustainable land use. In other words, Protection of land resources from degradation or depletion has always been an issue for consideration by the Mongolian Government.

This section includes the sound policy and law on land use and land privatization in Mongolia.

III Challenges and viewpoints

The agricultural production plays an important role in food security of Mongolia. Many challenges and views of the researchers are reflected for agricultural development, increased agricultural production and agricultural intensity. Some of the overall challenges are:

1) Making the policy on developing farming, animal husbandry, and forestry in integrated way.
2) Setting up the land value /price/ which will be used as economic incentives to develop the agriculture in the future.
3) Developing the irrigation of arable land and pastureland in complex way.
4) Introducing the modern and new technology, and areo-space information and database system for agriculture development.
5) Taking measures on preventing of desertification, land degradation, land erosion and combating desertification.
6) Organizing activities on policy coordination, technology and management to mitigate the impacts of drought and natural disasters.

References/related internet links

References/related internet links contain 33 references and 9 links about Climate, Weather, Agriculture, Environment, Remote sensing and other dozens of websites that are all related to water and land resources. Most of the information and data of the Gateway database are extracted from the number of the publications written by Mongolian famous scientists and National Statistical Office of Mongolia.

Notes: The Present Gateway database is updated for every half of year. Detailed information are available from:

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