



European Union



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Early Warning System: Monitoring Namibia’s rangelands from space

Farming with livestock or game becomes increasingly challenging in Namibia’s vast rangelands: Input costs increase relatively faster than revenues earned from the land, bush and other unwanted plants smother rangelands and higher temperatures makes the little rain received less effective. And then there are droughts too, which are all too common in Africa’s most arid country south of the Sahel.

To survive, farmers have to farm more effectively and keep their marketing options open. This calls for more precise farming methods and planning ahead of time to avoid the pitfall of a forage shortage forcing sales when animals are lean and market prices low. Poor decisions during droughts may result directly in animal production (or asset) loss and missed marketing opportunities, but more subtle is often an accelerated rangeland degradation such as bush or other problem plant invasion, perennial grass losses and accelerated soil erosion.



Recent livestock losses in the Oshana region following the 2014/2015 drought (photo courtesy MAWF)

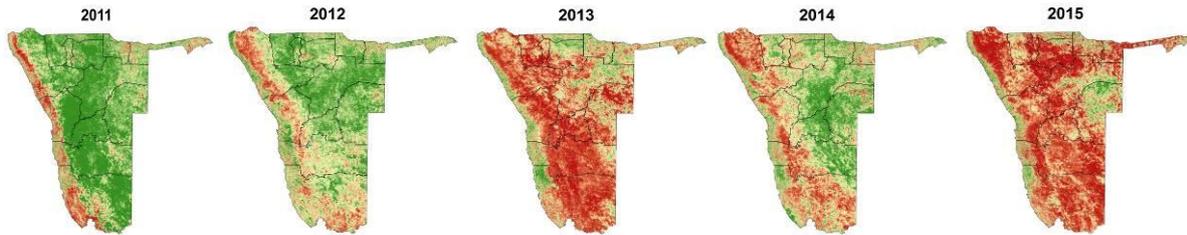
While many experienced farmers have strategies in place to avoid these negative effects, a large segment of the farming community could benefit from being more prepared.

An early warning system is a tool that can be used to support decision making with regards to animal production and rangeland management at these critical times. Such an early warning system makes reliable information about the expected productivity of rangelands available with sufficient lead-time to allow for timely intervention.

Funded by the European Union’s Climate Change Adaptation and Mitigation, including Energy programme, Agra Limited in partnership with Agri-Ecological Services is developing and testing an early warning system for Namibia’s rangelands in collaboration with stakeholders.

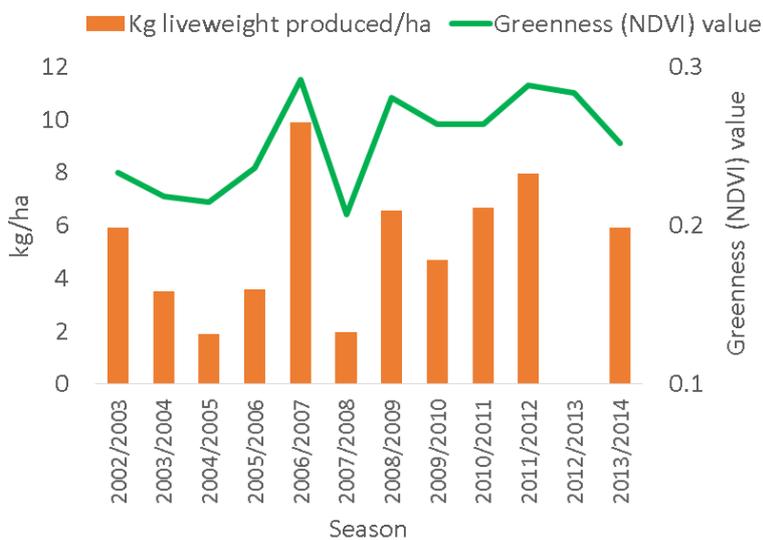
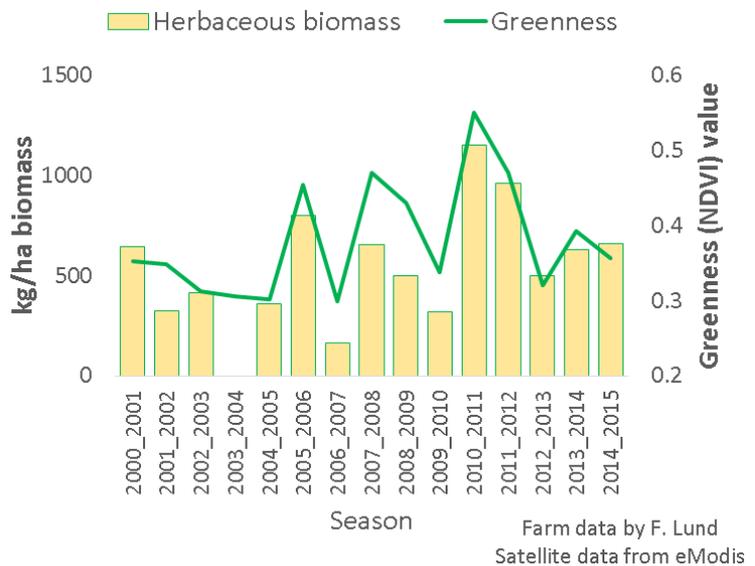
Monitoring rangelands from space

The most important component of the early warning system is based on proven remote sensing technology. This technology entails that the greenness (activity) of vegetation can be reliably monitored from satellites for the entire Namibia in near real-time. Most useful is to view the current vegetation activity patterns in relation to the long-term history of the same area for the same time of year. Below is a series of maps for 2011 to 2015. These maps show if the year’s mid-summer (January to March) vegetation “greenness” was normal (white), below normal (red) or above normal (green).



From the series it is clear that the 2013 and 2015 seasons showed extensive areas experiencing below normal vegetation activity. This translates in lower than normal forage production and provides early warning that action should be taken if conditions do not soon improve. At the same time it offers a valuable tool for support agencies to provide help when and where it matters.

Apart from providing useful information at a national and regional level, the detail and accuracy of the satellite derived vegetation information can support precision farming at a farm scale. Rainfall is a poor predictor of how much forage is produced, because the intensity, timing and distribution thereof also play important roles. Therefore information about the greenness of plants tracked over the growing season as derived by satellites, may offer a convenient index of effective rainfall. Besides, other factors such as temperature changes and grazing history also obscure the direct link between rainfall events and forage production. For example, a close relationship was found between herbaceous biomass yearly measured on the farm Kamombonde Ost (Erongo region) in relation to the greenness derived from satellite information. The graph shows the herbaceous biomass determined around May every year (yellow bars) in relation to the greenness value averaged for the farm (green line) for the last 15 seasons (no data for 2003/2004 season).



Farm data supplied by H. Botha
Satellite data from eModis

for the 2012/2013 season).

On another farm, Agagia in the Otjozondjupa region, cattle production for July to February every year was closely related to the greenness value (average for July to January) for 11 seasons. On the graph the brown bars indicate the cattle production in kg/ha and the green line the average greenness value for July to January of each season (no data available

Both these examples suggest that this technology might be useful for farmers to optimize their farming systems and to be warned of difficulties ahead, e.g. low dry season forage availability.

The next phase for the Early Warning System team will be to work with farmers and other stakeholders to turn this technology into useful and simple tools that result in better rangeland management decisions being made.

How can the Early Warning System information be accessed?

Currently the satellite information products are disseminated through the www.namibiarangelands.com website and an email service. The email service also circulates other information such as livestock auction prices. Complimentary to the Early Warning System, the Local Level Monitoring system is also supported. The Local Level Monitoring system is a user-friendly, self-assessment system that helps farmers to balance animal numbers with forage availability and to keep track of changes in rangeland health.

For more information and to register for the email service, please contact the Rangeland Monitoring Project team at email rangemonitor@gmail.com, or phone 064 570495 or cell 081 604 5878.