


몽골의 기후변화 현황과 저감 및 적응 사례

바트볼트 국제협력국장
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CLIMATE CHANGE AND NEEDS FOR ADAPTATION IN MONGOLIA

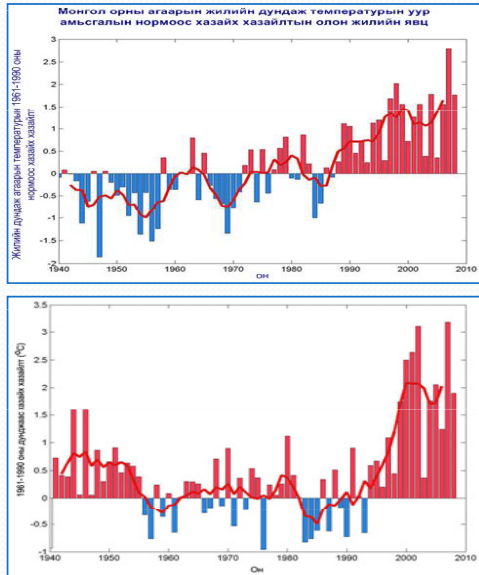
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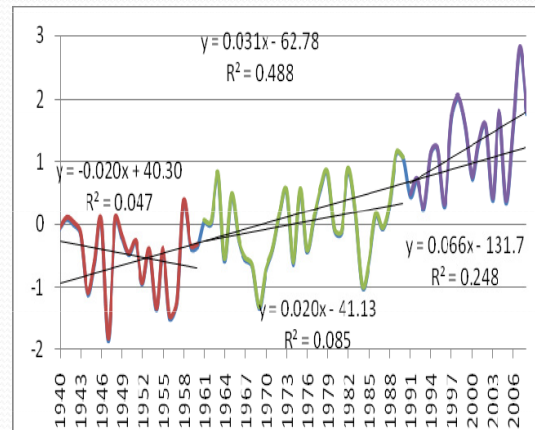
OUTLINES

- Climate Change and Its Impacts in Mongolia
- Needs for Adaptation
- Adaptation Measures to Reduce Adverse Impacts of Climate Change

Air Temperature Changes in Mongolia

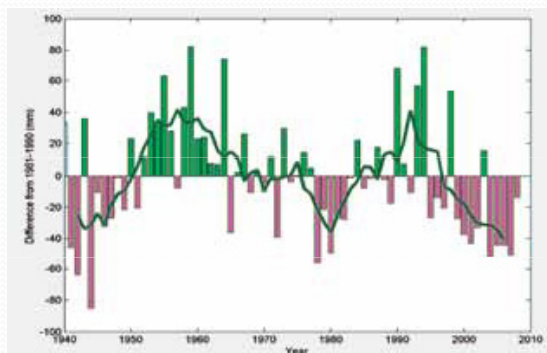


Annual Mean (above) and Summer Mean Temperature Trend (anomaly from the average for the period 1961-1990)

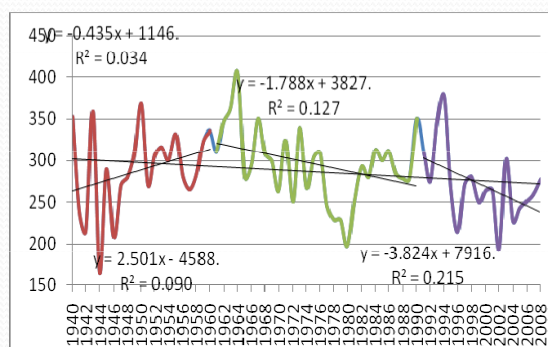


The annual mean air temperature of Mongolia has increased by 2.14°C between 1940 and 2009

Precipitation Amount Changes in Mongolia

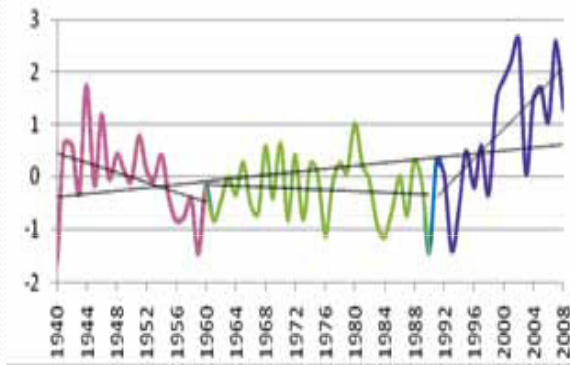


Annual Precipitation Amount Changes between 1940-2009 (anomaly from the mean 1961-1990)

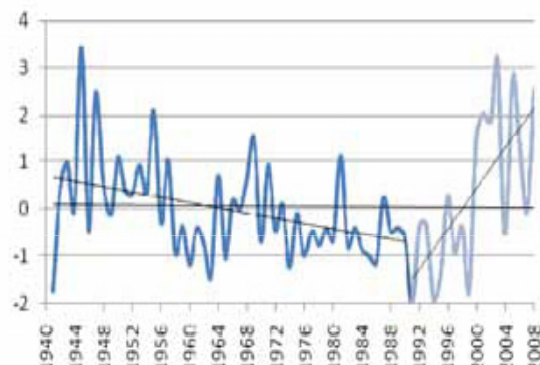


Precipitation Amount Changes in the Warm Season

Changes in Occurrence of Weather related Disasters



Multi year average drought index



Multi year average zud index

Note: positive value represents dryness, negative value- wetness

Features of Current Climate Change in Mongolia

Air temperature features:

- Annual mean temperature of Mongolia increased by 2.14°C for the period 1940-2008.
- Air temperature increased more significantly in summer than in winter season.
- Temperature increase more noticeable in mountain areas than in Gobi desert and steppe areas.
- Significant increases are in hot extremes and heat waves

Precipitation and Natural disaster changes:

- Relatively, winter precipitation increased slightly faster than summer precipitation.
- No significant changes in annual precipitation amount, but it decreased in Gobi and steppe areas.
- Increases in frequency and magnitude of natural disasters

Climate Change Projections for in Mongolia 21st Century by *HadCM3* model

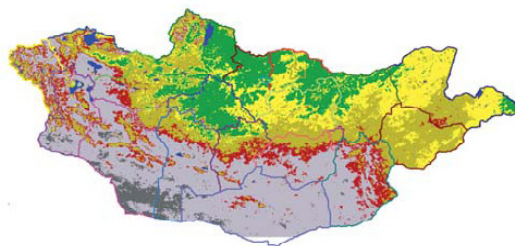
Season	GHG Scenarios	Air Temperature, °C			Precipitation, %		
		2011-2030	2046-2065	2080-2099	2011-2030	2046-2065	2080-2099
Annual	A2	1.0	2.7	5.0	2	9	15
	A1B	0.9	3.0	4.6	0	7	16
	B1	0.8	2.1	3.1	3	6	11
Winter	A2	0.7	2.3	4.2	14	19	55
	A1B	0.2	2.5	3.8	0	23	41
	B1	0.2	1.6	3.0	7	14	32
Summer	A2	1.1	3.1	6.3	-2	4	7
	A1B	1.4	3.6	5.6	-4	3	11
	B1	1.2	2.7	3.7	2	0	8

- Climate change would be intensified during the new Century.
- Warming in summer season is higher than in winter
- Summer temperature increases are **1.1-1.4°C** in 2011-2030, **2.7-3.6°C** in 2046-2065 and **3.7-6.3°C** in 2080-2099.
- Annual Precipitation amount increases are 0-16% during 21st Century that are much lower than potential evapo-transpiration increase.

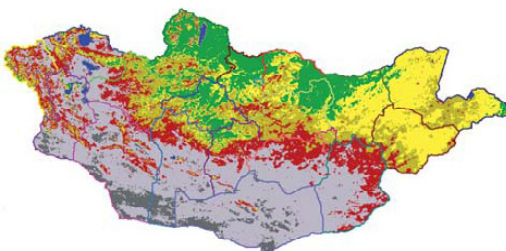
Land Surface Change and Desertification

- Studies show that pasture grassland yields decreased by 20-30% during the last 40 years.
- The 78.2% of Mongolia's territory has been affected by medium and high rates of desertification.

1992



2002



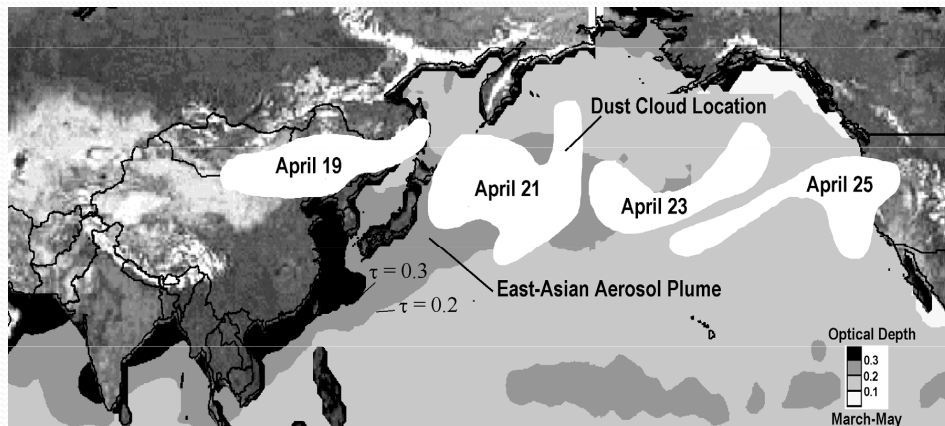
Most Vulnerable Natural Systems to climate change

- Ecosystems /Water Resources/Forest
- Natural Zones/Grassland
- Wild animals – habitat destruction
- Glaciers, Snow Cover
- Permafrost
- Land Degradation and Degradation

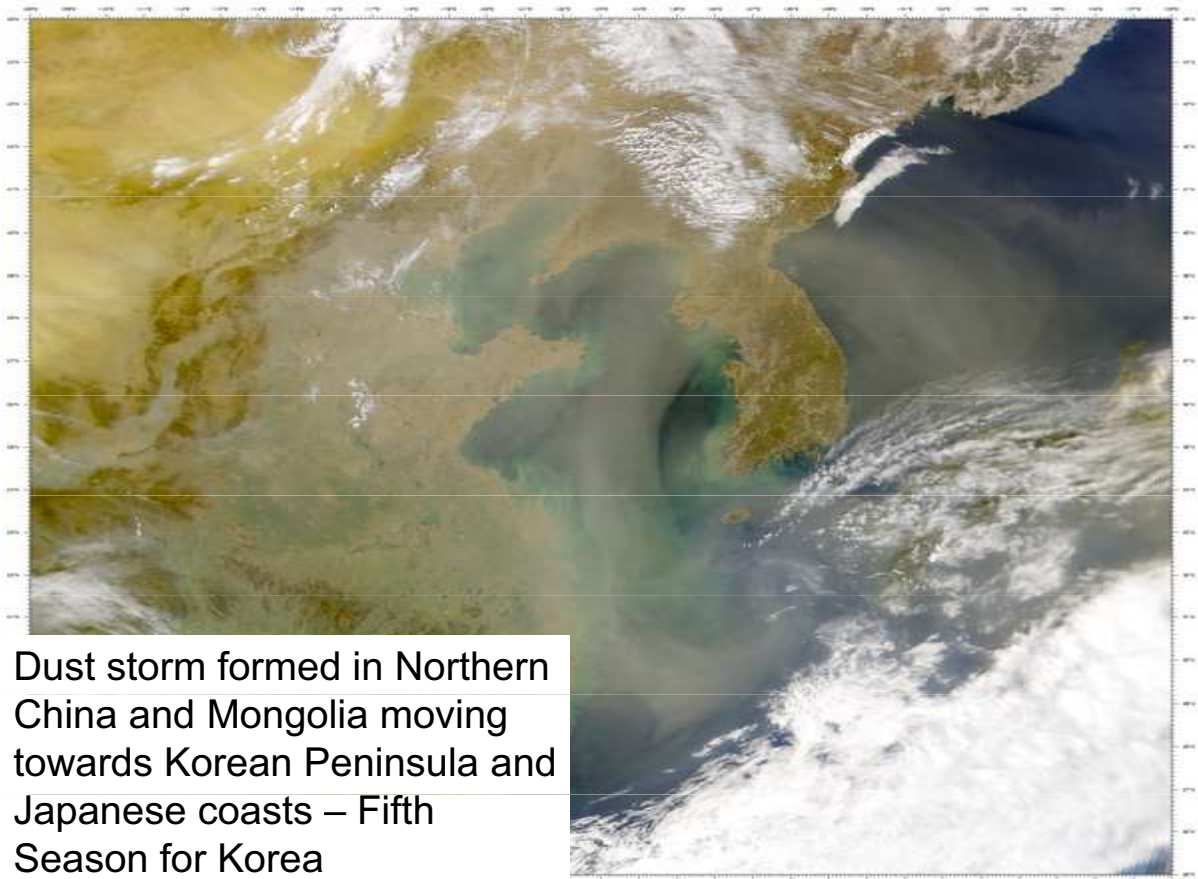
Consequences

- Natural disasters
 - Dust storms
 - Severe or warm winters or sudden change
- Uneven distribution of precipitation
- ?
- ?
- ?
- Vulnerability loss
- Loss of Biodiversity
- etc.
- etc.
- Affecting livelihoods

Transportation of dust storms from source areas to downwind regions



- Dust storms originated over the Northern China and Mongolian Gobi moved to NE of China, the Korean Peninsula and Japan as well as North America.
- **Source:** R. B. Husar et.al, JGR-ATM. 106 (D16): 18317-18330 AUG 27 2001 (in case of April 19-25, 1998) – this has happened also in April 18 2001 after 2 consecutive years of drought



Dust storm formed in Northern China and Mongolia moving towards Korean Peninsula and Japanese coasts – Fifth Season for Korea

Related Policy and Legal Documents

- Law on Air revised (2010, 1995)
- Law on Environmental Protection, (1995, 2007)
- Law on Disaster Prevention, 2003
- National Security Priorities
- The Mongolia Action Programme for the 21st Century (MAP21)
- The MDG-based Comprehensive National Development Strategy of Mongolia (2008)
- National Action Program on Climate Change (NAPCC) (2000, 2011)

National Action Program on Climate Change (NAPCC)

- The Updated National Action Program on Climate Change (NAPCC) is approved by the Parliament early January 2011.
- Goal of the program is to ensure ecological balances, development of socio economic sectors adapted to climate change, reducing of vulnerabilities and risks, mitigation of GHG as well as promoting economic effectiveness and efficiencies and implementation of 'Green growth' policies.
- NAPCC includes adaptation strategies and measures for key socio-economic sectors of Mongolia.

NAPCC: Strategic objectives

In order to achieve the goal, the following 5 strategic objectives have been defined:

1. Set up legal, structural and management systems that support measures against climate change
2. Ensure ecological balances and reduce socio economic vulnerabilities and risks step by step through strengthening of national adaptation capacity to climate change
3. Mitigate GHG emission step by step and set up low carbon economy through introduction of environment friendly technologies and improvement of effectiveness and efficiency.
4. Enhance national climate observation network, research and assessment
5. Conduct public awareness and support citizen and community participation in actions against climate change

NAPCC: Implementation period and phases

National action program for climate change will be implemented in two phases in the period of 2011 to 2021.

➤ **In the first phase (2011-2016)**, national mitigation and adaptation capacities will be strengthened, legal, structural and management systems will be set up and community and public participation will be improved.

➤ **In the second phase (2017-2021)**, climate change adaptation measures will be implemented and start up greenhouse gas mitigation actions

NAPCC: Implementation approaches

- Align with the national security strategy, sustainable development, Green economic growth and progress
- Adhere to keeping to environment balance, reduction of pollution, poverty alleviation and assuring human safe and healthy livelihood
- Introduce progressively advanced scientific and environmentally sound techniques and technologies in GHG mitigation and climate change adaptation actions
- Synchronize traditional practices and culture with modern advanced methods in implementation of the program
- Maintain international and regional partnership and cooperation
- Ensure cooperation of government and business, community and individual participation, improve integration of sectors, central and local levels actions
- Ensure justice, transparency, human rights and gender equality in the implementation.

Needs For Adaptation

- ❖ Because of the specific circumstances of the country, its natural ecosystem and socio-economic sectors are very vulnerable to climate change.
- ❖ Therefore, climate change will have adverse impacts on biophysical environment and socio-economic sectors of Mongolia.
- ❖ In order to reduce the adverse impacts of climate change, adaptation measures should be undertaken.

Adaptation strategy

- Development of national adaptation strategy focusing on issues of national concern and most vulnerable sectors to adverse impacts of climate change
- Integration into National and sectoral development policy and programmes and projects
- Evaluation of concrete and practical adaptation measures that could possibly decrease the vulnerability and sensitivity of most vulnerable sectors and areas.
- Improve adaptive capacity at all levels (national, sub-regional, sectoral, communities, etc.)

Adaptation challenges (1)

- Planning of adaptation on the regional or national level should be justified with the sectoral development programmes and economic and financial mechanisms.
- The identified adaptation measures would involve a range of possible actors. Long-term concerns with respect to sustainable use of pasture resources are generally the responsibility of the national government, as the pasture is state owned.
- Hence, the implementation of adaptation measures should first be on national planning organizations. However, successful adaptation requires coordination between central and local levels of management.

Adaptation challenges (2)

- Participation of national and local governments, scientists, and herders is equally important in the implementation of any of the adaptation measures.
- Implementation of most of adaptation measures requires heavy investments. Mongolia has many other socio-economic problems and financial constraints. Therefore, it is important that at the national planning level, the available funds are more clearly prioritized and allocated according to the objective of the economic and technical criteria.
- Mongolia should participate in regional, sub regional, and bilateral cooperation and initiatives on climate change-related issues, so that it could gather more experience and knowledge on adaptations to climate change.

Important adaptation measures (1)

- Conserving the natural resources, especially natural pasturelands
- Strengthening domestic animals biocapacity
- Enhancing capacities and livelihood opportunities of rural communities
- Increasing food security and supply
- Improving understanding of climate extremes and strengthening disaster risk capabilities
- Introducing new and reliable insurance systems

Important adaptation measures (2)

- Identification of high priority adaptation measures. These measures should be more effective, technically feasible, socially acceptable, financially recoverable and feasible within the existing or improved institutional and legal framework in Mongolia.
- Adaptations for the purpose of improving the economic sustainability of livestock production and the ecological sustainability of natural resources used in livestock production is focused on improving feed availability to livestock during annual production cycles.
- Reduction of vulnerability of livestock to impacts of climate change through the suggested adaptation measures requires actions in a coordinated way and incorporation in long-term planning.

Important adaptation measures (3)

- Research, training, strengthening, and building upon existing capacity might be most important measure in strengthening the adaptive capacity.
- Improvement of the forecasting and early warning systems is essential, although implementation could be deterred by institutional and communication infrastructure. Increase disaster forecasting as drought and dzud, would however help in preparing to meet potential dangers.

Potential Adaptation Project Proposals (1)

1. Livestock sector:

- Increasing meat production and reducing pasture degradation,
- Establishment of farmers cooperative,
- Establishment of water harvesting reservoirs for livestock,
- Planting animal forage,
- Improvement of water monitoring network,
- Early warning network of prevention and mitigation of risks related to climate change,

Potential Adaptation Project Proposals (2)

2. Agriculture sector

- Extension of irrigated cropland,
- Introduction of water efficient technology in agriculture,

3. Water sector

- Natural and artificial regulations of rivers flow,
- Equipping resident apartments in Ulaanbaatar with water counters,
- Public awareness on water consumption practices,

Potential Adaptation Project Proposals (3)

4. Health sector

- Comprehensive study of climate change impacts on human health,
- Adaptation of health service system to climate change,

5. Education and capacity building

- Capacity building for Climate Change Adaptation

Recalling back Traditional Knowledge

- Winter snow collection and storage of it under soil method in big areas – herders during winter used this method to keep humidity during spring the most dry season until first rain falls

CONCLUSION

- Actions to address the climate change challenges must be ultimately linked to the government strategies on sustainable development and economic growth, and fall across a variety of sectors.
- Bilateral cooperation between Mongolia and RoK in the field of environment and climate change would play an important role in implementation of the NAPCC.
- MEGD of Mongolia has a strong interest to collaborate with relevant organizations i.e. MoE of RoK in climate change area, especially to implement an adaptation projects.
- Also, there are big potentials in GHG mitigation in Mongolia, in particular REDD+, NAMA, etc.



**THANK YOU FOR YOUR KIND
ATTENTION**

