

Climate change, land use policies, and adaptation in Alxa region, Inner Mongolia, China (paper no 661)

Theme 4 "Preparing for Impacts", session 34 "Adapting to Human Land Use to Climate Change", chaired by Prof. Anette Reenberg:

Abstract:

The Alxa region of Inner Mongolia, China, is characterized by a temperate desert to steppe ecosystem and comparatively high population density. Low water availability is the key limiting factor but over the past 20 yr overgrazing and irrigation farming on marginal sites have led to increased land degradation, desertification, aquifer depletion, and soil and water salinization. The rising number of dust storms, which can even reach the capital Beijing, approximately 1000 km to the East of Alxa region, can be directly attributed to desert growth as function of mal-adapted land use practices.

However, the dust storms have also raised government awareness to desertification. In recent years Chinese government has introduced a number of new environmental and land use policies, aiming to invert degradation. Open grazing has been banned in 2003, leading to recuperation of the rangeland where the measure has been introduced. Herdsmen are compensated with an amount that is equivalent to herd size, but livestock revenues are nonetheless on the margin. Overgrazing will likely become a major problem again when the program ends next year. There is currently considerable debate whether or not to continue the program. For instance, the grazing ban has led to an accumulation of dry litter that raises the threat of steppe fires.

Irrigation agriculture as well as planting unadapted tree species in shelterbelts have led to a drop of the groundwater table by up to several meters and salinization of soils and aquifers. The increasing groundwater depletion is also caused by resettlement programs to the few oases in Alxa region. While this policy has reduced grazing pressure on the rangelands and thus contributed to steppe recovery, it has aggravated soil erosion and degradation, soil and water salinization, and desertification in the vicinities of the oases.

Other economic activities, like the extraction of medicinal plants for local and regional markets have further deteriorated the situation. However, creating opportunities for alternative livelihoods is seen as one of the most effective measures to raise the resilience of the local population and reduce pressures on the vulnerable ecosystems.

Temperature is showing a strong warming trend since 1970, and regional climate models predict a further rise, ranging from 4.4 to 5.2 °C and from 3.4 to 4.0 °C above preindustrial values by 2100 for the A2 and B2 IPCC SRES scenarios, respectively. Precipitation changes are predicted to be rather small, with a slight upward tendency. As a result, aridity and the overall vulnerability of the region's ecosystems will further increase, leading to more desertification, reduction of available water resources, and other impacts such as an increase in vector-borne diseases and invasive species. Hence, a further rise of human pressure on the ecosystems is likely if management systems are not adapted.

Within the ADAM project (Adaptation and Mitigation Strategies: Supporting European Climate Policy) response strategies and possible innovative policies are being studied in our Inner Mongolia case study, among other regions. First results from two surveys carried out in Alxa, which involved questionnaires being filled out by hundreds of local residents and a number of stakeholder workshops held in the region, indicate that about 60% of the interviewees are aware of the connection between climate change and extreme events and are willing to adapt, e.g. by introducing drought-resistant crops, plastic film mulching, or resettlement programs. Drip irrigation could effectively increase water use efficiency, which is currently very low, but the method is currently not well accepted. On the other hand, they identified lack of funds, water, infrastructure and technology.

Next to showing a certain openness to change and confidence in government policies, the responses also show the limitations of the methods employed when it comes to the barriers to act on change: the questionnaires and workshops have so far not been able to produce answers beyond the obvious; answers that reach the essence of the limits to adaptive capacity.

In upcoming interviews, questionnaires, and stakeholder workshops we will try to get more specific answers to the reasons for accepting or rejecting certain policies, offering more management options and asking the residents to rank them according to the expected impacts; we will further seek to understand the limits to adaptation and adaptive capacities of farmers and herdsman according to different criteria (e.g. town based or isolated; income; gender; livelihoods; age), their understanding of the role of state, and their expectations for the future, based on their current vulnerability, their willingness to pay for certain protection, and their reactions when faced with hypothetical future risks. The results of these participative methods will be discussed with government officials and regional stakeholders during a workshop in late 2008 so that the final results of the case study will be available in time for the Copenhagen conference.

The presentation at the conference will provide the participants of the parallel session with information on adaptation in one of China's environmentally most vulnerable regions. Lessons from the surveys and stakeholder workshops can be discussed in relation to adaptation in other dryland areas under different institutional settings and livelihood conditions.