GRAZING AND LAND DEGRADATION IN CIS COUNTRIES AND MONGOLIA

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The Concentration of animals in peri-urban environments and disruption of the transhumance herding as a response to many factors including sedentarization policies, lack of infrastructure and access to markets in remote pastures, lack of appropriate technology for pasture management, fragmentation and change in composition of livestock holdings and poverty create problems of overgrazing in nearby pasture villages and undergrazing in remote pastures. As a consequence, poverty and environmental problems related to livestock production such as land degradation, loss of biodiversity and global warming are arising in the region.

This paper offers an introduction to some of the issues to be discussed during the electronic conference; identifies the main livestock and environment interactions in the region and provides an outline of the technology and policy options that could be used for the adoption of a more sustainable livestock development in the region.

Grazing and land degradation

This problem is characterised by overgrazing in nearby village pastures and undergrazing in remote areas. In the past, livestock grazing was carried out in a semi-nomadic manner with frequent changes in pasture allowing regeneration to occur. Today permanent grazing is often practised in the vicinity of villages and artificial wells constructed during the Soviet era and this has caused local overgrazing extending many square kilometres. On the other hand, other pastures have been under-utilized for many years, resulting in a build-up of a soil crust and reduced water absorption and the displacement of valuable pasture flora by lichens.

The underlying causes driving this hotspot are:

Disruption of transhumance herding : The creation of constant settlements during the period of state regulation of the economy, and the politics of sedentarization concentrated stockbreeders around cultural and social centres violating traditional ways of herd management. After independence, with the privatisation and division of animal stocks, coinciding with the collapse of the wool market and with imported feed no longer available or affordable, there was a serious decline in the practice of transhumance herding. At the moment, in connection with privatization processes in agriculture and development of market relations, these tendencies have become especially intensive. Herders have concentrated in regions with a relatively developed infrastructure in which they have an easier access to public services (health, education, etc), water supply for animals and markets.

There are clear benefits of a shift towards restoring the rotational grazing patterns. Socio-economic studies have found that farmers are aware of the problem of degradation and undergrazing around villages but do not have a system to restore seasonal grazing nor rehabilitate land. Farmers also realize that collective action is the only means of promoting these practices. The fragmentation of livestock holdings and lack of operating capital have made integration of seasonal pastures unfeasible for small holders.

Overstocking: Despite the fact that official figures show a dramatic reduction of the total number of animals in the region, herds are concentrated in pastures near villages and exceed the safe carrying

capacity. This has been exacerbated by an increase in private livestock holdings and the reduction of pastures areas due to desertification, soil erosion, pasture allocation for cultivation, construction and development of mineral resources.

Change in the livestock composition: The number of goats in the region is increasing and the number of sheep is decreasing. This is explained by the price increase for goat wool, while the prices for sheep wool have significantly reduced. This has violated the principle of mixed farming in the region in which different domestic animals are grazed on the same pasture from different layers of plant formation: horses eat the upper layer, cows eat the lower layers and sheep eat whatever is left. An increased goat population creates a heavy load for pasture and prevents the ecosystems in forest steep landscapes from deforestation.

Other factors which exacerbate this hotspot:

- Inefficient and altered pasture management patterns, lack of rotational grazing
- Shortage of feed in the winter period and low livestock productivity
- Lack of environmentally-friendly technologies
- Desertification and excessive melioration.
- Periodic snow disasters, which cause high animal and human mortality in Mongolia.
- Imperfect law on land ownership
- Poverty (most farmers possess little capital (livestock, machinery) and few are skilled in farming).
- Poor social infrastructure (for remote pastures)
- Poor water supply system (currently for villages and wells surrounding areas).
- Poor investment climate.

The extent of the grazing and land degradation hotspot

Covering 260 million ha, the Central Asian rangelands are the world's largest continuous area of grazed land. It is difficult to find reliable statistics about the impact of livestock on land degradation. However reports from projects and research carried out in the region consistently highlight over- and undergrazing as the most important issues in the region, but especially for Central Asian countries and Mongolia. Overcoming this issue is vital for these countries since most of their total area is dedicated to permanent pastures.

Country	Total Area (1000ha)	Permanent Pasture (1000Ha)	%
Armenia	2,980	834	28
Azerbaijan	8,660	2,562	30
Belarus	20,760	2,995	14
Georgia	6,970	1,938	27
Moldova	3,385	378	11
Ukraine	60,370	7,910	13
Russian Federation	1,707,540	89,970	5
Mongolia	156,650	129,294	82
Kazakhstan	272,490	185,098	67
Kyrgyzstan	19,990	9,291	46
Tajikistan	14,310	3,500	24
Turkmenistan	48,810	30,700	62
Uzbekistan	44,740	22,800	50

There are indicators of the extent of the grazing and land degradation problems. In Uzbekistan, for example, empty land areas over 0,5 million ha have been created around wells, over 10.000 ha of pasture land with valuable fodder are destroyed per year by overgrazing and 3 million ha of pastures have become overgrown with moss in the absence of grazing. As a result, the total vegetation degradation involves 58% of the rangelands. In Kyrgyzstan and Kazakhstan the pastures between 6 – 12 and 150 km from the villages produce 168 and 108% more biomass respectively than the ranges at 1 – 5 km from the village. In Mongolia (Tien Shan region) the productivity of the pasture land ranges from 660 kg DM/ha to less than 350 kg DM/ha and 50,000 km2 of the 88,000 km2 of natural pasture in this region are un-exploitable due to the lack of infrastructure for access and the lack of watering points.

Loss of biodiversity

Overgrazing is the single most serious threat to biodiversity. In the desert areas it has reduced the productivity of desert range-lands and threatens extreme desertification in some places, while in the mountains it has in some areas destroyed or retarded woody plant growth and reduced the stability of slopes, bringing erosion, dangerous mud slides and reduced capacity for water retention.

The active exploitation of biological habitats for decades has already exhausted the reproductive capacity of nature as well as causing a significant reduction of species. In some cases this process has already proved to be irreversible. The danger of extinction threatens a constantly growing number of species. Several species previously classified as “rare” have been moved into the “disappearing” category due to the various impacts on natural habitats.

Globally Threaten Species in CIS countries and Mongolia, 1990s:

Country	Endangered, endemic species (7 groups)*	
	Total Species	Endangered Species
Armenia	92	12
Azerbaijan	92	22
Belarus	68	8
Georgia	132	22
Kazakhstan	453	32
Kyrgyzstan	66	13
Moldova	405	10
Mongolia	623	26
Russian Federation	138	77
Tajikistan	85	16
Turkmenistan	117	25
Ukraine	n/a	n/a
Uzbekistan	73	n/a

Source: WRI, UNEP, UNDP,WB (1998) World Resourses 1998-1999. NewYork, Oxford University Press, 369 pages, page 322-325
* FRA 2000 main report.(428-429 pages); 7 groups are: mammals, birds, reptiles, amphibians, ferns, palms, trees.

CO^2 emission and global warming

Most countries in the region have experienced significant losses of soil fertility and organic matter. A significant proportion of the loss of soil carbon is therefore released into the atmosphere as CO2, the main greenhouse gas. By developing and quantifying the results of agricultural technologies that reduce tillage and increase the soil organic matter content, it will promote the crediting of agriculture with

reduced country emissions. It is likely that, in the future, a trading system of “carbon credits” will be implemented so that the agricultural sector can receive a direct cash benefit from the application of appropriate forage production technologies. An increase in the amount of land devoted to legume and grass forage crops, incorporation of forages into cereal rotations, and proper management of rangeland grazing will result in carbon sequestration, lowered erosion of soils, and reduced pollution of water resources.

Constraints for Livestock Development

There are barriers for livestock development and poverty alleviation in the region. Some of these are:

Degradation of arable land: water and wind erosion, decline of soil fertility, reduction of the humus layer width. Better grazing practices, integration of forage and crop production through rotation, and integration of use of mountain and semiarid rangelands could result in improved physical and chemical soil properties.

Desertification: The increase of sand particles in soil. Rangelands have the potential of sequestering considerable amounts of carbon, especially if overgrazed and desert areas can be improved through effective management and possible reclamation efforts.

Salinization: Over-irrigation leading to salinization of soils is the root of the region’s water management problems. Salts and agrochemicals are the major concerns associated with internal trans-boundary rivers.

Water scarcity: It is caused by many factors, including a destroyed and unmaintained irrigation system and artesian wells.

Deterioration of watersheds: This problem has been caused by inappropriate land use. Surface water quality will improve and the quantity of water available to plant growth will increase with land usetypes that reduce runoff and increase the soil`s water holding capacity.

Safety issues of herds and herders in remote areas.

Technology options and Policy options

There are many technologies that can help to reduce or eliminate this particular problem. The technology options for tackling the underlying causes are:

- increase livestock nutritional status during winter by supplementation.
- use of hay and reserved forage plots.
- alternative management schemes.
- range improvements.
- herd management.
- seasonal-suitability and rest-rotation grazing methods.
- different improved pastures seeded in marginal agricultural lands formerly used for small-grain production.
- winter feeding options such as fenced forage-reserve plots, supplementation with grains, hay production, and fencing of land to attain exclusive and rational range use.
- use of local fodder resources for silvopastures and fodder banks as an alternative feed for ruminants.
- introduction of fodder species for particular environments for areas affected by desertification.

Policy options to remove the underlying causes and to promote sustainable use of pasture in the region are many. The decision regarding which options or which mix of policy and technology options is necessary has to be analysed in depth. Some of the available policy options are:

- Policies on land tenure and related issues.
- Strengthening local natural resource management.
- Promoting conflict resolution mechanisms.
- Curtailing direct control of stocking rates.
- Introducing well-designed grazing fee regimes.
- Drought management policies.

- Planning of water point provision.
- Human service delivery to mobile pastoralists.
- Remove subsidies on feed and for dry land cropping.
- Create price incentives for off take and for stratification.
- Establishment of pastoral banking systems.
- Encouragement of non-pastoral employment.
- Policies governing taxes.
- Grazing permits.
- Securing safety of herds and herders in remote areas against stealing.
- Regulation of marketing during times of forage scarcity.
- Promotion of fencing and fodder banks.
- Incentives (e.g. payments for carbon sequestration, subsidies and preferential credits, cost of mineral fertilizers, taxation of emissions, labeling and certification).
- Infrastructure development (e.g. transport facilities, water supply, roads cold-chain, slaughterhouses).
- Access to markets.
- Improvements in rural financial systems, marketing networks and education to allow more opportunistic diversification of livestock and human capital.
- Improvements in the flow and capture of information to enhance efficiency in marketing and resource allocation.
- Comparative evaluation of development investment options for various types of infrastructure, key institutions, or programs to improve pastoral risk management throughout the region.

Policy makers, researchers and extension services need to balance these options with regards to the multiple objectives (e.g. range management, environment protection, food security, poverty alleviation) and multiple criteria (e.g. cost efficiency of the policy instrument, ease of enforcement, level of required technologies). To achieve this balance a lot of information and knowledge is requiered for example: understanding regarding how, with expected changes in input (including transportation prices) and output prices, a growing proportion of rangeland can be economically and sustainably exploited; finding the current pattern of rangeland condition as a function of the distance from villages and spatial pattern of use in order to provide detailed quantitative information upon which to base recommendations; the analysis of different ecological and policy scenarios to explore the regional impacts of various technical alternatives; knowledge on the status of forage resources around villages for the purpose of recommending conservation measures and land use; etc.

Conclusive Remarks

Given the complexity of the root causes that determine overgrazing and land degradation, a holistic approach is necessary. This approach should not be different from working principles of closing the gap between individual and societal optima, influencing decisions about resource use (location, intensity and scale), understanding decision-making, providing feedback mechanisms, polluter pays - provider gets principle, correcting the underlying causes is often more efficient than correcting the symptoms and acknowledging multiple objectives with a focus on environment and poverty.

The challenge here is to address the negative social and environmental consequences of grazing and land degradation. Establishing an appropriate land-livestock balance is fundamental for the restoration of degraded pasture lands in the region. This can be archived by implementing policy and technology options closely with local communities and government officials, that promote economic and environmentally sustainable land use and rangeland management.