

Sustainable livestock management under changing climate in Central Asia

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Challenges in livestock production of Central Asian countries

- increasing demand for livestock products
 - growing human population in the region
 - the increasing incomes
- difficulties in sustaining livestock production due to the changing climate

Available resources and their use

- Area of rangelands of the five Central Asian states accounts for about 80% of their territory and serve as the main source of forage for livestock
- Rangelands in the region occupy a total land area of 286 Mha, of which
 - 25.3% is deserts (less than 150mm rainfall) and
 - 74.7% is steppe (over 150mm rainfall)

Related problems: degradation of rangelands

- ❑ Low cost of keeping livestock on common pasturelands has led to overstocking
- ❑ Excessive concentration of grazing on certain areas and limited flock mobility caused overgrazing of pastures
- ❑ Expansion of rainfed crop (mainly wheat) production on former rangelands during the independence period has also contributed to resource degradation

Related problems: degradation of rangelands

- Kazakhstan: 24 million ha (13.2% of total) of rangelands are degraded at different levels
- Kyrgyzstan: 6.8 million ha (74%)
- Tajikistan: more than 90% of the total 3.7 million ha of rangelands
- Turkmenistan: 20.8 million ha (50%)
- Uzbekistan: 10 million ha (42%)

Drivers of rangeland degradation

- ❑ Destruction of transhumance and seasonal migration of livestock led to overgrazing and degradation of pastures causing desertification of 60 mln. ha of rangelands in Kazakhstan
- ❑ In Kyrgyzstan, overgrowth of weeds is observed on 3.0 mln ha, 1.7 mln ha are heavily degraded mainly because of the increased number of grazing animals

Drivers of rangeland degradation

- ❑ Overgrazing caused by the lack of the developed pasture management system led to degradation and desertification of rangelands in Turkmenistan
- ❑ More than 30 percents of desert rangelands in Uzbekistan lost 50-70 percents of productivity due to degradation and desertification because of anthropogenic factors and uncontrolled growth in the number of the grazed livestock

Livestock production and environment

- ❑ The greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and halocarbons, have significantly contributed to most of the observed temperature rise since the 1950s
- ❑ Livestock production contributes 18% of all global greenhouse gas emissions, which is higher than transport emissions (14%)
- ❑ Livestock activities are responsible for 80% of all agricultural GHG emissions (FAO 2006a). Production of red meat from ruminants contributes 150% more GHGs than chicken and fish

Livestock production and environment

Central Asia

- Average share of emissions from agriculture was around 10% in 1990
- Highest emissions (60-80%) were recorded in energy sector
- Although recent data on emissions show an increase of this share, it is mostly attributed to a decline in emissions from energy and industrial sectors due to decreased production.

Climate change

- ❑ Climate change is already ongoing in the region and expressed in warming and higher frequency of droughts and mudflows
- ❑ It puts additional pressure on livestock production, especially extensive systems
- ❑ In Central Asia, in twentieth century, temperature increase has exceeded the worldwide warming average, and reached as much as +3°C

Climate change

- ❑ The current rate of glacier loss in the region forms 0.5–1.0 per cent per year, and from 15 to 35 per cent of the Tien Shan and Pamir glaciers have melted for the last 50–60 years, depending on location, size and elevation
- ❑ For the last 20 years, the mountain snow cover area in the Tien Shan has decreased by 15 per cent that is expected to negatively affect water runoff from the mountains of Central Asia

Recommendations

- ❑ Improvement of forage resources is possible through pasture rotation as well as introduction of improved varieties of fodder crops
- ❑ In Kyrgyzstan, mixed cropping of legumes and cereals on forage croplands can help increase yields by 25-30 percent compared to cultivation of only alfalfa or sainfoin,
- ❑ In Chuy and Fergana valleys mixed planting of maize and soybean can increase protein content of the green mass by 50 percent
- ❑ In Uzbekistan, insufficient feeding allows reaching only 60-70 percent of the production capacity in livestock
- ❑ Development of a sustainable forage/feed base can be achieved through intensification of the irrigated forage production

Recommendations

- ❑ Introduction of the drought tolerant forage crops is needed in Central Karakum, Turkmenistan, with a very low annual precipitation (80-120 mm)
- ❑ To establish a pasture fund to be supported from land leasing payments as well as income from environmental services such as carbon sequestration
- ❑ Overstocking could be addressed through introduction of grazing fees per animal grazed on common pastures; that would lead to culling of less productive livestock by farmers

Recommendations

- ❑ Technological interventions including reseeding with more productive grasses and watershed development, complemented with preventing encroachment, promotion of rotational grazing, and charging grazing fees can help improve the productivity of common rangelands
- ❑ Kazakhstan has a good chance to become a regional leader in livestock production considering significant area of available grasslands
- ❑ Targeted breeding of improved drought- and heat-tolerant animals should be supported by the national authorities through introduction of community based breeding farms

Recommendations

- ❑ Higher productivity in livestock and feed crop production will lead to mitigation of greenhouse gas emissions from deforestation and rangeland degradation
- ❑ Conservation tillage, cover crops, agroforestry, and restoration of desertified rangelands could help sequestering up to 1.3 tonnes of carbon per hectare each annually
- ❑ Reduction of methane emissions can be achieved through improved breeding and improved diets to decrease enteric fermentation; improved manure management and biogas;

Recommendations

- ❑ Nitrogen emissions can be mitigated through improved diets and manure management
- ❑ Increasing the share of poultry, monogastric mammals, and vegetarian fish for human consumption and reducing emissions of nitrous oxide through efficient use of nitrogenous fertilizers to decrease GHG emissions in livestock sector

Future scenarios

- ❑ Demographic, income, and urbanization pressures are expected to strengthen a competition between herders and crop farmers for agricultural cropland as demand for food crops will also go up
- ❑ Higher prices for meats, milk and cereals due to increasing demand for food in the next decades
- ❑ Higher incomes would boost the quantity of meat consumed in the region

Future scenarios

- ❑ In Central Asia, according to a medium variant estimation, population is projected to grow by 22 percent to 2030 and by 35 percent to 2050 both compared to 2010 level, with Uzbekistan's highest contribution to the expected growth
- ❑ For the period 2030 to 2049 the projected increase in mean annual temperature in Central Asia will form at least 1.6°C
- ❑ Decrease in river runoff is projected to form about 20 percent in the next 50 years

Future scenarios

- ❑ Decline of the water flow in the Amu Darya and Zeravshan rivers may form 10–15 per cent and in the Syr Darya river - 5 per cent by 2030-2050
- ❑ As a result, downstream states, Turkmenistan and Uzbekistan, depending on irrigation water for agriculture, may suffer the most from a water shortage
- ❑ Productivity of grasslands will decrease due to decline in rainfall and more frequent droughts, that could exacerbate overgrazing and degradation problems
- ❑ In extensive pastoralism systems, rangeland use is expected to increase by 50 percent in the world as early as 2030, leading to degradation of pastures

Future scenarios

- ❑ Rangeland degradation from animal production will continue in dry areas of the region with its implications to climate change, water depletion and biodiversity loss
- ❑ Smallholders depending on extensive livestock production on marginal pastures in arid and semi-arid areas of the region are expected to suffer the most in future.

Thank you!