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DESERTIFICATION IN RANGELANDS – AN INTERNATIONAL PERSPECTIVE ON TECHNOLOGY, INSTITUTIONS AND POLICY

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BACKGROUND

The Inner Mongolia Grasslands Management Project (IMGMP) is located in Xing'an League, in far north eastern China. The project, funded by the government of the People's Republic of China and the Australian Agency for International Development, selected new target areas in 2003 because of severe land degradation due to continued over-grazing and inappropriate cropping practices. The objective was to use a land-use user rights-based allocation process to develop environmental and social sustainability for herding and cropping systems.

In support of the objective, it was assumed that practical approaches to community self-management would be supported by appropriate Chinese government policies. In this way, the process of analysing policies (which shape the grazing management behaviour of herder communities and the local government regulatory and micro-economic environment) was expected to provide relevant guidelines, and ensure regulatory compliance through improved grassland management practices. It was also intended that this policy analysis would assist with the design of new policies, and the improvement of policies, which do not complement improved cropping and grazing practices and communal sustainability.

Against this background, this paper describes how environmentally-degrading grazing and cropping practices and inappropriate government policy ("growth at all cost") are perpetuating unsustainable over-grazing and cropping of the fragile grasslands, and supporting household investment objectives which are based solely on maximising livestock numbers and crop areas.

PROJECT AREA

In one of China's most fragile and widely desertified ecosystems (the Kerquin grasslands), severe over-grazing initially resulted in grassland degradation, increased susceptibility to flooding, and the abandonment of lowland cropping areas. Following community resettlement about 15 years ago, continued over-grazing and the introduction of destructive cropping practices have resulted in land degradation on a massive scale, (e.g. in Chaoaoritu Aili) it is estimated that 1 million tonnes of soil are lost per annum from only 77,500 mu (5,200 ha).

Overgrazing-induced grassland damage and destructive cropping practices have destroyed ecosystem resilience and hastened the collapse of herding communities' natural assets. Such a collapse:

1. chronically lowers livestock condition and productivity;
2. threatens physical assets (buildings and roads);
3. results in declining crop yields;
4. under-mines the quality of life (on and off-site);
5. reduces poor people's incomes and investments in livestock; and
6. negatively impacts on the longer-term viability and sustainability of User Rights, and related policies.

The current situation in Chaoaoritu and Baiyinhaga is that rapid desertification and the beginning of socio-economic collapse (with its attendant social problems) mean that supposed tenure over grazing rights could be under question. Therefore the grazing and cropping management systems must change, and quickly.

COMMENTS ON THE SITUATION IN EARLY 2005

The ecosystem collapse in Chaoaoritu and Baiyinhaga means that desertification now threatens future community viability. Until there is evidence of environmental recovery in progress, grazing should be banned because the Sustainable Carrying Capacity (SCC) is zero. China's use of the SCC approach to grazing management needs to be revised to reflect a greater focus on environmental health and sustainability, rather than a simple estimate of total dry matter production.

Current food and cash cropping practices are environmentally destructive because all crop residues are removed and tillage mechanisms are inappropriate (repeated ploughing). These practices expose sand-plain soils to gross deflation by wind erosion and totally destroy the last vestige of topsoil within a few months of residue harvest for livestock feed. In the absence of complementary conservation tillage systems (zero-tillage), cropping should be discouraged, and forage (and grain) purchased from outside the area. This cropping system is not new in China - there are about 10.5 million mu (700,000 ha) of minimum-till crops in China.

In anticipation of an eventual, but progressively-introduced grazing ban, market outlets for stall-fed animals need to be explored and developed through community involvement with support from the Animal Husbandry Bureau. Any "scaling up" of the User Rights system needs to be prefaced by a Rapid Rural Appraisal-type situational analysis, plus a grassland resource survey/environmental asset assessment.

To reflect the original purpose of User Rights in terms of poverty alleviation, grazing and crop land allocation should be completed on an equitable basis. This process should be independent of past or present livestock holdings, and allocate land at a flat rate per household member, with a fixed number of livestock units for every household.

In the event that some grazing is still permitted (not recommended) after a period of grassland recovery; User Right Contracts issued to households for grassland management should be subject to renewable sustainable grazing conditions which clearly state:

- the number of animals a household is entitled to graze (not greater than the agreed SCC);
- the calendar periods during which each class of animal can be grazed; and
- areas designated as "grassland recovery", on which all grazing is prohibited in order to enable grassland rehabilitation, erosion mitigation, and seed collection.

Chinese technicians need training in a broader, more ecological approach to grassland monitoring - it is time to train technicians in "modern" ecological monitoring techniques.

ENVIRONMENT ASSESSMENT IN EARLY 2005

Condition of Grassland

- Residual grass cover and grass height was very low, to absent.
- There were no areas in either Aili with grass height/cover levels even approaching those necessary to mitigate active soil erosion.

Accelerated Erosion

- Active wind erosion was almost ubiquitous.
- There was gross surface re-deposition of wind-sorted sandy material, mainly stripped from the higher points of the natural contours down onto surface roughness elements.
- The major sources of windblown material appeared to be:
 - Grossly and very actively fragmenting and deflating crests and higher points of the undulating sandy belt landscape;
 - Re-distribution of mobile sand grain-sized soil fractions;
 - Crop fields with exposed, ploughed, grazed and trampled surfaces and inadequate levels of stubble cover;
 - The clayey soils of the lowland plains (which have undergone more local gross soil erosion); and
 - Roads, tracks and animal laneways.
- Community tree-planting activities focused on poplars (minimal value for windbreaks, unlike the ideal coppicing growth habit of the last remaining native tall shrubs {elms} which are still present).

Soil Losses

- Crop land - 450 tonnes/ha/year
- Grazing land - 130 tonnes/ha/year

Mobile Dune-Fields

- The mobile dunes were recently induced by human activity, especially overgrazing.
- They were built up after soil breakdown, by wind and also by water erosion, and subsequent large particle accumulation.
- The source of the huge dune volumes was the large areas of sheet erosion plus the mobilisation of (often) 0.5-2.0m of the soil profile from the crests and higher parts of the sand sheet.
- There were many exposed relics of root systems - this indicated that the present levels of grazing pressure, wind energy and subsoil collapse were all too high for established shrubs to survive.

Sodicity, Salinity and Alkalinity

- The lowland plain soil units were calcareous, sodic, more or less potassic, and patchily highly alkaline.
- Although often referred to as "salinity areas" when in a degraded state, they are generally only weakly saline.
- Efflorescing greyish white powdery salts and waterlogged surface re-crystallisation were evident on the surface of bare soils in the low lying drainage plains (the main soil formerly used for cropping - and still for hay).

Water Tables and Salinity

- In both Ailis, large areas of the low-lying land units with heavier soils had water tables within 1m of the surface.

Flood Risk

- Widespread waterlogging of the lower parts of the landscapes was a major concern – occurred in the following spring, even after a very dry season in 2004.

CONCLUSION

The environmental (and looming social) crises in Chaohaoritu and Baiyinhaga mean that the government, if it wishes to avoid expensive and socially destructive solutions such as ecological migration, has no choice but to make difficult decisions on how to manage this situation – one of severe and ongoing land degradation, in a policy context (in terms of objectives to increase livestock numbers and crop areas) which does not support a sustainable solution.

IMGMP has assisted stakeholders to make these decisions in terms of:

1. Analysing the situation and identifying causes – as the basis for essential changes;
2. Recommending solutions (some of which might seem to be radical and initially unpalatable);
3. Advising on appropriate changes in terms of policy interpretation, and new/adjusted policies;
4. Assisting with the introduction of new and more appropriate livestock and crop production techniques; and
5. Monitoring and evaluating outcomes once decisions are made and new production systems are implemented.