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Review of GHG Inventory Preparation in Mongolia

Dr. DORJPUREV JARGAL
EEC Mongolia

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Development of the National System for the GHG inventory preparation

- GHG inventory preparation is executed by Ministry of Nature, Environment and Tourism (MNET), which is responsible for climate change related issues, with the support of various related ministries as well as private sector, local communities and NGOs. The MNET is the operational focal point for multilateral environmental agreements.
- The National Climate Committee (NCC) established in 2000 is responsible to provide policy advice and guidance to the proposed project.
- A Project Management Team (PMT) and a National Study Team (NST) were reconstituted under the MNET. The NST consists of five Thematic Working Groups (TWG) including GHG Inventory and Mitigation Analysis.
- The Inventory working group is composed of a number of experts from both public and private sectors, academic institutions and NGOs.

Development of the National System for the GHG inventory preparation

- In order to prepare periodically GHG Inventories and to improve its quality, a National Manual of Procedures of preparation of GHG Inventories was developed to follow it in preparation of inventories.
- This *Manual* of Procedures of National GHG Inventory Preparation is the technical document to prepare National Greenhouse Gases Inventories for submission to the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC).

The main contents of the GHG Preparation manual are:

- Legal and Institutional Arrangements;
- Preparation of activity data;
- Choice of estimation methods suited to national circumstances;
- Quality assurance and quality control procedures
- Uncertainties at the source category level;
- Archiving, Reporting and Documentation.

Preparation GHG Emissions for National Communications

- The Initial National Communication included GHG emissions for the period 1990-1998 which was submitted to the COP/UNFCCC in 2001. During the calculation of GHG emissions there were difficulties with incomplete statistical information for source categories and lack of national emission factors.
- Since 2001, when INC has submitted, significant structural changes have occurred in the most important sectors of the national economy and the system of collection and processing of statistical information has been changed. Therefore, a more differentiated and detailed approach to inventory preparation was required within the framework of the SNC.
- The GHG Inventories for Second National Communication were prepared during the period of 2006-2008.
- For new inventories for SNC, it was updated all data and emission factors and recalculated GHG emissions for the period 1990-1998 and newly calculated GHG emissions for the period of 1999-2006.

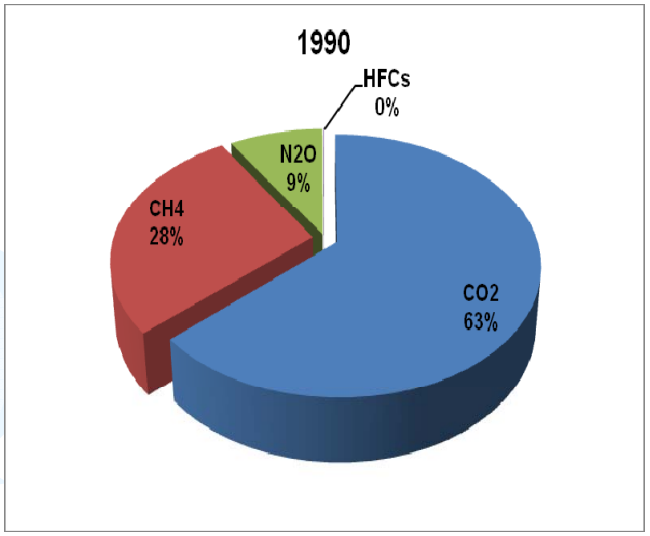
Preparation GHG Emissions for National Communications

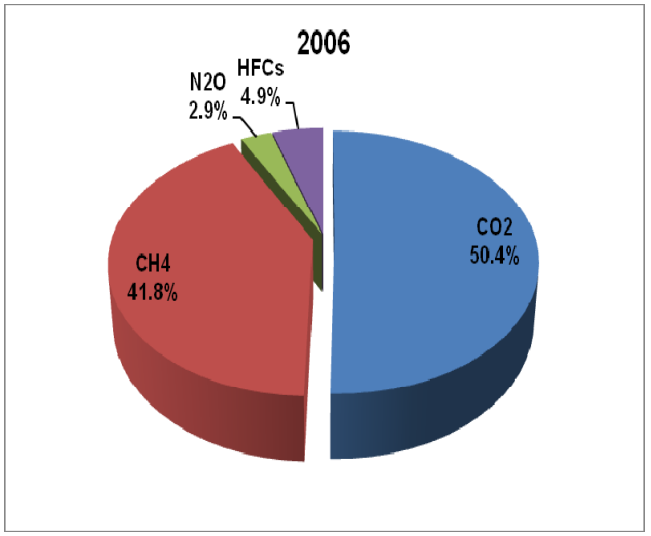
GHG inventory preparation during the Initial and second National communications

Sectors	*Initial National Communication*	*Second National Communication*
All Sectors	- Calculation of GHG emissions for the period 1990-1998	- Recalculation of GHG emissions for the period 1990-1998 - New calculation of GHG emissions for the period 1999-2006
Energy	- CO2, CH4, N2O, NOX, CO emissions from fuel combustion by Reference Approach - Fugitive emissions from sold fuels	- CO2, CH4, N2O, NOX, CO, NMVOC and SO2 emissions from fuel combustion by Reference Approach - CO2, CH4, N2O, NOX, CO, NMVOC and SO2 emissions from fuel combustion by Sectoral Approach - Comparison of these 2 approaches - Fugitive emissions from sold fuels
Industry	- CO2 emissions from cement and lime	- Calculation of CO2 and SO2 emissions from cement and lime - NMVOC emissions from Food and drink production - Emissions from consumption of Halocarbons (HFCs)
Agriculture	- CH4 emissions from livestock - Default emission factors with some assumptions (Tier 1)	- CH4 emissions from livestock - Country specific emission factors for enteric fermentation of domestic animals (Tier 2) - CH_4, CO and NO_X emissions from the burning of agricultural residues - N2O emissions from Cultivation of soils
Land use change and forestry	- CO2 emissions from Changes in Forest and Other Woody Biomass Stocks - CO2 emissions from Forest and Grassland Conversion - CO2 removals from Abandonment of Managed Lands	- CO2 emissions from Changes in Forest and Other Woody Biomass Stocks - CO2 emissions from Forest and Grassland Conversion - CO2 removals from Abandonment of Managed Lands
Waste	- CH4 emissions from Solid Waste Disposal on Land	- CH4 emissions from Solid Waste Disposal on Land - CH4 emissions from Wastewater treatment - Country specific emission coefficients

Preparation GHG Emissions for National Communications

GHG Emissions in CO_2-eq by gases for the period 1990-2006

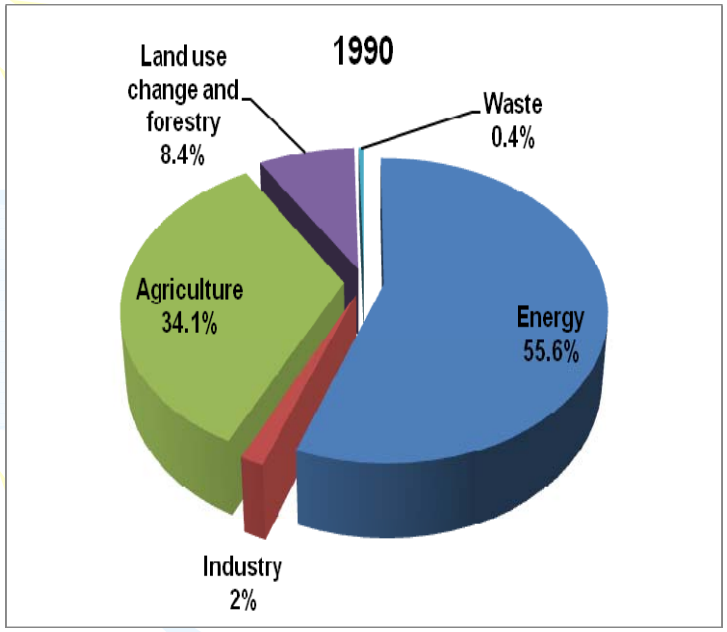


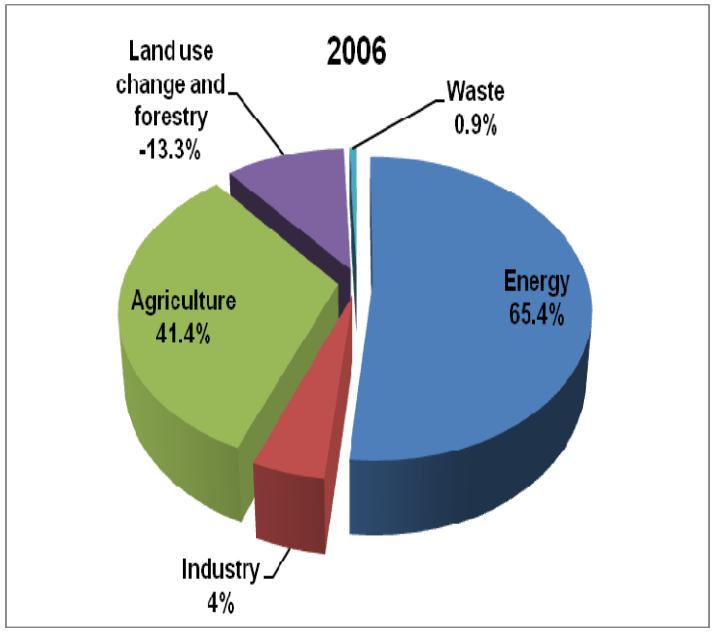


Carbon dioxide is the most important greenhouse gas in Mongolia's inventory with a share of 50.4 % of the total CO2-eq emissions in 2006 followed by methane, which comprises 41.8%. The remaining gases (N2O, HFCs) make up 7.8% of Mongolia's GHG Emissions.

Preparation GHG Emissions for National Communications

Contribution to total CO_2-eq emissions by sector for 1990 and 2006

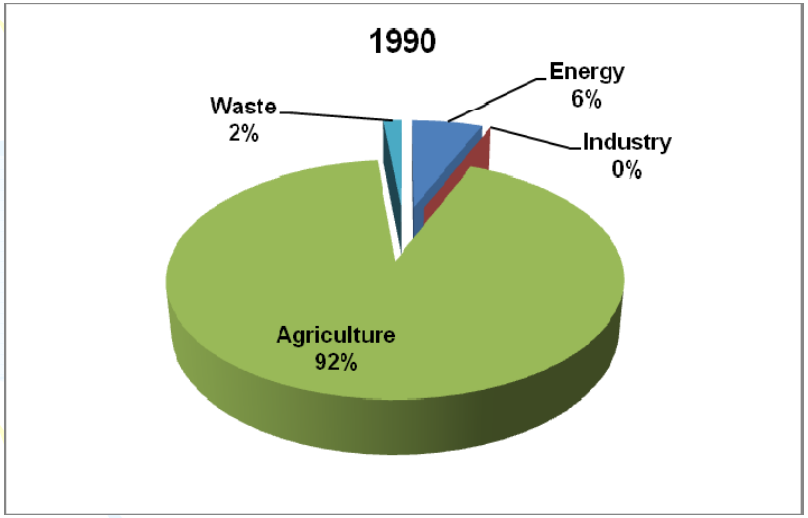


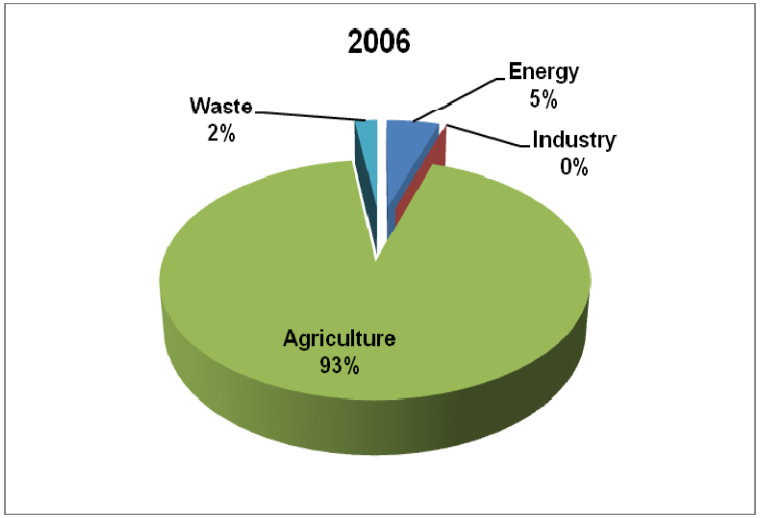


In 2006, the energy sector (including stationary energy, transport and fugitive emissions) was the largest source of greenhouse gas emissions comprising 65.4% of total GHG emissions in CO2-equivalent. The second largest source of GHG emissions was agriculture sector (41.4%). For Land use change and forestry sector, the total CO2 removals were 13.3% due to increase of the area of abandoned lands and reduce of newly cultivated land. Other relatively minor sources currently include emissions from industrial process and waste sector.

Preparation GHG Emissions for National Communications

Contribution to methane emissions by sector for 1990 and 2006

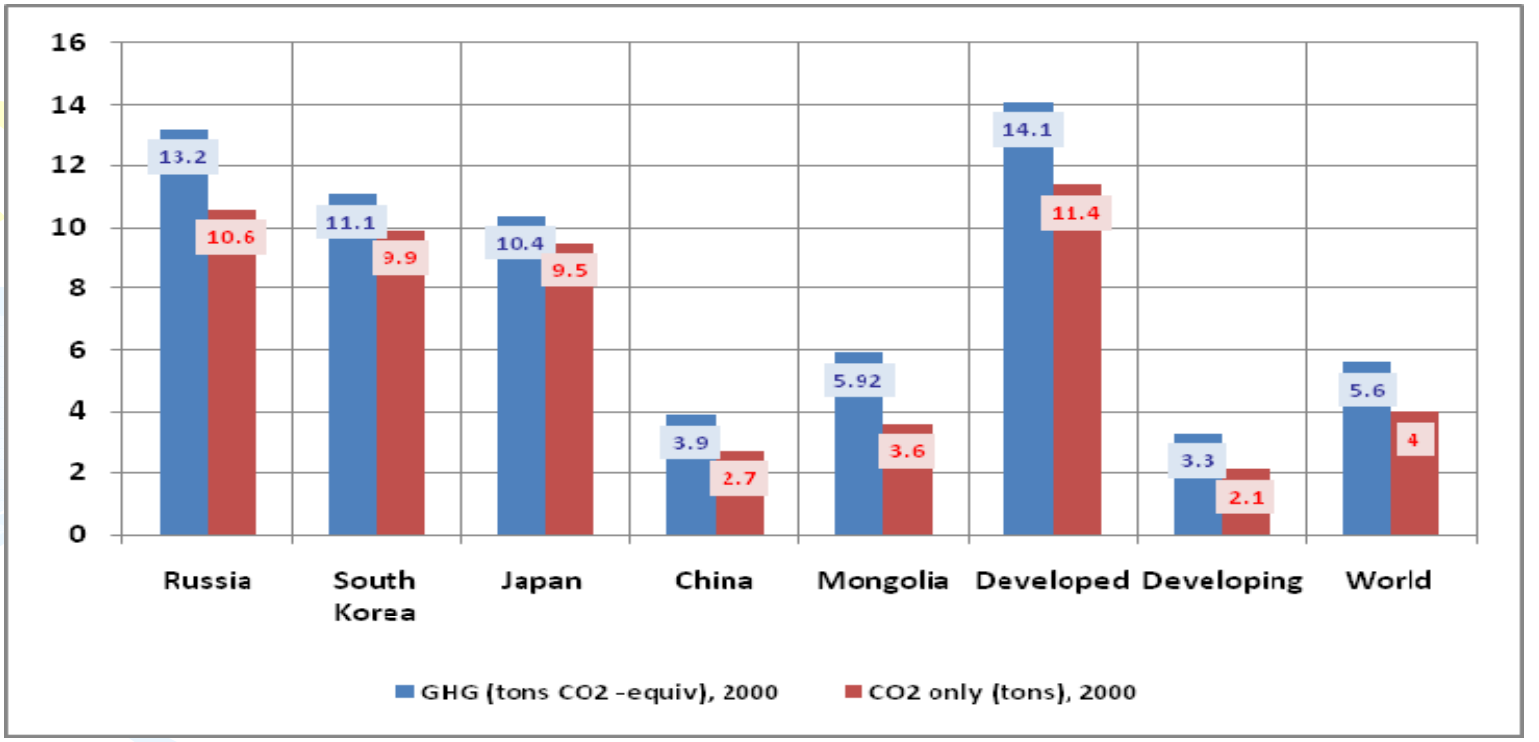




The main contributor to the total methane emissions is the agriculture sector with about 92- 93% of the total methane emissions The second biggest contribution comes from the energy sector with about 5-6%, while all other sectors are contributing with less then 2% in total.

Preparation GHG Emissions for National Communications

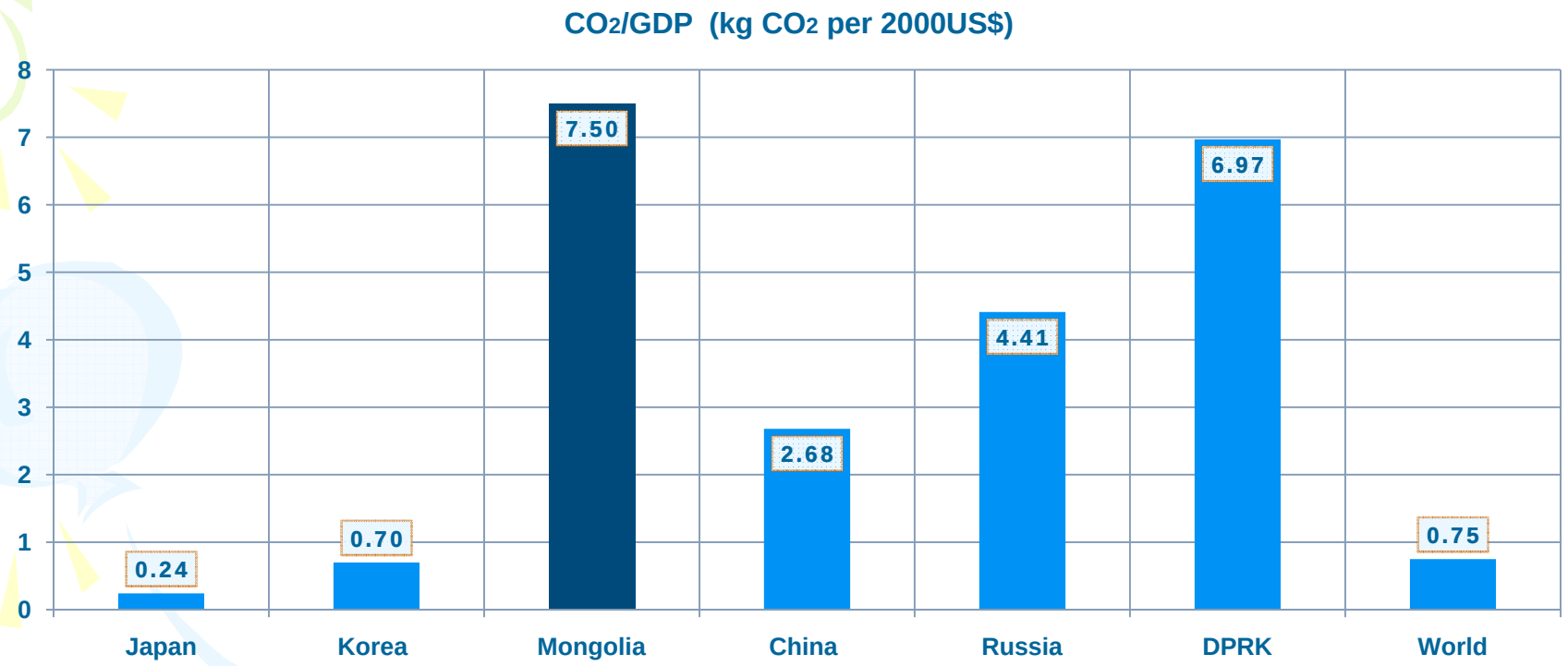
Per Capita Emissions



If compare with the other developed and developing countries, the total GHG emissions is small, but per capita and per GDP emissions is high. Mongolia's per capita emissions were 6.0 tons /person, which is almost 2 times more than developing countries average.

Preparation GHG Emissions for National Communications

CO2 Emissions per GDP



Per GDP CO_2 emissions are 10 times more than world average

Difficulties with data gaps and uncertainties

The Mongolian Greenhouse Gas (GHG) Inventory follows the methodologies recommended by the IPCC (IPCC, 1996).

The main obstacle was the lack of reliable data for the calculations. It was possible to obtain officially data from Statistical Yearbooks only general activity data, such as fuel and energy consumption and production, main industrial outputs, domestic animal population, area of cultivated land, etc.

Other required data could be found from different kind of courses. In some cases same data from different sources is different. In most cases, specialized data such as emission factors and country-specific emission data of gases have not been worked out for Mongolia. Therefore, the IPCC recommended default values were typically used in the GHG Inventory calculations.

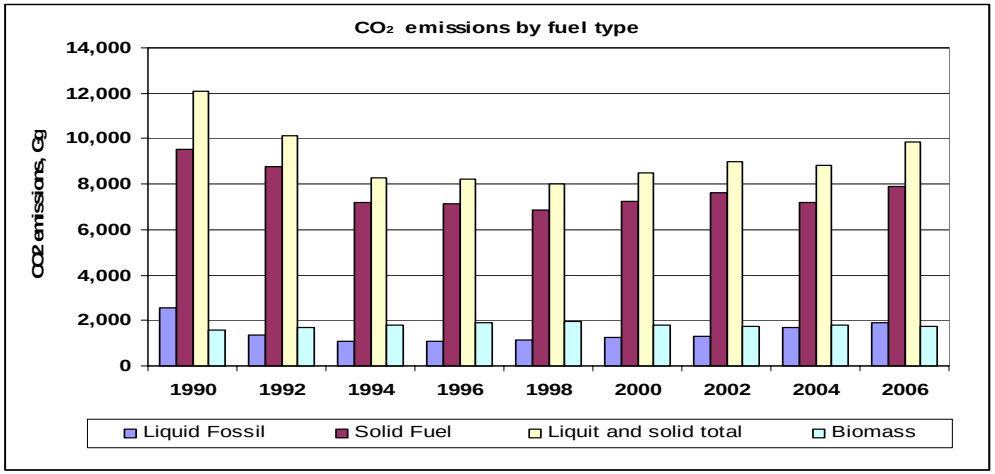
Difficulties with data gaps and uncertainties

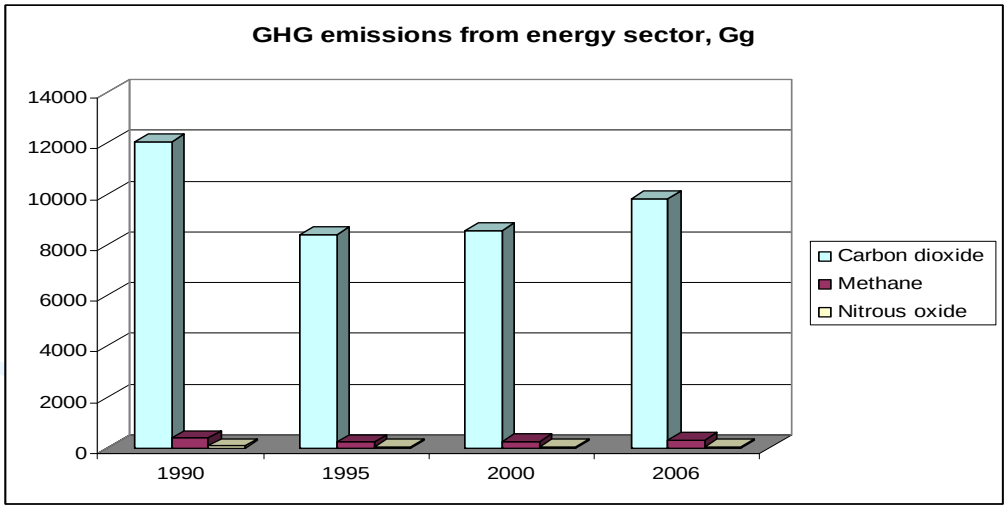
But the last GHG Inventory includes following improvements in order to reduce uncertainty.

- For energy sector, GHG emissions from fuel combustion were calculated using 2 approaches- Reference and Sectoral and made comparison analysis.
- For Agriculture sector, the GHG Inventory team is developed country specific emission factors for enteric fermentation of domestic animals. Methane emission from enteric fermentation of livestock depends on livestock type, its weight, productivity and quality of forage. However, most Mongolian livestock is an indigenous breed of animals, grazing trough out the year on natural pastures, with low productivity and small size compared to other breeds of animals in the world. Livestock stay in the pasture whole year and obtain forages from pasture where its quality varies season to season. Actually, cold season in Mongolia continues 7 to 8 months. Also there are no other countries similar to Mongolian nomadic husbandry are available. Therefore emission factors for enteric fermentation have been developed for Mongolian specific conditions using Tier 2 by working group on GHG Inventory.

Development of time series Estimates

Greenhouse gas emissions from Energy sector

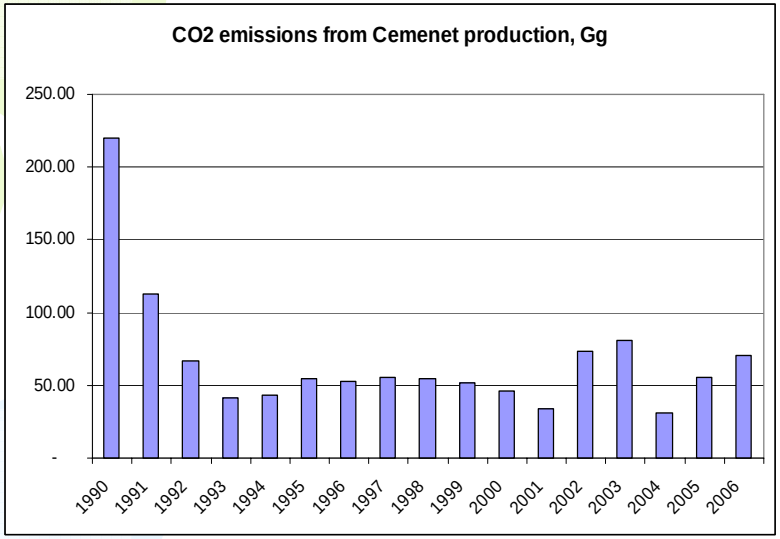


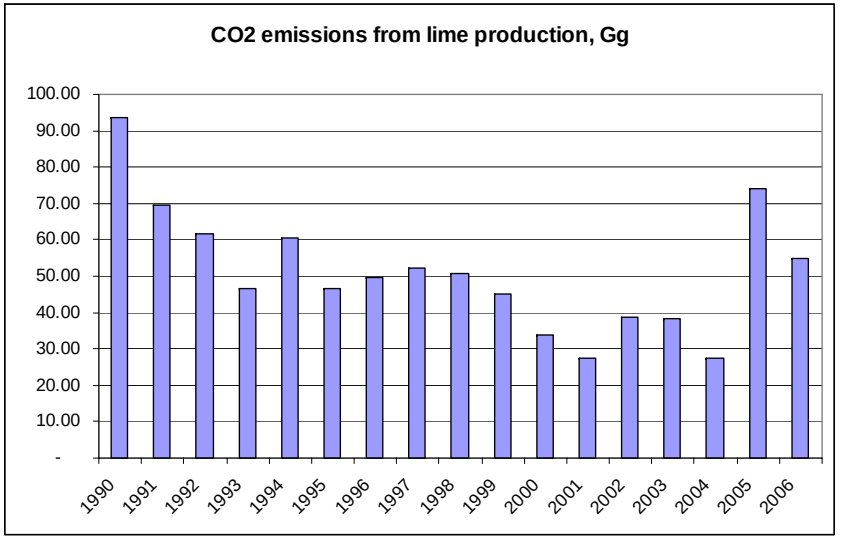


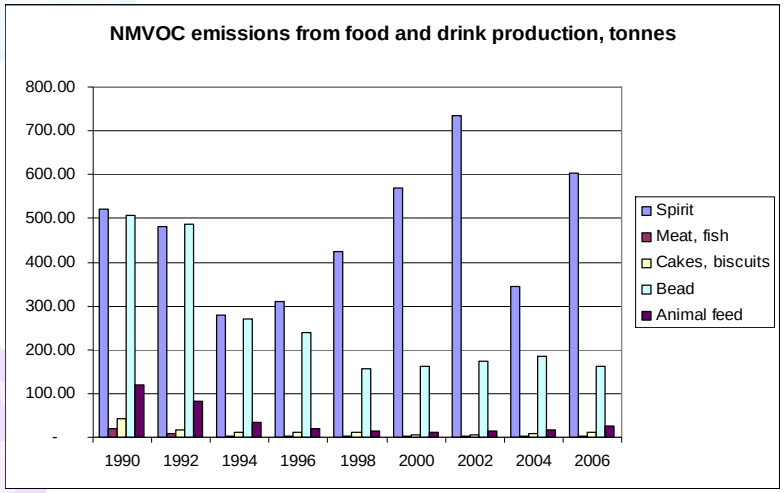
The decrease of Carbon dioxide emissions from fuel combustion between 1990 and 1995 is mostly due to socio-economic slowdown during the period of economic transition.

Development of time series Estimates

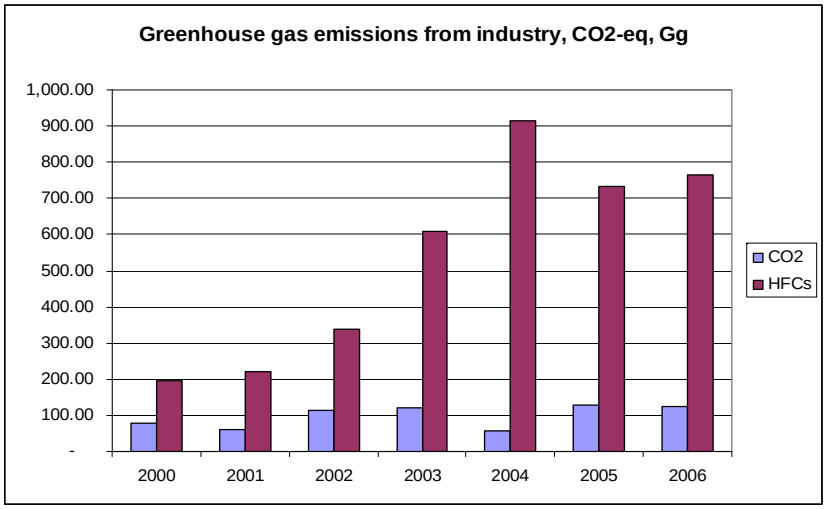
Greenhouse gas emissions from Industry







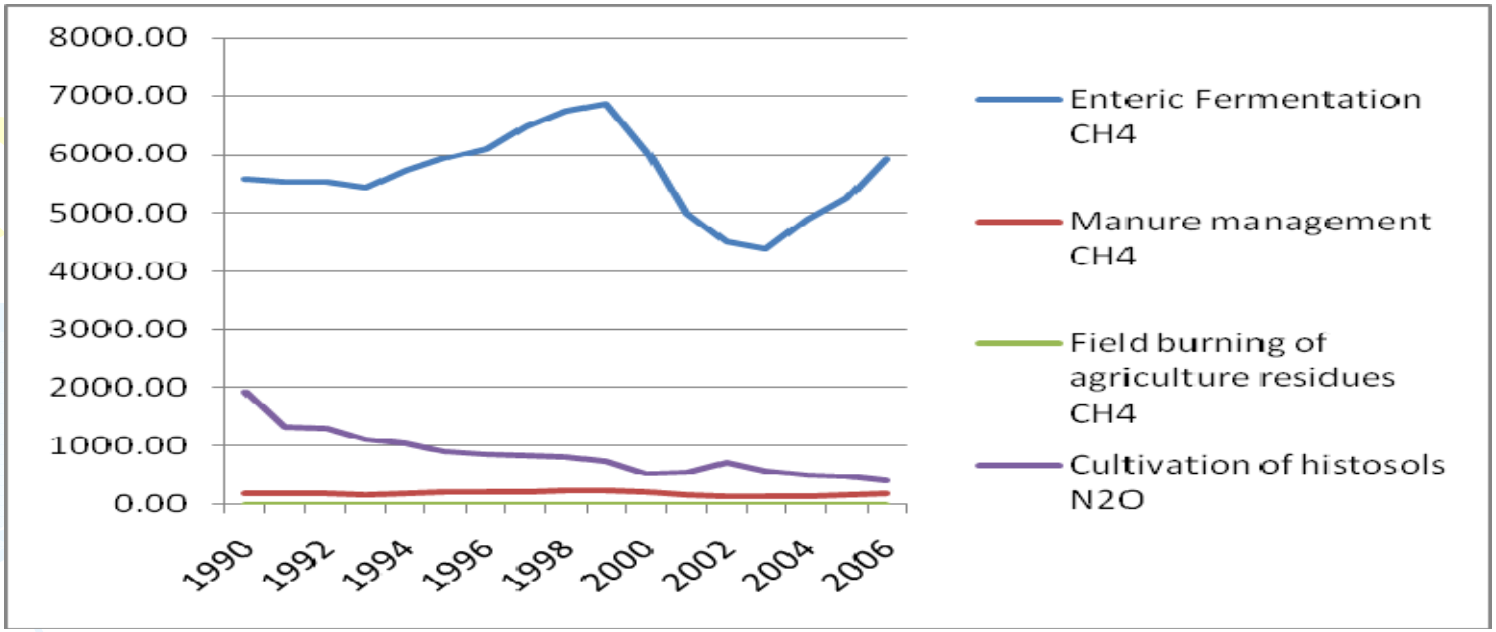
Non-Methane Volatile Organic Compounds (NMVOCs)



Fluorinated hydrocarbons (HFCs)

Development of time series Estimates

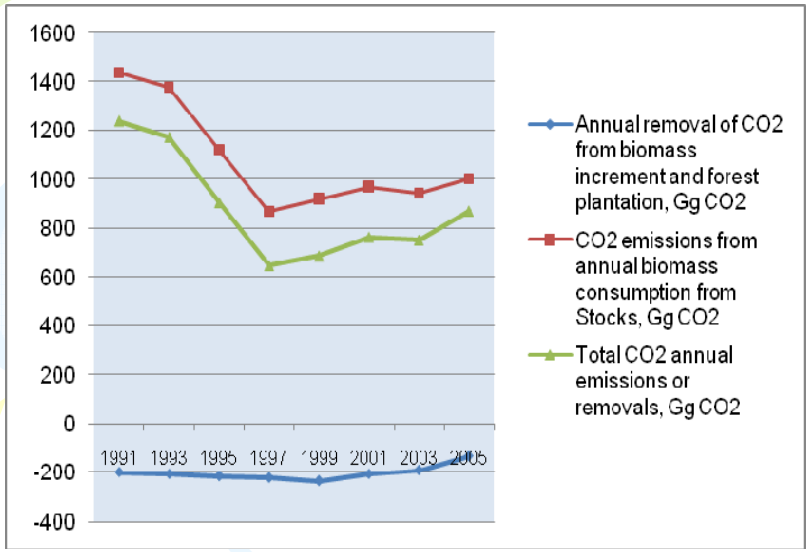
Greenhouse gas emissions from Agriculture

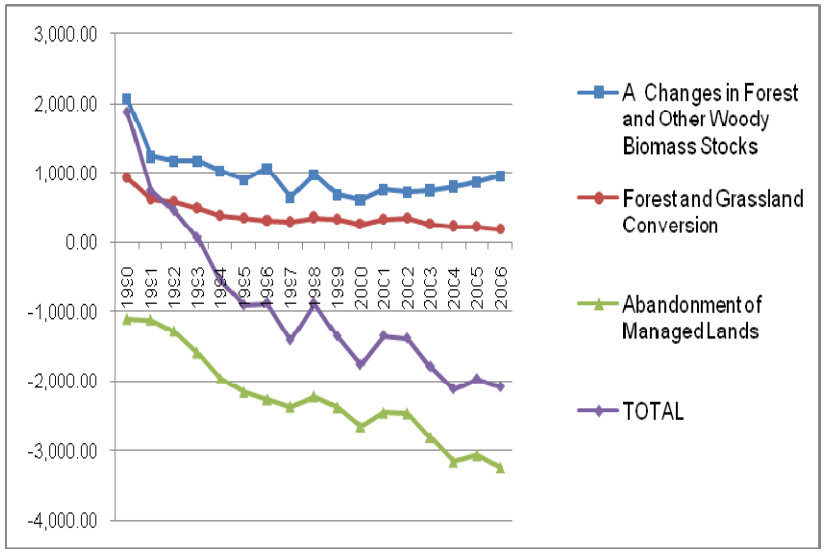


The most methane emissions for agriculture are from enteric fermentation of animals . The changes of methane emissions from enteric fermentation depend on livestock population

Development of time series Estimates

Greenhouse gas emissions from Land use Change and forestry

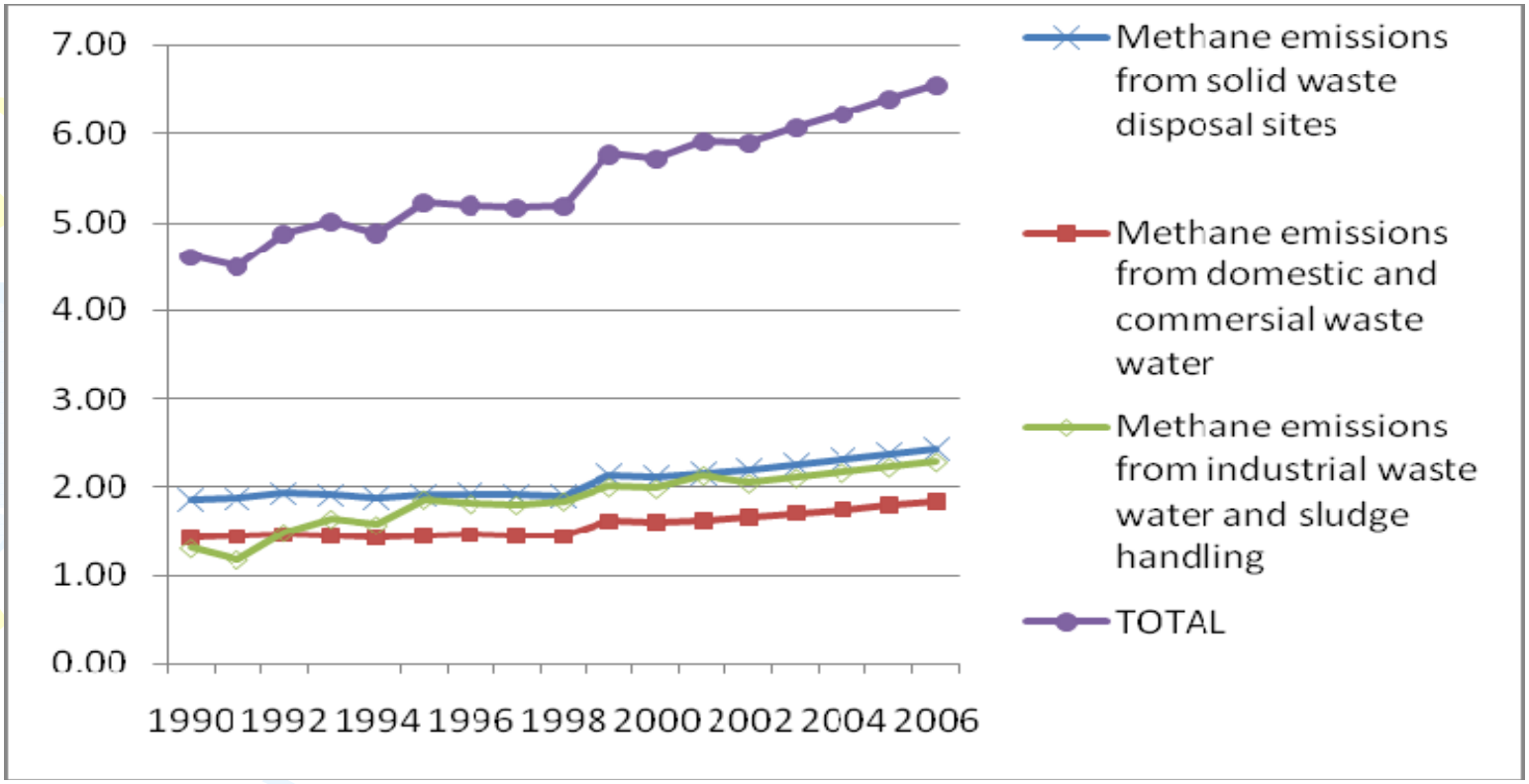




For land use change and forestry sector, CO2 removals were increased due to increase of the area of abandoned lands and reduce of newly cultivated land.

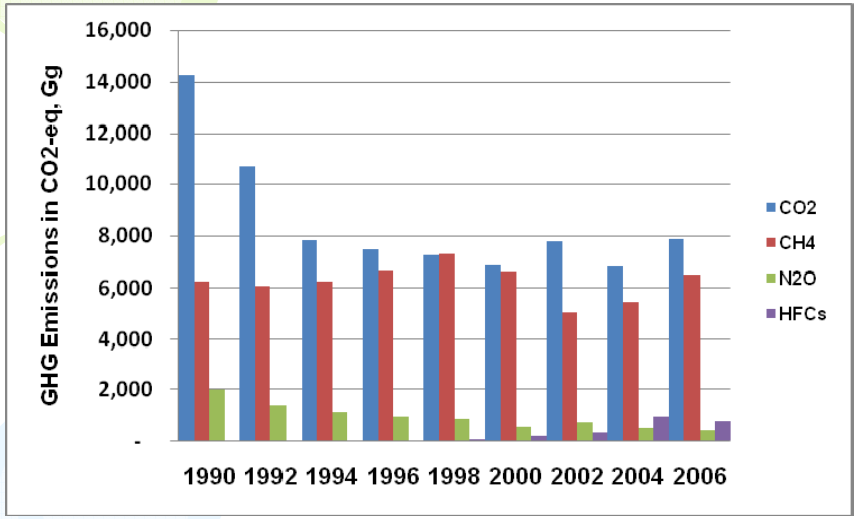
Development of time series Estimates

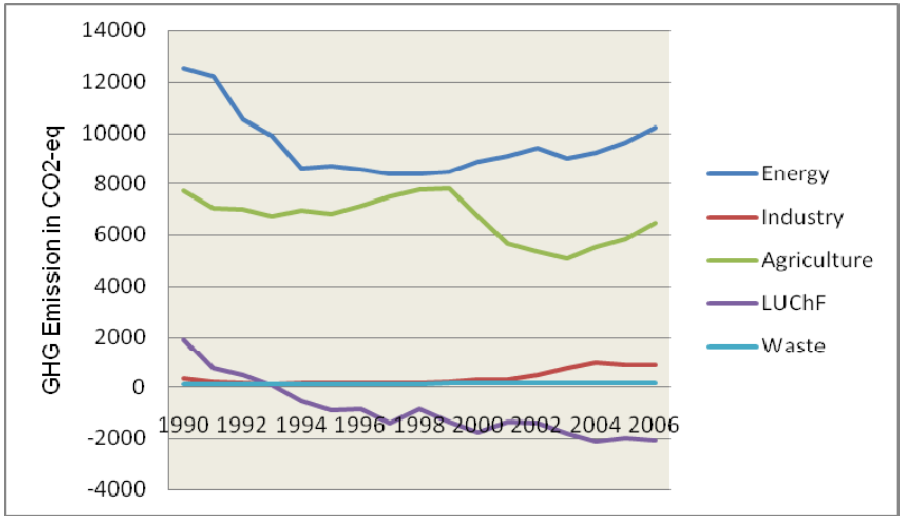
Greenhouse gas emissions from Waste

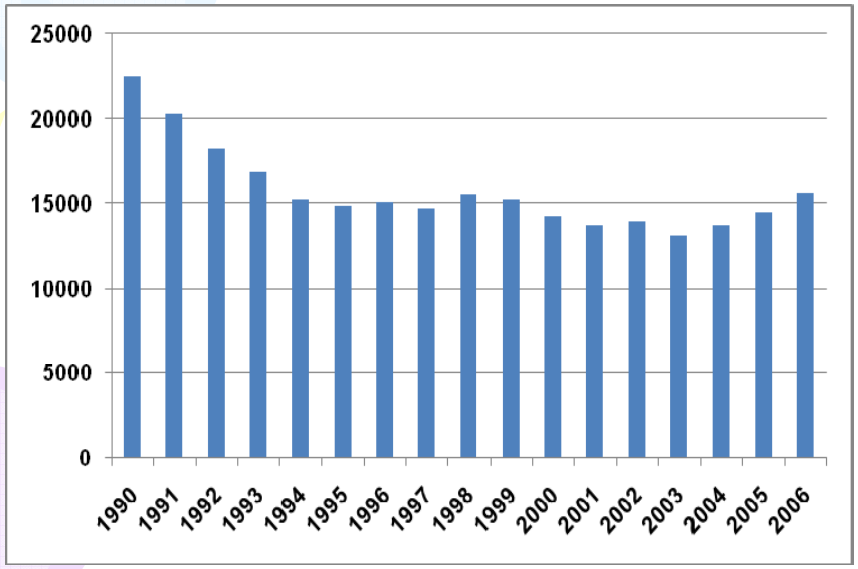


Development of time series Estimates

Total Greenhouse gas emissions







In 1990, Mongolia's net GHG emissions were 22532 thousand tones CO_2-eq. and the net GHG emissions were reduced up to 14850 thousand tones in 1995. The reduction of net GHG emissions is mostly due to socio-economic slowdown during the transition period from socialism to market economy. But during this period the methane emissions are increased due to increase of livestock population. The HFCs are increased for the period 1990-2006 due to increase of refrigerators and vehicles with air conditions.

Thank you for attention