

Gobi Forage : an early warning system for livestock in the Gobi region of Mongolia

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Introduction During the period from 1999 to 2002 , Mongolia experienced a series of droughts and severe winters that lowered livestock numbers by approximately 30% countrywide . In the Gobi region , livestock mortality reached 50% with many households losing entire herds (Siurua & Swift 2002) . In March 2004 , a program was initiated by the United States Agency for International Development (USAID) through the Global Livestock Collaborative Research and Support Program (GL-CRSP) . The goal of this program was to develop forage monitoring technologies that provide early warning of drought and winter disasters to improve livestock herder decision making in the Gobi region . The program has two major objectives : (1) to develop a regional forage monitoring system that provides near-real time spatial and temporal assessment of current and forecasted forage conditions , and (2) to develop a communication infrastructure that provides stakeholders with data on forage conditions to assist them in making timely and specific management decisions .

Materials and methods Since May 2004 , 297 monitoring sites have been established in 8 provinces in the Gobi region (Figure 1) . At each site , vegetation , soil , and grazing data were collected for input into the PHYGROW forage production model (Stuth et al . 2003) . PHYGROW is driven by near real-time climate data acquired from the National Oceanic & Atmospheric Administration's (NOAA) CMORPH system (Joyce et al . , 2004) . The forage model outputs for the monitoring sites are coupled with Normalized Difference Vegetation Index (NDVI) data using geostatistics to create surface maps of forage yield and deviations from long-term average . Statistical forecasting (Stuth et al . , 2003) is used to project forage conditions for 60 days into the future .

Results Maps of forage availability and deviation from long-term average are produced each half month . A sixty-day forecast of forage conditions is also provided . Maps are distributed via mail and internet to local and regional governments . Situation reports , derived from model and map outputs , are broadcast weekly on national radio . During the summer and fall of 2007 , the early warning system was able to detect severe drought conditions in the Gobi Altai and Dundgobi provinces . (Figure 1) . A survey conducted in October 2007 indicated that the radio broadcasts were an effective means of communicating the early warning information and that the maps were useful for providing information for livestock movement and decision making .

Conclusions A forage monitoring system has been developed to provide early warning for below normal forage or catastrophic winter conditions on rangelands in the Gobi region of Mongolia . The system has been effective in identifying regional drought and providing information on probable conditions within a 60 day window . Information from this system will allow stakeholders access to real-time information to reduce risk of livestock mortality , protect the ecological stability of the rangeland resources .

References

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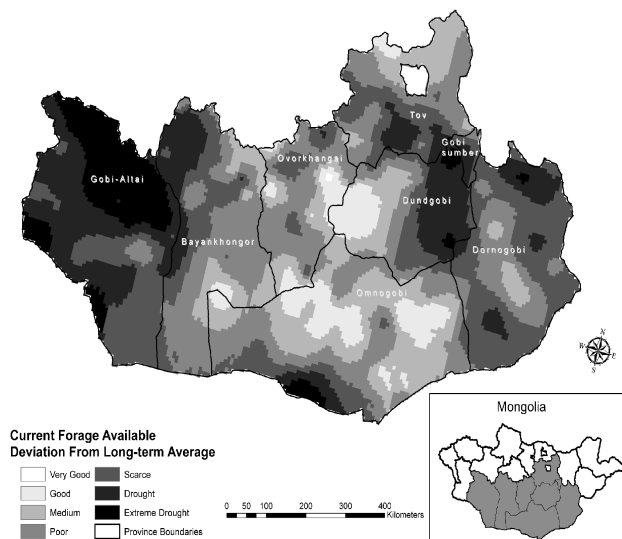


Figure 1 Current forage deviation from long-term average for the September 1 to 15 , 2007 period in the study area .