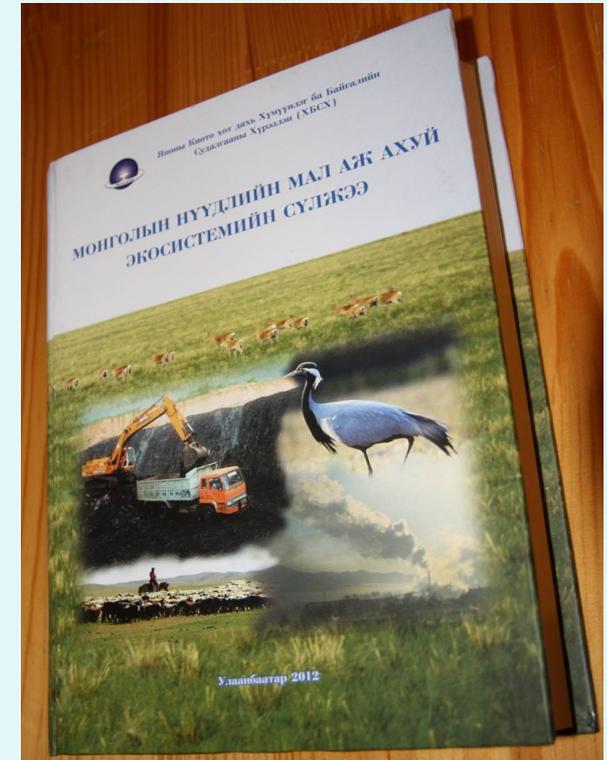
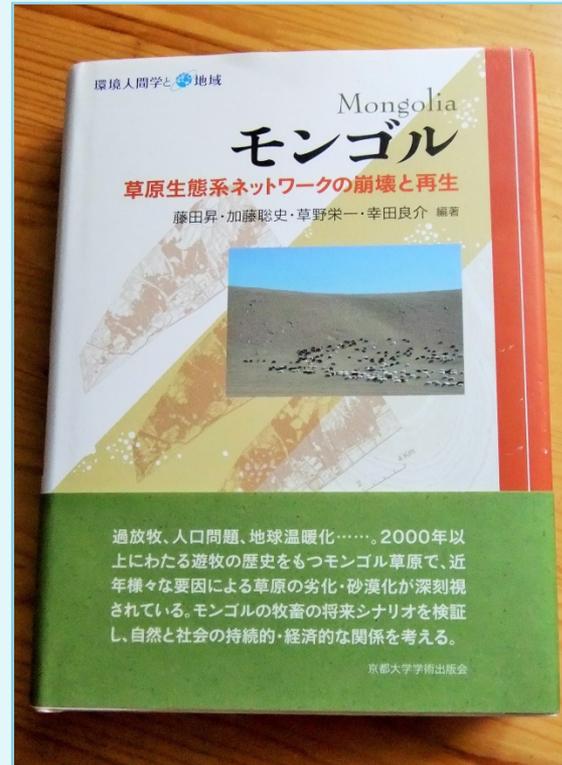
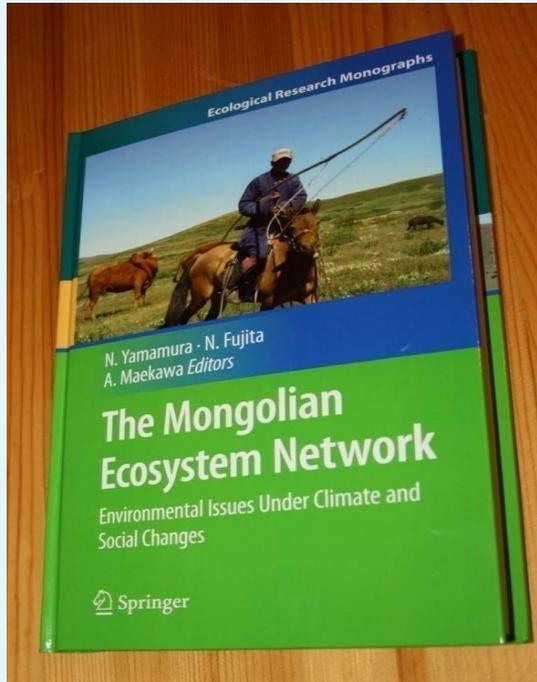


Project outcomes: publications on Mongolian ecosystem network



Lessons have to be learned by decision makers: to maintain interface with the scientific communities and listen to the voice of civil society groups

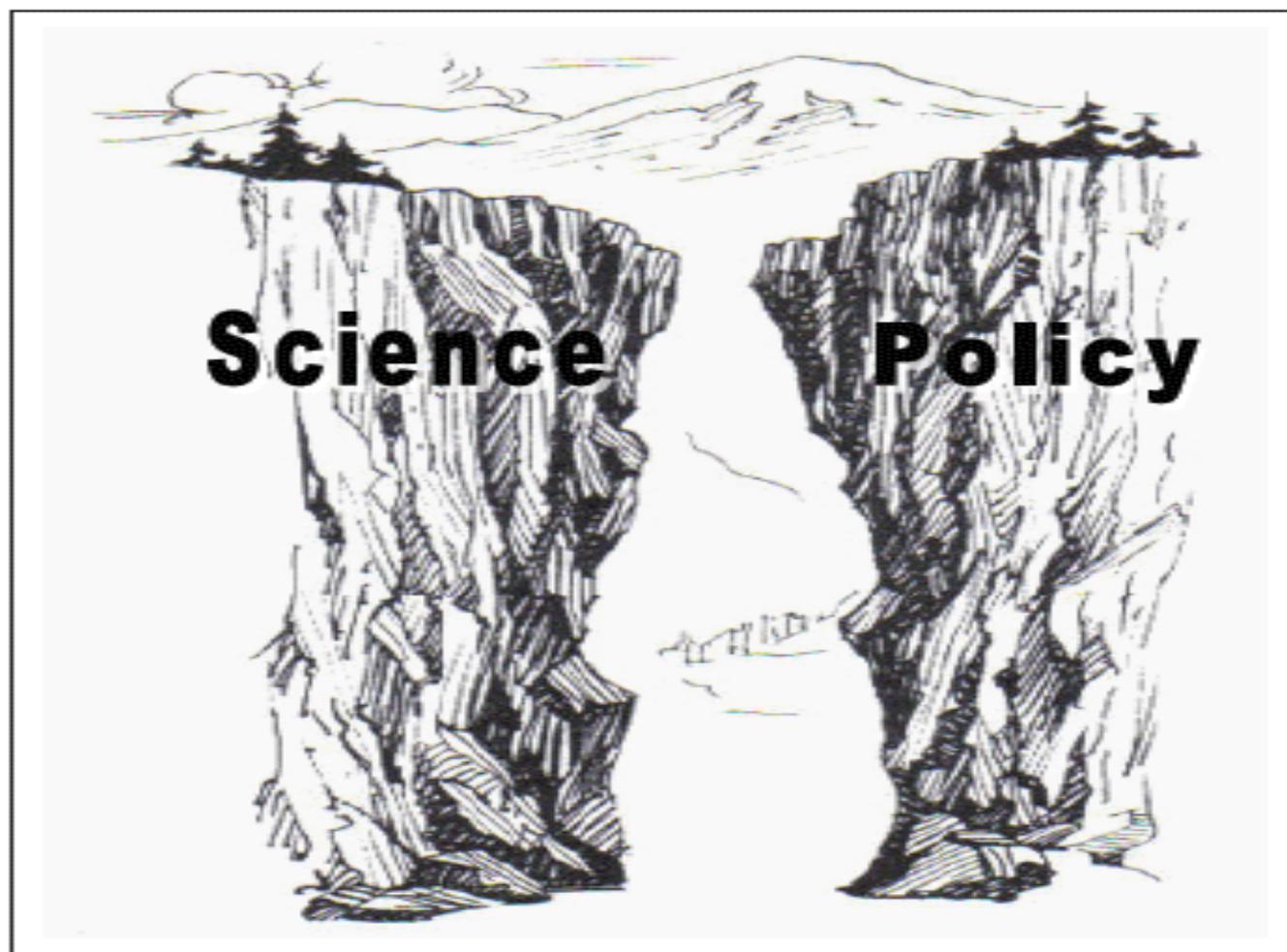


FIGURE 3
The science-policy chasm

Adaptation options to the changing climate with a minimum impact of the natural hazards, particularly zud events

- ▶ Passive adaptation (Дасан зохицох) based on the inherited (biological) and gained (life experience) resilience
- ▶ Active adaptation (Зохицон дасах) based on enhanced (scientific knowledge, education) resilience,
- ▶ Proactive adaptation (Идэвхтэй зохицон дасах) engineered resilience (communication, transportation means and facilities, infrastructure)

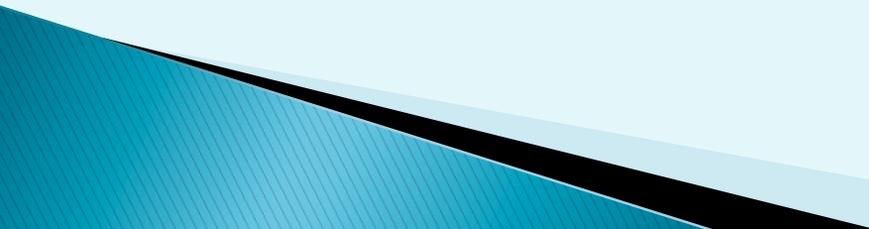
Adaptation related policy documents

The “Millennium Development Goals–based Comprehensive National Development Strategy” of 2008, as well as the “National security concept of Mongolia” of 2010 reflect the issue of development and implementation of climate change adaptation policy to a certain degree.

The Mongolian “National action program on climate change” (NAPCC) was first elaborated in 2000 and was updated in 2011. The NAPCC includes general climate change adaptation strategy, policy and measures.

The climate change adaptation concept

For development of a climate change adaptation policy, the economic assessment of positive and negative climate change impacts and how this would in the future affect the environment and socio-economic development is yet to be conducted. The climate change adaptation concept can be understood as **reducing possible future risks for the country's vulnerable socio-economic sectors** and building the foundation for **green development** that is well adapted to the environment.



The adaptation strategies and measures for certain vulnerable sectors

Animal husbandry

Strategic goal: To ensure **food security**, sustainable supply of raw materials for the food and light industries and to expand the production of clean and ecological products by developing an animal husbandry sector that is **resilient and adapted** to climate change.

▶ *Strategic objective 1.* Improve the management of animal husbandry production and increase **the output, quality and productivity**. The following measures are to be taken to achieve this objective:

Strategic objectives

- ▶ *Strategic objective 2.* Decrease vulnerability of pasture to climate change and improve its adaptive capacity: 20 measures
- ▶ *Strategic objective 3.* Produce **nutritious forage** appropriate for the productivity of pastoral and intensive animal husbandry and improve the food supply for people: 15 measures
- ▶ *Strategic objective 4.* **Build capacity to overcome risks** related to animal husbandry: 4 measures

The adaptation strategies and measures for certain vulnerable sectors

Arable farming

Strategic goal: Supply the domestic demand for food from arable farming sources and for livestock fodder by exploiting beneficial opportunities of climate change and mitigating risks that could arise from the negative impacts.

- *Strategic objective 1.* Explore possibilities to cultivate **winter crops**
- *Strategic objective 2.* Increase the soil moisture supply by **retaining snow** on the arable farming fields:
- *Strategic objective 3.* Exploit opportunities to **cultivate crop sorts** with medium to medium-late maturity periods and high yield:.

Strategic objectives for arable farming

- ▶ *Strategic objective 4.* Sustainably use irrigable farm land resources for irrigated arable farming:
- ▶ *Strategic objective 5.* Protect and sustainably use water resources from **glaciers** and ice sheets:
- ▶ *Strategic objective 6.* Employ **irrigation methods and technology** that employ the least amount of water resources and labor for irrigated agriculture:.
- ▶ *Strategic objective 7.* Introduce methods to **increase moisture accumulation and to decrease evaporation** in the non-irrigated arable farming:
- ▶ *Strategic objective 8.* Select and cultivate **drought and heat resistant crop sorts**:

The measures are to be taken to achieve this

objective:

- ▶ establish and develop a legal and economic framework for promoting herder groups, communities, and cooperatives which are based on herders' economic interests;
 - ▶ establish and implement the legal framework for providing incentives to herders who are practicing climate compatible production;
 - ▶ develop training programs to adapt production of herder families to climate change, and conduct local and distance training jointly with international and national projects and programs;
 - ▶ supply herders with suitable warm clothes in case of natural disasters and support national production of such products;
 - ▶ improve the quality of livestock in selected regions by establishing breeding and trading farms of livestock with high productivity at aimag and soum level based on public-private partnership principles;
- 

The measures are to be taken to achieve this objective (cont.):

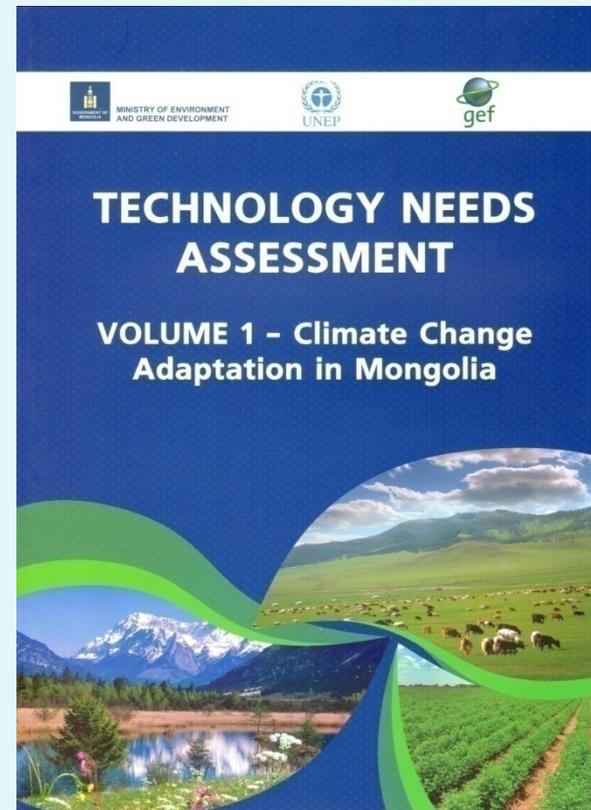
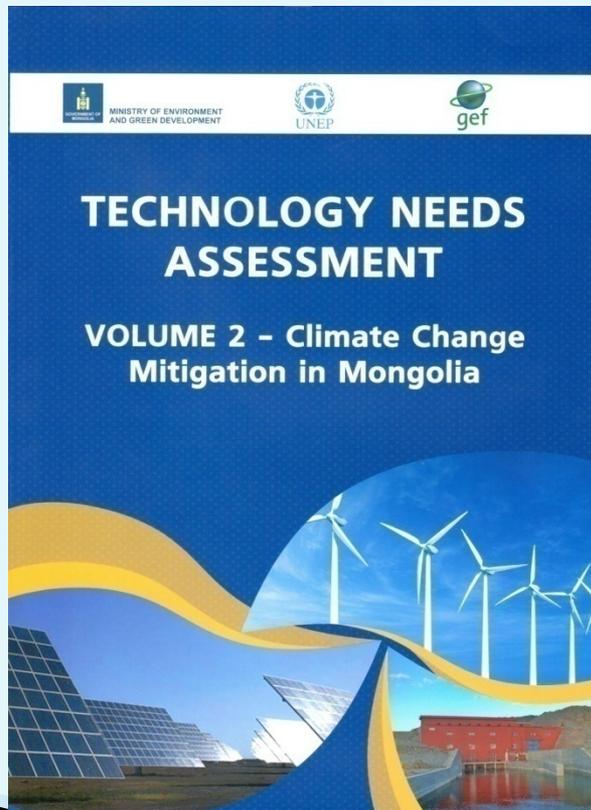
- ▶ create policy framework for promoting the breeding of livestock with high productivity complying with pasture carrying capacity by providing incentives and taxes where appropriate;
- ▶ retain the weight of female reproducing stock at certain scientifically founded levels and maintain appropriate herd structure balance;
- ▶ promote intensive farming of productive stock close to highly populated urban areas and support the establishment/ strengthening of such facilities and capacities by providing incentives such as credits with favorable conditions; and
- ▶ increase investment for, and strengthen the capacity of, professional facilities mandated to **reduce risk of climate-related animal diseases.**

Technology and adaptation

The Mongolian Government adopted important policies to develop and introduce environmentally-friendly technologies. This includes the Law on Technology Transfer (1998), the National Comprehensive Policies based on the Millennium Development Goals (2008), [the National Programme of Renewable Energy \(2010\)](#), the National Programme of Climate Change (2011), and the Green Development Policy Concept (2014).

Advanced technologies are an important part of the successful implementation of the adaptation related policies. This assessment suggest options of the most important technologies, feasible to introduce to Mongolia in the immediate future to respond to climate change adapting to it all principal sector of the economy and livelihood of the local community as well as reducing the GHG emissions. [Assesments of currently used technologies and its needs for each of the sectors are provided: Energy, Industry, Livestock, Land Use and Wastes.](#)

Technology Needs Assessment project has just finished. Technology Needs Assessment Report describes key mitigation technologies in priority sectors for Mongolia such as large scale Hydro-power plants; Wind parks, Super critical coal fired power plants; energy efficient lighting; and improvement of insulation of panel apartment buildings.



Human Rights–Based Approaches (HRBA)

- ▶ Human Rights–Based Approaches (HRBA) provide a conceptual framework for development based on human rights standards as stipulated in international treaties and declarations.
- ▶ These aim to promote and protect human rights by integrating the norms, standards and principles of the international human rights system into the plans, policies and processes of development

Community-Based Adaptation (CBA)

- ▶ Community-Based Adaptation (CBA) has been defined as, “a community-led process, based on communities’ priorities, needs, knowledge and capacities, which should empower people to plan for and cope with the impacts of climate change.”
- ▶ It refers to an evolving yet distinct set of principles and practices that consistently target the most **vulnerable populations** and focus on activities with the **greatest direct impact**.

ecosystem-based adaptation (EBA)

- ▶ ecosystem-based adaptation (EBA) is a young concept. It has been defined as the use of **biodiversity and ecosystem services** as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change.
- ▶ Under this definition, EBA uses a range of opportunities for the **sustainable management, conservation, and restoration** of ecosystems to provide services that enable people to adapt to the impacts of climate change. It aims to **maintain and increase the resilience and reduce the vulnerability of ecosystems and people** in the face of the adverse effects of climate change.
- ▶ EBA focuses on maintaining **ecosystem functions and services**, it is an integral part of any broader strategy for human adaptation. EBA can be cost-effective and **generate social, economic and cultural benefits**, including disaster risk reduction, livelihood sustenance and food security, carbon sequestration and sustainable water management.

Human and Nature (Ecosystem) in Mongolia モンゴルの人と自然(エコシステム)

In the long history of human society the ecosystem at the territory of Mongolia had been controlled by direct impacts of the global climate system through its regional patterns.

There was no significant human intervention which could affect natural cycles except grazing pressure by wild and domestic animals. Natural mechanisms were in action for balancing the pressure.

Inclusive without “tragedy of commons”

The pasture land, as a common pool natural resource, was customarily managed with free access for everyone within its administrative jurisdiction.

Advantage: there was no need for a costly governing structure, which might not be free from the possible management distortions and even certain elements of corruption.

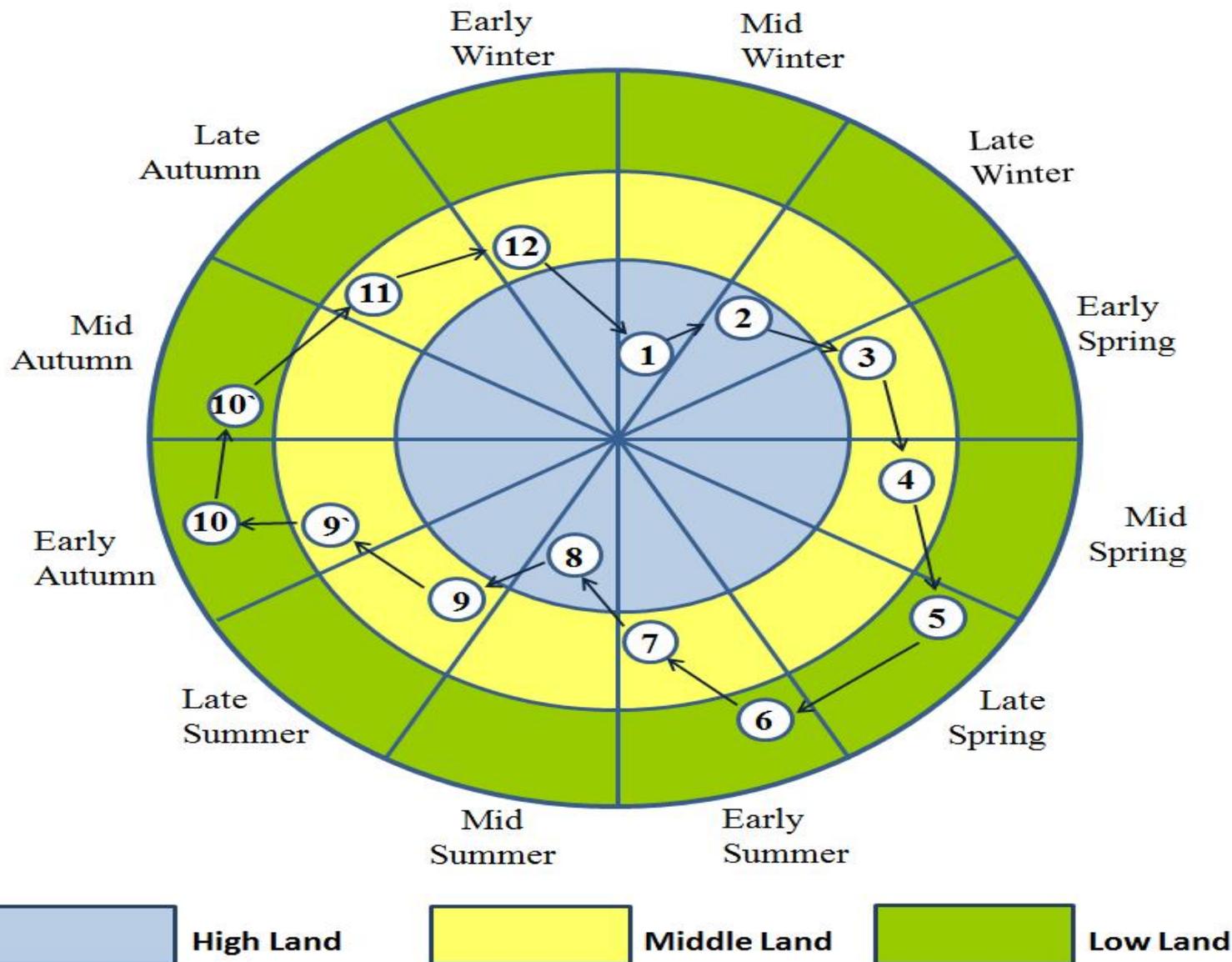
Mobility as advantage and its benefits

四季ごとの牧草地への移動

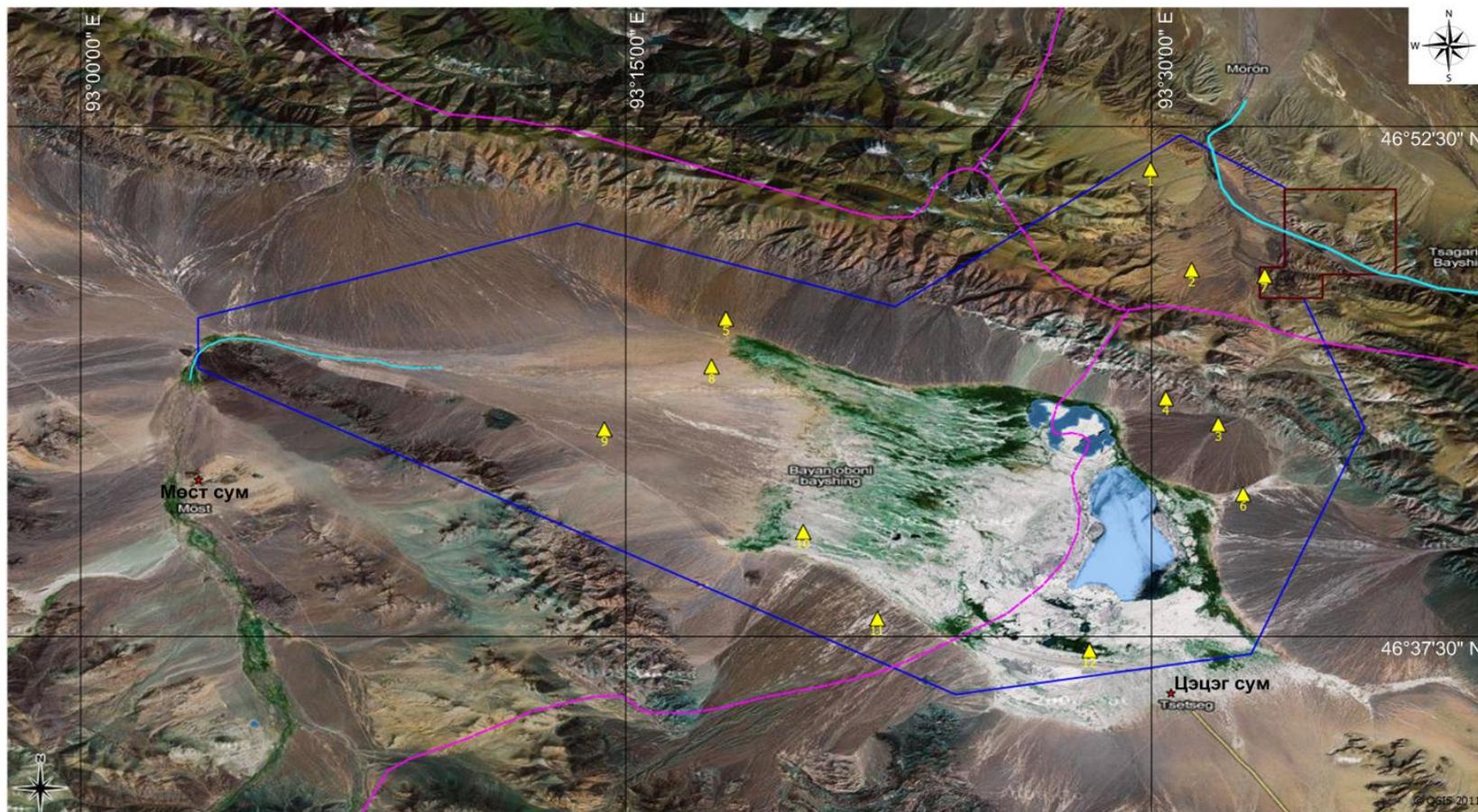
Seasonal mobility scheme with flexible timeframe and customary adjustments among householders were helping people to reduce the stress from spatial and temporal variability of climate factors, including extreme weather events.

Management tested by life: Round of year life circles for the Mongolian pastoralists within a given ecosystem service domain

モンゴル牧畜民の年間生活循環。

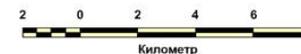


Efficient use of land properties and landscape features for grazing, hay making and cropping (Western Mongolia)



Таних тэмдэг:

- | | |
|---|---|
|  Сумын хил |  Төслийн хил |
|  Сумын төв |  Уурхайн хил |
|  Нуур |  Ажиглалтын цэгүүд |
|  Гол | |



ЖЭМР ХХК

Хөшөөт – Амьтан

Байршил: Ховд аймаг, Дарви, Цэцэг, Мөст сум

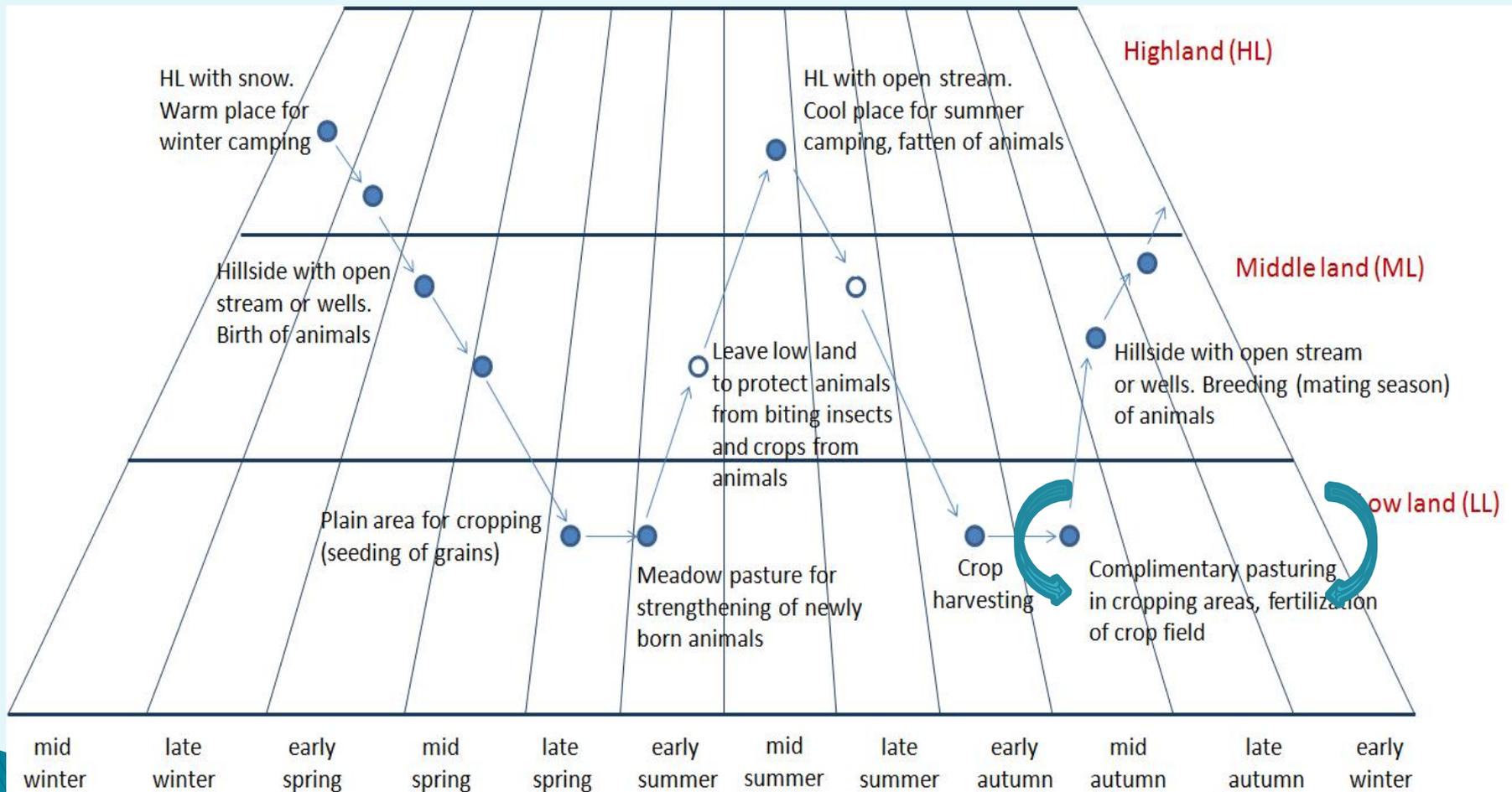
Ашигласан эх мэдээ: Google Map, судалгааны материал

Огноо: 05/17/2011
Бэлтгэсэн: С.Баясгалан

Масштаб: 1:200 000
Проекц: WGS84 GEO
Бүс 46 N

Diversification of income sources in traditional way combining livestock breeding and crop cultivation

牧畜、農業：相互關係



Efficient utilization of limited resources

限られた資源の効率的活用

The breeding of different types (up to five) animals (sheep, goat, cattle, horse, camel) by every individual household.

Advantages:

- efficient use of pastures with multi-composition of plant species favorable for different types of animals.
- less risk for fragmented overgrazing of particular patterns of the pasture.
- self provision of food items and transportation services.

Unemployment was not an issue:

Everyone from kids to seniors were engaged in everyday routine work to support life, including a care of livestock. It was a game like exercises for kids and health keeping exercises for seniors

Collaborative distribution of every day herding duties among group of families (“khot ail”, “saahalt ail”) was arranged customarily

Advantages: Efficient use of the available man power with delegated duties in accordance with individual’s capabilities depending on experience, age and other performance capacities.

Waste free technology streamlined with natural cycles

自然のサイクルと合理化された無駄のない技術

The indigenous technologies for food processing, clothes making and home building (ger barih), applicable at the level of a single household.

Advantages:

- ✓ Effective combination of domestically and locally available raw materials with minimum tools from outside for processing.
- ✓ Direct use of natural heat, cold, solar radiation, wind and others, instead of appliances which needed electricity.
- ✓ Fully naturally degradable packaging materials
- ✓ Fully naturally recyclable solid waste and waste water without chemicals.

Mongol lifestyle, 3R principles,
full biogeochemical cycles
モンゴル人のライフスタイル、3Rの原則、
バイオケミカル完全サイクル

Mongols, having a traditional way of life in the past, used materials provided by nature and after use returned them back to nature in forms easily degradable and can be incorporated into **natural biogeochemical cycles**.

Who innovated the green economy concept? 誰がグリーン経済概念を導入しましたか

Well maintained function of every single unit of society, starting from an individual household at the grass root level, was the primary guarantee for sustainability of life in Mongolia through its long history.

Production based on renewable resources and consumption with fully recycling principles were solid basis for the environmental sound life sustaining system.

Perception and reality

知覚と現実

These above mentioned “primitive” and “unproductive” (as someone might call) **governing structure and organization of life** could yield enough output for human life with a minimum input from exhaustible natural resources while not causing much harm on the **ecosystem functions** involved in interactions between human and nature.

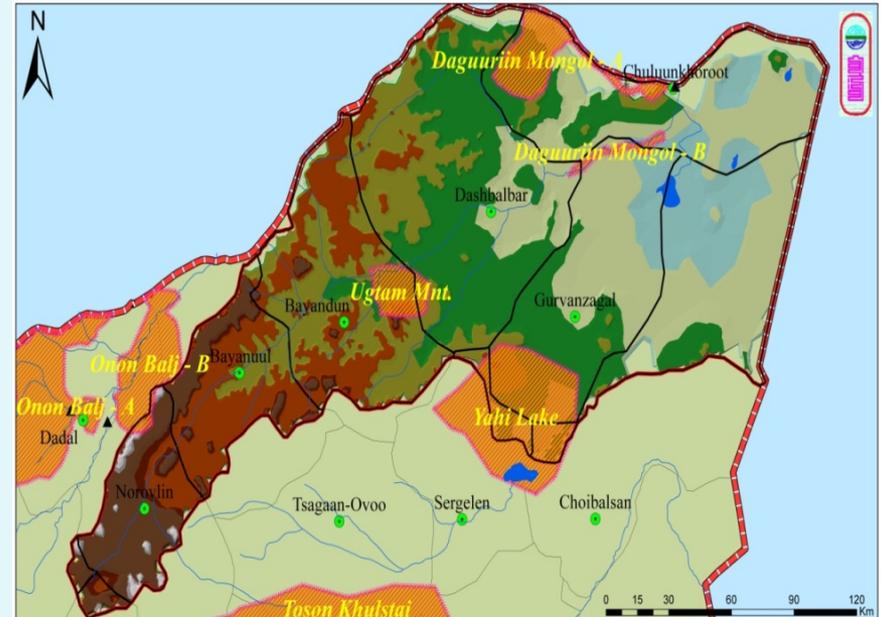
Talk on the pastoralism in Mongolia is a sentiment or practical question?

These traditional ways of life partly described here are not just a sentiment. Many elements of it can be translated into modern way of life through theoretical modeling exercises.

The Research Institute for Humanity and Nature, Kyoto was implementing a study project titled “*Collapse and Restoration of Ecosystem Networks with Human Activity*”. One of focal area for study was grassland of Mongolia. The project aimed to design a model that could simulate a network of social and ecological systems which would be able to function on inclusive principles with maximum use of ecosystem services.

Ecosystem based Adaptation Approach to Maintaining Water Security in Critical Water Catchments in Mongolia (Kharkhiraa-Turgen and Ulz rivers basin)

MON/12/301



Legend

- Soum boundary
- kharkhiraa river basin
- Turgen river basin
- Protected area
- Hydrology station
- River network
- Glacier
- Forest
- Lake

Elevation, m

3800 3467 3133 2800 2467 2133 1800 1467 1133

| | Turgen river | Kharkhiraa river |
|---------------------------------|--------------|------------------|
| Area, km ² | 2038 | 3226 |
| Length, m | 128093 | 124470 |
| Slope | 0.014 | 0.018 |
| Glacier area, km ² | 7.02 | 48.32 |
| Forest area, km ² | 238.1 | 112.78 |
| Protected area, km ² | 530.8 | 270.3 |

| Soum name | Area, km ² | Basin area, km ² | Basin area, % |
|------------|-----------------------|-----------------------------|---------------|
| Bokhmurun | 3703.5 | 14.72 | 0.40 |
| Ulaangom | 1109.3 | 978.08 | 88.17 |
| Turgen | 2169.5 | 44.51 | 2.05 |
| Khvnd | 2876.9 | 6.77 | 0.24 |
| Tarialan | 2784.3 | 1706.22 | 61.28 |
| Naranbulag | 5225.3 | 255.04 | 4.88 |
| Davst | 3295.2 | 220.76 | 6.70 |
| Bokhmurun | 3703.5 | 149.82 | 4.05 |
| Ulaangom | 1109.3 | 77.199 | 6.96 |
| Turgen | 2169.5 | 1644.11 | 75.78 |
| Davst | 3295.2 | 166.98 | 5.07 |

Legend

- International boundary
- Soum boundary
- Soum center
- Hydrology station
- River network
- Protected area
- Ulz river basin
- Lake

Elevation, m

1400 1311 1222 1133 1044 956 867 778 689

| | Ulz river |
|-----------------------|-----------|
| Area, km ² | 37962 |
| Length, m | 386170 |
| Slope | 0.001 |

| Protected area, km ² | Onon bali | Daguuriin mongol B | Daguuriin mongol A | Yahi lake | Ugtam |
|---------------------------------|-----------|--------------------|--------------------|-----------|-------|
| | 66.6 | 152.8 | 897.3 | 1544 | 460.2 |

| Soum name | Area, km ² | Basin area, km ² | Basin area, % |
|----------------|-----------------------|-----------------------------|---------------|
| Sergelen | 4009 | 393 | 9.82 |
| Bayan-Uji | 5668 | 3158 | 55.71 |
| Bayandun | 8211 | 5634 | 68.71 |
| Dashbalbar | 8824 | 8789 | 99.61 |
| Chuluunkhoroot | 6138 | 6090 | 99.21 |
| Choibalsan | 10687 | 5448 | 50.98 |
| Gurvanzagal | 5552 | 5552 | 100 |
| Bayan-Adarga | 2767 | 142 | 5.148 |
| Batorov | 4933 | 241 | 4.892 |
| Norovlin | 5759 | 2515 | 43.659 |

Kharkhiraa-Turgen river sub-basin summer season



Ulz river basin winter and summer season



Kharkhira-Turgen Basin area

Limited resources but non-limited opportunities if public participation is promoted on inclusive basis
(Discussion with the soum governor about grass-root level activities)



Green House in Ulz river area



Diversified income source in addition to livestock products in Ulz river area.
(Strawberry cultivation:quite new business in this area)



Summary remarks

- Mongolia is one of the sparsely populated country in the world **surviving the extreme continental climate condition** with its high amplitude fluctuations of meteorological parameters, **exercising** most exposed to natural hazards life style based on **pastoralism**.
- It could serve as a benchmark of response to internal social turbulences interfrened with external factors, like global warming and globalization
- **Balanced vulnerability and inherited resilience capacity** of all biological species, including human beings, could serve as a perfect example of response to external, but localized factors as the regional climate change and social circumstances associated with the change in the international political and economic regimes.
- Traditional lifesustaining system in Mongolia was fully consistent with **major principles** of modern concept of the **Green Economy**.

Summary remarks continued

- Production involving renewable resources and consumption with fully recycling principles were a solid basis for the environmentally sound life sustaining system.
- Conflicts, between the closed system as a living environment with limited capacity (pasture, for instance) and the open human system without forced limitation of the population size, have been resolved thanks to **consistence of production and consumption patterns with natural cycles**
- All mentioned above major principles can serve as a proper basis for development of adaptation options in response to the changing climate conditions, minimizing the negative impact of extreme natural events combined with the failures of social origin, which lead to the disasters like zud phenomenon.

A vibrant rainbow arches across a grey, overcast sky, its colors transitioning from red on the left to violet on the right. Below the rainbow, a vast field of golden-brown grass stretches to the horizon. In the lower right corner, a small, dark pond is visible, reflecting the surrounding landscape. The overall scene is a mix of natural beauty and somber weather.

***Thank you for your kind
attention!***