



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Indicators of Sustainability in African Rangelands

Walter J. Lusigi
The World Bank

Leornad Berry
Florida Atlantic University

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/4-1/3>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Indicators of sustainability in African rangelands

Walter J. Lusigi, Leornad Berry

Natural Resources Management, Global Environment Facility, The World Bank, Washington DC 20433 USA. Wlusigi@thegef.org

Institute of Environmental Studies, Florida Atlantic University, Florida USA.

Key points : Survival of pastoral people who derive their entire livelihoods from rangelands is the most critical indicator of sustainability of African rangelands. But that survival is under threat through rangeland ecosystem fragmentation, human and livestock population pressures, unsustainable land use changes, weak policy and socio-economic environments, available technology and natural disasters. Essential monitoring of these factors which is essential for their management by stakeholders is constrained by weak institutional capacity. This can be alleviated through regional and global, scientific and economic collaboration.

Key words : Rangeland, Indicators, Ecosystem, Human Survival

Introduction Rangelands around the world have common characteristics which include - relatively low rainfall, typically less than 800 mm unevenly distributed through the year and often unreliable, variable from year to year usually with a longer term cyclical variation; low productive potential per unit area; low levels of output and of population density. Thus the areas have generally become economically marginal, with poorly developed or limited physical and economic infrastructure.

African rangelands share the above characteristics but in addition have certain unique features which require adjustments in conventional approaches to rangeland management. First African rangelands are home to pastoral people of different ethnic backgrounds who traditionally derive their whole livelihood from rangeland resources. Survival of pastoral people with their cultures which have long evolved around rangeland resources is a priority consideration in assessment, monitoring and management. Secondly, poverty at both local and state levels limits the adoption of a broad range of available alternative approaches to rangeland management.

Assessment of rangeland condition and monitoring of trends in Africa has been inconsistent and constrained by lack of financial resources, enabling policy environment and institutional capacity. But individual countries, supported by international partners, have established rangeland management training and research institutions, which have made good initial inventories and surveys including mapping, but there has been lack of coordination between countries and continuity in data collection and monitoring, which has limited their use. Because of this I would like in this presentation to use, as an example, my country of Kenya with which I am most familiar.

In African terms, Kenya has had a considerably long history in rangeland management which has seen the application of various approaches to resolve the issue of land degradation in the arid and semi arid zones of the country. These have included introduction of various land tenure systems in rangelands and establishment of rangeland research, training and management institutions. In discussing indicators of sustainability of African rangelands, it is important to focus on how these developments have impacted on the stability of rangeland ecosystems and how improvements could be made. Although not supported by hard and consistent scientific data, it is generally acknowledged from field observations that African rangelands are undergoing severe degradation and pastoral people are becoming poorer.

Indicators of sustainability The causes of and impacts of land degradation are often multiple and complex and usually involve a combination of human and natural factors. There are direct and indirect relationships between the state of natural resources (soil, vegetation, water, ecosystem), and biological diversity at species level (animal, plant and microbial species) and ecosystem level (habitats, interactions, functions) and the management of those resources (Bunning 2003). Management practices directly or indirectly affect the capacity of land users to conserve and sustain resources and provide goods and ecological services. The assessment and monitoring of range condition and associated ecosystem processes, therefore, requires an integrated set of biophysical and socio-economic indicators, which will provide a basis for informed management decisions by a range of stakeholders from resource users and managers to technical advisers, planners and policy makers.

Territorial integrity of pastoral lands

The long term survival of pastoral people who are wholly dependent on resources of the rangelands is perhaps the best indicator of the sustainability of African rangelands. That assurance pre-supposes that the pastoral people have adequate rangeland to cater for their year round survival including times of prolonged droughts or floods or outbreaks of disease. Conversion of African rangelands to non viable grazing units is perhaps the biggest threat to their sustainability.

Pastoral nomadism is a necessity for survival on African rangelands and has been traditionally practiced for many years. Pastoral people moved over large territories in search of suitable grazing for their livestock and sections of rangeland were

reserved for dry season grazing and periods of drought . The movements were orderly and the decision making processes that initiated such moves were well established within the pastoral cultures . Territorial integrity was assured through tribal councils of elders who regularly met to discuss issues of mutual interest across tribal boundaries . Grazing reserves were protected for the use of all . In order to regain the integrity of the rangeland , it is important to restore some of the original rangeland territory through trans-boundary agreements that guarantee access to grazing rangelands across modern state boundaries .

In Kenya , for example the Kenya/Uganda boundary divides the tribal territories of the Pokot and Turkana pastoralists ; the Kenya/Ethiopia border divides Borana , Gabbra and Somali pastoralists ; the Kenya/Somalia border divides Somali , Pokomo and Oromo pastoralists ; while the Kenya/Tanzania border divides the Masai and Kalenjin tribal territories . Tribal disputes due to cross border grazing have been on the increase in the recent past sometimes resulting in clashes that have cost human lives . In order to resolve these problems it will be important for the modern nation states to draw standing trans-boundary agreements that would assure orderly access to these rangelands for the pastoral populations affected .

Security of tenure of African rangelands

Security of tenure is an important indicator of the sustainability of rangelands for without security of tenure of the residents of African rangelands , long term rangeland management measures and investments cannot be assured . Tenure under the traditional systems was assured through the tribal custodianship of rangelands vested with tribal elders . Tribal territories had been established after long term negotiations between the tribes , sometimes occurred after bitter tribal wars . Rangelands were owned as tribal entities and their use was regulated by tribal rules , which had evolved over time and whose basic foundation was to maintain the integrity of rangelands for the long-term survival of the tribe .

The establishment of modern nation states which brought together many different tribes necessitated the introduction of new land tenure systems , some of which would be based on individual land ownership . Although this was easier to establish in agricultural communities and tribes , it was not very easy to prescribe specific land tenure systems for pastoral rangelands . The experience in Kenya , is a good example .

In the early 1900 s Kenya s high potential rangelands were converted into fenced off commercial ranches to raise beef largely for the export market . In addition group ranches with group title deeds were established for certain select semi-settled agro-pastoral communities . The pastoral nomadic groups were left with low potential rangelands without any specific tenure status but put under the custody of country councils , which had never been involved in rangeland management . The individual and group ranches were originally part of the pastoral nomadic seasonal grazing cycle , which consisted of both wet and dry season grazing areas in order to use rangelands in a sustainable way . The removal of these rangelands from the established nomadic grazing cycle was a factor which led to rangeland degradation . The communal ownership of rangelands left for pastoral nomadic groups did not qualify for investment credit from financial institutions . In order to assure sustainability of the African Rangelands pastoral communities must be assured of the tenure of their lands in order to take responsibility for their sustainable development and management .

Land use change and sustainability of African rangelands

Large portions of African rangelands occupied by pastoral people are ecologically fragile and nomadic pastoral grazing rangeland is the ecologically most suitable land use . Politically and economically , however , these areas have had a history opportunistic exploitation that has resulted in increasing degrees of human hardship and ecological damage .

In Kenya , for example (Table 1) , due to increasing human population pressure in arid and semi arid rangelands , rangelands are increasingly being converted into cropland . The general result of this type of agriculture , in these ecologically delicately balanced areas , is to convert potentially good quality grazing land into ecologically unstable areas of lowered fertility , liable to water and wind erosion .

Table 1 *Changes in Area of Major Land Use Categories-Kajindo District*

ID	Land use	Area in Hectares (Ha)			
		1973	1984	1994	2000
1	Forest	646 .34	595 .88	416 .69	416 .69
2	Irrigated Agriculture	245 .17	3 ,512 .48	4 ,043 .39	4 ,766 .18
3	Rainfed Agriculture	7 ,211 .47	17 ,762 .31	22 ,032 .66	24 ,911 .04
4	Rangeland	160 ,846 .76	147 ,094 .63	142 ,473 .97	138 ,871 .08

From : David J . Campbell et al , *Human Ecology* , Vol 33 , No . 6 December 2005 .

In order to further ensure food security for increasing human populations , critical areas of rangelands that were retained for dry season grazing , have been converted into irrigated farmland . Many of those irrigation schemes have been abandoned after the rangeland has been destroyed and thus increasing the instability of the rangeland ecosystem . Where such schemes have

survived, they have served to displace pastoral livestock to more marginal rangelands which can least support them and hence contributing to continued rangeland degradation through overgrazing. Although it may not be economically possible to restore some of the rangelands, efforts to stabilize the already degraded areas should increase their sustainability.

Rangeland fragmentation through the sale of already securely adjudicated individual and group ranches is another factor contributing to the instability of African rangelands. Although security of tenure was seen as a way of keeping rangeland for grazing use, many of the individual and group ranch owners are increasingly leasing or selling these lands to absentee landlords for commercial wheat farming and production of other crops (Figure 1). Valuable dry season grazing rangelands are being turned into flower farms for export. Although these exports may be beneficial to the national economy, such lands should have been guaranteed to remain rangelands through a still current zoning policy. These land use changes are leading to irreversible damage to the rangelands and serious consequences for the pastoral people who live there.

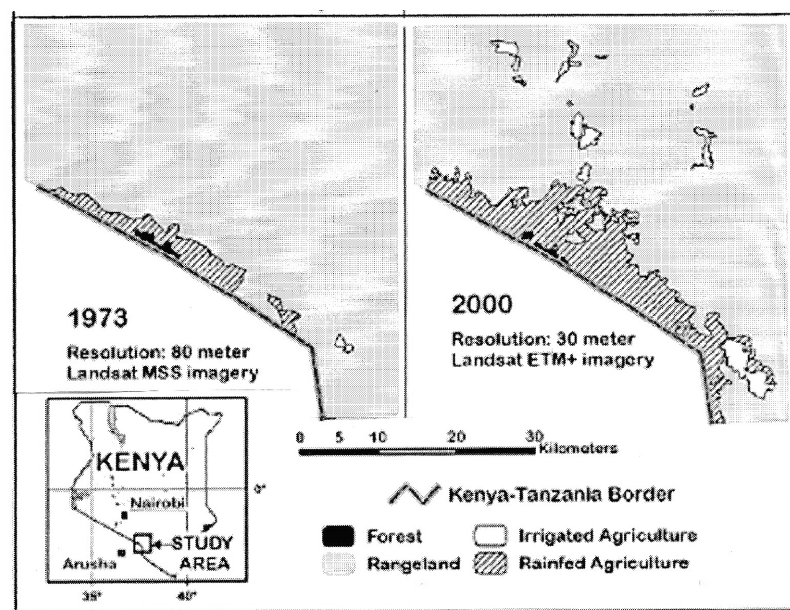


Figure 1 Patterns of land use change in southeast Kajiado District, Kenya 1973-2000
From David J. Campbell et al, *Human Ecology*, Vol 33, No 6 December 2005.

Demographic change and sustainability of African rangeland

Since sustainability of African rangelands is directly linked to the livelihoods of the pastoral people who live there, demographic change in rangelands and the living conditions of the pastoral people is perhaps the most important indicator of sustainability of rangelands. Apart from the reduction in pastoral territory, changing land tenure and land use; population of the people who live in rangelands has increased by 2.2 percent annually. This has far reaching consequences. Since the pastoral people are directly dependent on their livestock, an increase in their population traditionally requires an increase in livestock numbers. Increase in livestock populations increases pressure on already reduced rangelands. The result is unprecedented rangeland degradation accompanied by human suffering. During relatively frequent times of drought there are usually not only environmental refugees who flee to famine relief camps but loss of livestock and human life. This is the scenario across most of Africa's rangelands which has not been adequately addressed through national policies and development plans.

Another demographic trend of far reaching impact on the sustainability of African rangelands is the official government encouragement of sedentarization of pastoral nomadic people. In Kenya, this was done through the establishment of grazing schemes and group ranches as good models of proper land use and livestock management. Once settled, the pastoral populations would receive medical treatment, the children would go to school, and the people would pay taxes to the government. Other forms of settlements are outgrowths from famine relief centers created to provide food for people following droughts after they have lost their livestock. It is understandable that the government, anxious to safeguard the welfare of these people might have encouraged these types of activities without realizing their ecological consequences. But in the long term interest of the survival of the pastoral people of the rangelands, African governments must promote land use approaches and socio-economic systems that must restore the integrity of pastoral rangelands and assure sustainable human livelihoods.

Changes in livestock populations

Livestock is the primary link between the pastoral people and their environment . Pastoralists determine the condition of their rangelands through the performance of their livestock . Milk production is an important indicator of the condition of the rangeland and plays an important role in determining their movement over their rangelands . When milk production continues to decrease , it usually means that the availability of grazing and water is low and hence time to move to the next grazing unit . Assurance of survival was also further achieved through the keeping of mixed herds of livestock-cattle , camels , sheep , goats and donkeys-which utilized different parts of the available forage and had compatible water needs . Wildlife was part of the range and diversified their food security during times of drought .

The situation in Kenya with regard to livestock populations could be representative of Africa 's rangelands . Control of livestock diseases and provision of adequate watering points for people and their livestock are some of the most compelling human urges on African rangelands , but this has led to livestock populations exceeding rangeland grazing capacity . This becomes self defeating when carried out on a narrow front , without any surrounding strategic design for controlling livestock numbers or diluting modern human greed for exploitation .

Vegetation and sustainability of African rangeland

In range science , condition of the vegetation - its composition and diversity , its type and vigor , and its cover of the soil surface - is one of the most important indicators of rangeland sustainability . Vegetation on African rangelands occupied by pastoral people has continued to deteriorate due to a combination of the above factors .

Human population pressures have put direct pressure on the vegetation through their demand for fuel wood and building material and for building night enclosures to protect livestock from predators . This has reduced woody vegetation which is forage to livestock and wildlife populations .

Because of weak grazing controls and livestock marketing structures on these communal lands , there is increased overgrazing over large areas of the rangelands . Information on vegetation change on African Rangelands has been fragmented but satellite imagery is now providing some hope for a broad assessment of the situation . When this information is available , new policies will need to be put in place by individual countries . But those policies need to be enforced and alternative livelihoods offered to the rangeland people .

The effects of soil degradation

Soil stability and fertility are important indicators of rangeland sustainability . The condition of rangeland soils in Africa is being increasingly reduced due land use malpractices .

After periods of rain in Kenya , for example , it is possible to see rivers changing color , as valuable soil is washed from land and swept away . This is an irretrievable loss to African nations and in many cases has already undermined the development processes and food security on which the welfare of the people depend .

Wildlife conservation and rangeland sustainability

Wildlife is an indispensable part of the African landscape , especially its rangelands . Wildlife utilizes different vegetation components from those used by livestock and is more resilient in use of available water . Pastoral people have always considered wildlife to be part of their landscape which does not only provide survival during times of drought , but also offers alternative livelihoods in terms of wildlife based tourism . Its presence or absence is an important indicator of the sustainability of rangelands .

Conclusion It is difficult to make a general evaluation of the status of African rangelands because of the vast differences in their physical location and socio-economic conditions of the countries where they are found . Socio economic conditions of the people and their welfare will continue to be the most important indicator of the sustainability of rangelands in both the short and long term . Because of poverty and differences in the socio-economic status of the individual countries , it is difficult to implement a uniform monitoring program that would yield reliable continent-wide data for development planning and management . But since most rangelands are trans-boundary , such information will be needed at the regional scale if it is to be useful . There are currently many well established centers for rangeland research and development which have been operating below their full potential due to lack of funds and enabling environments for extensive field surveys . These must for the time being remain the nucleus for rangeland development and collaboration between African states and indeed the rest of the world . It is quite possible that the recognition of these centers as regional centers of excellence could remove them from the national constraints . The most important objective for such centers would be to provide the urgently needed information to arrest and reverse the current accelerated degradation of African rangelands .

References

Talbot , Lee M , 1986 . Demographic factors in resource depletion and environmental degradation in East African Rangelands . *Population and development review* 12 , No 3 1986 .

- Campbell , D . J . , 2005 . Multiple Methods in the Study of Driving Forces and of Land Use and Land Cover Changes : A case Study of SE Kajiado District , Kenya . *Human Ecology* , Vol . 33 , No . 6 , December 2005 .
- Bunning , S . 2003 . Stocktaking of Dryland Biodiversity Issues in the Context of the Land Degradation Assessment of Drylands (LADA) . FAO Draft Report 2003 .
- Lusigi , W . J . 2003 . Rangeland Interventions-Linking Science and Society . Paper Presented at the International Rangeland Congress , Durban , 2003 .
- wb21461 L : \ Indicators of Sustainability in African Rangelands 2 .doc 03/26/2008 9 :59 :00 AM .