

GENERATING WEALTH FROM ENVIRONMENTAL VARIABILITY

the economics of pastoralism
in East Africa's drylands

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Productivity in the face of environmental variability and resilience to periodic but unpredictable cycles of drought and flood are built into pastoral livelihoods, institutions and knowledge systems.¹ Yet poverty, environmental degradation and conflict persist in many pastoral areas of Africa. This is, in large measure, a direct result of inappropriate policy and development interventions. Enduring perceptions of pastoralism as an economically inefficient, and environmentally destructive land-use systems continue to drive rangeland and livestock policy. But these perceptions are not evidence-based. They are sustained by ignorance of the dynamics of dryland environments and pastoral livelihood systems, and the absence of an economic valuation framework in which to assess the true contribution of pastoralism to local and national economies. Furthermore, policy design and practice are not sufficiently informed by past failure or designed with the participation of pastoral communities.

Governments' poor understanding of pastoralism, combined with the inability of pastoral groups to influence the decisions that affect their lives and to hold government to account, is perpetuating a vicious circle of pastoral poverty and conflict, thereby reinforcing the very preconceptions underpinning policy directives for pastoral development in much of East Africa. These are failures of governance.

Building the capacities of both pastoral communities and their advocates to challenge these ingrained perceptions is an essential pre-requisite for the greater participation of pastoralists in national and local decision-making processes. Until governments better understand the rationale of pastoralism and the significant economic and environmental benefits of mobile livestock keeping, they will see no value in engaging with pastoralists or protecting their rights.

Box 1: Persistent perceptions

One of the weaknesses of communal land tenure is that it does not confer adequate incentives and sanctions for efficient utilisation and management of common property resources, which leads to what is commonly referred to as the "tragedy of the commons". Draft national policy for the sustainable development of arid and semi-arid areas of Kenya, 2005, p.7.

We are producing little milk, export very little beef, and our livestock keepers roam throughout the country with their animals in search for grazing grounds. We have to do away with these archaic ways of livestock farming. Hon Jakaya M. Kikwete, President of Tanzania, Press Conference on 4th January 2006.

"The extensive system which is mostly agro-pastoralism and pastoralism is a livestock production system which is based on seasonal availability of forage and water thus requiring mobility. This system is constrained by poor animal husbandry, lack of modernization, accumulation of stock beyond the carrying capacity and lack of market orientation..." National Livestock Policy, Tanzania, 2007, p.1

"The need to facilitate the restructuring of the pastoral economy over time towards a market driven economy, where key inputs are accessed through the markets rather than social networks as is the case currently..." Draft national policy for the sustainable development of arid and semi-arid areas of Kenya, 2005, p.28

"Improved productivity in terms of yield per unit area or per unit of livestock is envisaged to be one of the main areas of focus for agricultural transformation under PMA"...Uganda's Plan for Modernisation of Agriculture: Eradicating poverty in Uganda, 2005, p.74

Persistent perceptions

Two narratives continue to dominate environmental and livestock policy in East Africa even though there is little or no evidence to support their premises, particularly with respect to pastoralism – see Box 1. These need to be challenged.

First, the “tragedy of the commons” thesis articulated by Garrett Hardin (1968), which maintains that environmental degradation is inevitable where lands are held in common while livestock is privately owned.² Despite being discredited, it still strongly influences governments’ attitudes to customary pastoral land tenure systems, prompting policies to control stocking levels and privatize pastoral land. Hardin’s arguments are not in themselves wrong in that, in the absence of any enforceable rules of use or management of common goods, resource depletion and degradation may occur. The collapse of certain fishing stocks as a result of the failure of the international community to manage quotas in the world’s oceans, or the impunity with which the industrialised world continues to contribute to global warming through uncontrolled greenhouse gas emissions, are two contemporary examples.

But Hardin’s thesis does not apply to pastoralists, who customarily have complex rules of resource management to ensure that they use pastures and water in a sustainable manner – see Box 2. Furthermore, a careful reading of Hardin’s article, and in particular the section within it in which he uses pastoralism to il-

Box 2: Traditional water management in Ethiopia

Pastoralists traditionally control stocking rates by controlling the number of animals that can drink from a permanent dry season water point. This water management ensures sustainable use of the rangeland in dryland areas.

Among the Boran in southern Ethiopia, the Abba Herrega, an elected water manager, controls the clan’s traditional deep wells that provide permanent water in the dry season. The Abba Herrega ensures that strict watering regimes are followed.

The livestock of the well’s owner are watered first, followed by the most senior member of the clan responsible for traditional administrative issues, and then others according to the membership of the given Borana clan.

Setting the watering rotation is the responsibility of the well council. All those who graze in the same grazing circumference of the well have access rights to the water point. People who come from other grazing areas are not denied water, but they will need to negotiate the conditions of access.

Source: Modern and Mobile: the future of livestock production in Africa’s drylands. IIED and SOS Sahel, 2010 (forthcoming), p.43.

Shenabla Nomads moving south with the rains, North Sudan
Photo: Sue Cavanna



lustrate his hypothesis, demonstrates his lack of understanding of the dynamics of pastoralism in dryland environments. No account is taken of livestock mobility or of the dynamics of the pastoral herd where numbers are in constant flux as a result of animal mortality, livestock sales, births, etc. Contrary to Hardin's thesis, pastoral herd numbers do not grow exponentially over time but are constantly increasing and decreasing within and between years. Natural pastures, too, are in constant flux but, subject to rainfall, they do reproduce themselves, providing highly nutritious, if dispersed, fodder on a seasonal and inter-annual basis.

Second is the widely-held belief that pastoralism is backward and that livestock mobility is wilful, conflictual and, crucially, less productive than alternative land uses such as commercial ranching or agriculture. Many governments in East Africa believe that ranches with rotational grazing, controlled stocking densities, high-yielding cattle breeds and improved veterinary control produce more and better quality beef than pastoralism.

Economic productivity of pastoralism

Such views fly in the face of a growing body of evidence showing the very significant economic contribution pastoralism makes to national and regional economies and how it is considerably more productive per hectare than settled commercial ranching in similar environmental conditions. Research in Ethiopia, Kenya, Botswana and Zimbabwe comparing the productivity of ranching against pastoralism all came to the same conclusion: pastoralism consistently outperforms ranching, and to a quite significant degree (see Table 1). Whether measured in terms of meat production, energy generation (calories) or cash provision, pastoralism gives a higher return per hectare of land than ranching. Whereas commercial cattle ranching tends to specialise in only one product – meat – pastoralism provides a diverse range of outputs including meat, milk, blood, manure and traction which, when added up, is of greater value than meat alone.

Table 1: Comparing outputs per hectare from mobile pastoralism versus settled commercial cattle ranching in eastern Africa

Productivity of pastoralism and ranching		Unit of measure
Ethiopia (Borana)	157% relative to Kenyan ranches	MJGE/Ha/yr (Calories)
Kenya (Maasai)	185% relative to east African ranches	Kg of protein production/ha/yr
Botswana	188% relative to Botswana ranches	Kg of protein production/ha/yr
Zimbabwe	150% relative to Zimbabwean ranches	US\$ generated/ha/yr



Furthermore, contrary to popular belief, mobile livestock keeping in the drylands of Africa is more productive than sedentary livestock keeping in the same environment, as research from Sudan and Niger, respectively presented in Tables 2 and 3 below, testifies.

In the dry rangelands, the timing and distribution of plant nutrients are highly variable and unpredictable. This variability is due not only to the erratic rainfall but also the different soil types, different plant species and even the different stages of a plant's growth cycle. Pastoralists, unlike sedentary livestock keepers, use this variability to their advantage to maximize the productivity of their herds. Research by Krätli (2006) among Wodaabe pastoralists in Niger

demonstrates how these communities positively exploit their unpredictable environment in order to maximize the productivity of their livestock.⁷ Through controlled breeding, the Wodaabe select animals that are not only highly mobile and capable of withstanding very high temperatures with little water but which are also able to feed selectively, carefully choosing the most nutritious plants, and even parts of the plant, in the rangelands. Combined with mobility, these skills enable pastoral herds to track and exploit the unpredictable concentrations of nutrients in dryland pastures thereby outperforming sedentary animals in similar conditions.

Table 2: Comparing productivity of mobile and sedentary cattle in western Sudan⁸

Indicators of productivity	Mobile Herds	Sedentary Herds
Calving rate	65%	45%
Females 1st calving under 4 years	65%	29%
Total herd mortality	15%	35%
Calf mortality	11%	40%
Meat production per breeding female	0.057 kg	0.023 kg

Table 3: Comparing productivity of sedentary, transhumant and nomadic cattle in Niger⁹

Indicators of productivity	Sedentary	Transhumant	Nomadic
Annual rate of reproduction	61	65	69
Mortality calves under 1 year	11.1	0	5.9
Calf weight at 300 days in kg	98.1	80.6	88.3
Average days in lactation	285	295	321
Quantity of milk per cow for human consumption in 1 lactation cycle	575	615	668

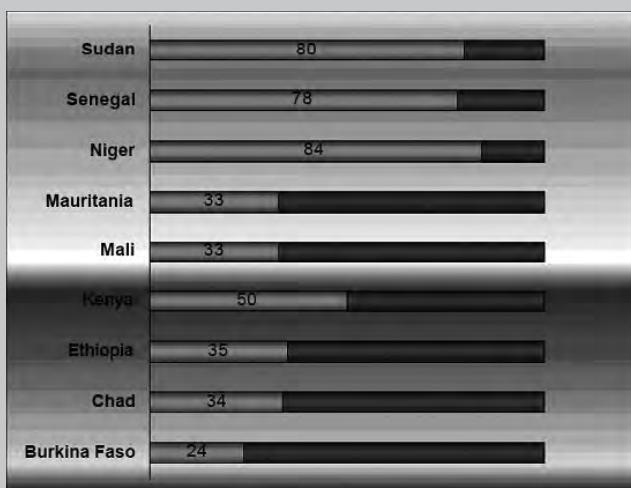
A cattle route in action - South Kordofan, Sudan. Photo: Sue Cavanna



Economic contribution of pastoralism

The high productivity of livestock in pastoral systems not only supports millions of pastoralists but also contributes significantly to other sectors in national and regional economies in Africa. Official statistics confirm the significant contribution pastoralism makes to agricultural GDP in many African economies – see Figure 1 below.¹⁰

Figure 1: Contribution of pastoralism to agricultural GDP



These figures, however, do not reflect the Total Economic Value of pastoralism to national economies.¹¹ In addition to the direct subsistence value of goods produced through pastoral production, there is the substantial economic value of these goods on the formal and informal markets through the sale and export of meat, livestock, and hides and skins, including leather. Pastoralism provides inputs to a wide range of formal industries such as the meat and restaurant trade, and is very significant in the informal meat industry, including the *nyama choma* or roast meat trade in East Africa. A 2005 study in Arusha, Tanzania, identified over 600 *nyama choma* businesses employing 5,600 people with an estimated 25,000 dependents.¹² When ancillary businesses such as butchers' outlets are included, the annual turnover of the industry in Arusha is now estimated at US\$ 22 million.

Pastoralism contributes significant but unknown value indirectly to other sectors and industries. Agriculture is a key beneficiary of pastoralism. It helps raise agricultural productivity by providing manure, animals for agriculture and transport, seasonal labour, and technical knowledge for the rising number of farmers now investing in livestock. Farmers also help pas-



Sudan - goats drinking on -the- move. Photo: Sue Cavanna



Camels resting at the oasis, Northern Kenya. Photo: Sue Cavanna



Messeri ya pastoralists moving from summer pastures in North Kordofan down to South Kordofan, Sudan. Photo: Sue Cavanna

toralists by providing crop residues as fodder – potentially crucial in drought years. These reciprocal exchanges help reduce conflict and promote peaceful relations. In tourism, a vital input from pastoralism is the maintenance of grazing reserves, which provides critical dry season habitats for wildlife. Nelson (2009) estimates the protection of dry season grazing contributes US\$ 8m million to Tanzania’s northern circuit tourism industry.¹³ The carbon storage potential of the rangelands is increasingly recognized. The rangelands are the largest land-use system in the world, covering about 40% of the earth’s land mass and 60% of Africa. It is estimated that these habitats store approximately 30% of the world’s carbon stocks.¹⁴ Pastoralism, while generating economic benefits from these areas through the temporary grazing of livestock, also plays a significant role in ensuring the stored carbon is not released, as would be the case with alternative land-use systems (e.g. farming, bio-fuel production).

Making the economic argument

Pastoralists and their advocates need to make the economic argument for pastoralism with some urgency. Throughout East Africa, governments have embarked on an agenda of institutional reform centred on the modernisation of the agricultural sector as the pathway out of poverty. Within this, the replacement of pastoralism either by a livestock sector based on commercial ranching or alternative land-use systems such as commercial farming is promoted as a key objective. Political and economic factors are combining to replace pastoral grazing land with other allegedly more beneficial land uses. These decisions, however, are not informed by a sound analysis of either the expected returns or the benefits foregone from replacing pastoral access to prime grazing land with alternative commercial land use. This is because the value of pastoralism as a land use, both in comparison with alternative land uses and to the national economy, is unclear. Sound field-based research on the Total Economic Value of pastoralism is urgently required to gather hard evidence of the multiple contributions pastoralism does make to local and national economies.

Such research, however, needs to be accompanied by a parallel process of building the capacity of pastoral communities and their advocates to use data in order to make the economic argument in favour of their livelihood system. Whereas twenty years ago pastoral advocacy was largely driven by well-meaning northern organisations, today an increasingly vocal and well-organised pastoral civil society is emerg-

ing. Increasingly visible events such as “pastoralists day” in Ethiopia and “pastoralist week” in Kenya and Uganda, and the establishment of pastoral parliamentary groups in all East African countries are contributing to keeping pastoralism on the political agenda. The challenge now is to ensure it features on the economic agenda of these countries. To do this, pastoral civil society must further strengthen partnerships with different stakeholders and at different levels, including those sectors in which pastoralism provides a range of inputs, often in interlocked markets of reciprocity (e.g. farming, tourism, conservation). Developing such alliances is essential if they are to develop the political and economic “leverage” necessary to ensure that improved knowledge of the value of pastoralism is actually used by government to improve policy and legislation in its support, thereby addressing poverty, environmental degradation and conflict in East Africa’s drylands. □

Notes

- 1 Krätli S. 2007. Cows Who Choose Domestication. Generation and management of domestic animal diversity by WoDaaBe pastoralists (Niger), PhD thesis, Institute of Development Studies, University of Sussex, Brighton, UK.
- 2 Hardin, G. (1968) The Tragedy of the Commons,” *Science*, 162(1968):1243-1248.
- 3 Cossins, W.J. (1985) The productivity of pastoral systems. *ILCA Bulletin* 21: 10-15.
- 4 Western, D. (1982) The environment and ecology of pastoralists in arid savannas. *Development and Change* 13: 183-211.
- 5 De Ridder, N. & K.T. Wagenar. (1984) A comparison between the productivity of traditional livestock systems and ranching in eastern Botswana. *ILCA Newsletter* 3 (3): 5-6.
- 6 Barnett, J.C. (1992) The economic role of cattle in communal farming systems in Zimbabwe. *Pastoral Development Network paper 32b*, ODI, London.
- 7 Krätli S. 2007. Cows Who Choose Domestication. Generation and management of domestic animal diversity by WoDaaBe pastoralists (Niger), PhD thesis, Institute of Development Studies, University of Sussex, Brighton, UK. Krätli S. (2008) Cattle breeding, Complexity and Mobility in a Structurally Unpredictable Environment: the WoDaaBe herders of Niger. *Nomadic Peoples* 12(1): 11-41.
- 8 Wilson, R.T. and S.E. Clarke (1976) Studies of the livestock of southern Darfur, Sudan II. Production traits in cattle. *Tropical Animal Health and Production* 8: 47-51.
- 9 De Verdière, C. P. (1995) Les conséquences de la sédentarisation de l'élevage au Sahel. Etude comparée de trois systèmes agropastoraux dans la région de Filangoué, Niger. Thesis presented in the context of doctoral research at the l'Institut National Agronomique Paris-Grignon, 220 pp.
- 10 Rodriguez, L. (2008) A global perspective on the Total Economic Value of pastoralism: Global synthesis report based on six country valuations. World Initiative for Sustainable Pastoralism, Nairobi.
- 11 Hesse, C. and MacGregor, J. (2006) Pastoralism: drylands' invisible asset? Developing a framework for assessing the value of pastoralism in East Africa. *Drylands Issue Paper 142*, IIED, UK.
- 12 Letara, J. (2006) *The economics of the Nyama choma business in the city of Arusha*, Tanzania. RECONCILE/IIED.

- 13 Nelson, F. (2009) Natural Conservationists? Evaluating the Impact of Pastoralist Land Use Practices on Tanzania's Wildlife Economy. IIED and TNRF, in press.
- 14 Tinnigkeit, T and Wilkes, A 2008 Carbon Finance in Rangelands. ICRAF/UNFCC Challenges and opportunities for mitigation in the agricultural sector. Technical paper.

References

- Barnett, J.C., 1992:** The economic role of cattle in communal farming systems in Zimbabwe. *Pastoral Development Network paper 32b*, ODI, London.
- Cossins, W.J., 1985:** The productivity of pastoral systems. *ILCA Bulletin* 21: 10-15.
- De Ridder, N. & K.T. Wagenar, 1984:** A comparison between the productivity of traditional livestock systems and ranching in eastern Botswana. *ILCA Newsletter* 3 (3).
- De Verdière, C. P., 1995 :** *Les conséquences de la sédentarisation de l'élevage au Sahel. Etude comparée de trois systèmes agropastoraux dans la région de Filangué, Niger.* Thesis presented in the context of doctoral research at the Institut National Agronomique Paris-Grignon.
- Hardin, G.: 1968:** *The Tragedy of the Commons*, Science, 162(1968).
- Hesse, C. and MacGregor, J., 2006:** Pastoralism: drylands' invisible asset? Developing a framework for assessing the value of pastoralism in East Africa. *Drylands Issue Paper 142*, IIED, UK.
- Krätli S., 2007:** *Cows Who Choose Domestication. Generation and management of domestic animal diversity by WoDaaBe pastoralists (Niger)*, PhD thesis, Institute of Development Studies, University of Sussex, Brighton, UK.
- Krätli S., 2008:** Cattle breeding, Complexity and Mobility in a Structurally Unpredictable Environment: the WoDaaBe herders of Niger. *Nomadic Peoples* 12(1).

- Letara, J., 2006:** *The economics of the Nyama choma business in the city of Arusha, Tanzania.* RECONCILE/IIED.
- Nelson, F., 2009:** *Natural Conservationists? Evaluating the Impact of Pastoralist Land Use Practices on Tanzania's Wildlife Economy.* IIED and TNRF, in press.
- Rodriguez, L., 2008:** *A global perspective on the Total Economic Value of pastoralism: Global synthesis report based on six country valuations.* World Initiative for Sustainable Pastoralism, Nairobi.
- Tinnigkeit, T. and Wilkes, A., 2008:** Carbon Finance in Rangelands. ICRAF/UNFCC Challenges and opportunities for mitigation in the agricultural sector Technical paper.
- Western, D., 1982:** The environment and ecology of pastoralists in arid savannas. *Development and Change* 13.
- Wilson, R.T. and S.E. Clarke, 1976:** Studies of the livestock of southern Darfur, Sudan II. Production traits in cattle. *Tropical Animal Health and Production* 8.

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Sheep at the water hole - Sudan - Photo: Sue Cavanna

