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#### Building up Regional to Global Sustainability: Asia vision

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The emerging challenges for Mongolia associated with tripled stresses due to global warming, globalization and possible "resource curse"

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#### **Structure of the Presentation**

- Introductory remarks.
- The key points that should be highlighted:
- on climate issues,
- on globalization impact,
- on resource curse misfortune.
- Concluding remarks.

# Principal message from the climate change studies as basis for policy making:

 Present global warming in the long run would lead to the shift of climate zones with more dominance of arid and semi-arid areas in Mongolia.

- Vegetation zones will move to the north and semi desert and steppe zones will expand.
- Aboveground biomass will be diminished and pasture quality will be deteriorated.

### GCM projections for the 21st century (AIACC, MARCC) :

- Dry and hot summers, milder but more snowy winters.
- Evapotranspiration is much higher than the projected slight increase in precipitation.
- The severity of extremes like drought might be doubled by 2080.

#### **Projected impact on livestock :**

- The area unfavorable for animal grazing would increase from the current 40 % to about 70 % by 2050, and 80 % by 2080.
- Animal mortality estimated to reach about 12 % by 2020, 18-20 % by 2050 and 40-60 % by 2080
- Decrease in animal productivity (based on projected decrease of the ewe weight of animals due to shortened grazing time because of heat stresses)

#### **Predicted** future for pastoralism in Mongolia:

The increased extremes resulting from climate change serve a significant barrier to livestock sector development and this impediment would grow significantly over the next 80 years.

#### **NO FUTURE FOR PASTORALISM IN MONGOLIA ?**

This appeared to be a strong message for policy makers, who argued that: If there is no future for the pasture based livestock husbandry, it needs to be transformed to a settled farming system. There is a need to seek out an alternative way of life (for at least half of residents of Mongolia).

> My question to audience: Do you have any ideas on that?

#### Perception of the general public, including those who are directly faced with the challenge is a little bit different than of the policymakers.

Their attitude is that the traditional way of life in Mongolia associated with pastoralism could be the more sound and more feasible option in response to climate change, thanks to the high adaptive capacity of communities in Mongolia to the rapid changing living environment.

> Again my question to the audience: Do you agree with that?

#### The history lesson

The societies in Mongolia during the country's long history could overcome and survive high amplitude of social turbulence, economy turmoil and climate variability, thanks to their lifestyle based on pastoralism. Moreover it enabled to maintain a life sustaining system with a guaranteed provision of the Basic Human Needs (BHN), without stepping over thresholds up and down in life line.

#### Modern interpretation

Unfortunately, not every social system, even the most sophisticated in the modern interpretation, has inherited the above mentioned performances imperative to be called sustainable.

## The arguments in favour of the traditional livestock system:

1) Pasture based livestock husbandry or pastoralism was the only way to sustain the net level of production for the BHNs in arid areas where vegetation cover had been patched and grass yield had been fluctuating in spatial and temporal scale, depending on various, mostly, unpredictable direct and indirect climate factors and changeable weather events.

2) It has served without failure for a long time as the principal component of the national economy;

- It was life sustaining basis for the entire population of Mongolia for thousands of years;
- It has high enough returns in terms of economic efficiency mobilizing in maximum the potential of ecosystem services of natural systems without interrupting their core functions;

- 5) It will serve a great contribution to the cultural heritage of mankind being the last instance of classical nomadic civilization;
- 6) It can make priceless contribution to the natural heritage by preserving the gene pool of animals with high tolerance to harsh climate conditions and by preserving a portion of grasslands where grazing exercise is still controlled by natural order.

 It can be said that, the so-called "tragedy of commons" has not revealed itself within the traditional subsistence livestock husbandry in Mongolia in the past, mostly thanks to the customary regulations within the demands of the BHN.

But:

 The new features of the livestock in Mongolia, attributive to modern market economy, based on competition for a profit, might not be properly managed within the traditional scheme alone. Another important issue is related to the scientific conclusion itself. Scientists could make reservation on possible options of the study outcome:

On <u>global</u> outcomes because of the existing uncertainties with regard to the GCMs.

On <u>regional</u> outcomes because of the pattern behavior of the climate system, mosaic peculiarity of the land cover, and <u>mixed structure</u> of ecosystems with aggressive intervention of man managed systems where pastoralism plays a special role in case of Mongolia.









Scheme of "effect areas" in different parts of mountain (modeled as circles) depending on the orientation of given spots to the Sun and Wind Projection of orographic effect of mountain on precipitation amount and evapotranspiration rate

#### Density of Vegetation cover (shrubs, patches of grass and etc.) as function of temperature and rainfall for given soil properties

**D**= f ( T, P )

T, P are around the climate norm



$$\Delta P = \frac{P' - \overline{P}}{\overline{P}} \qquad \Delta T = \frac{T' - \overline{T}}{\overline{T}}$$

#### In accordance with the current trend of climate variability the adverse impacts of climate change on livestock can be outlined as:

Traditional way of livestock husbandry can be threatened by multitude of factors such as globalwarming-caused cold waves with heavy snow storms, an early establishment of long lasting and fixed snow coverage over the territory in winter. These factors in combination with the increased soil moisture deficit, due to possible decrease in summer rainfall and intensified evopotranspiration, can prevail as pressures on livestock, with heat stress no longer being the single stress factor for animals.