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Pastoralism: drylands' invisible asset?

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Developing a framework for assessing
the value of pastoralism in East Africa

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2. Visit <http://www.iied.org/NR/drylands/themes/supporting.html> for more information on the PCS-EA programme.

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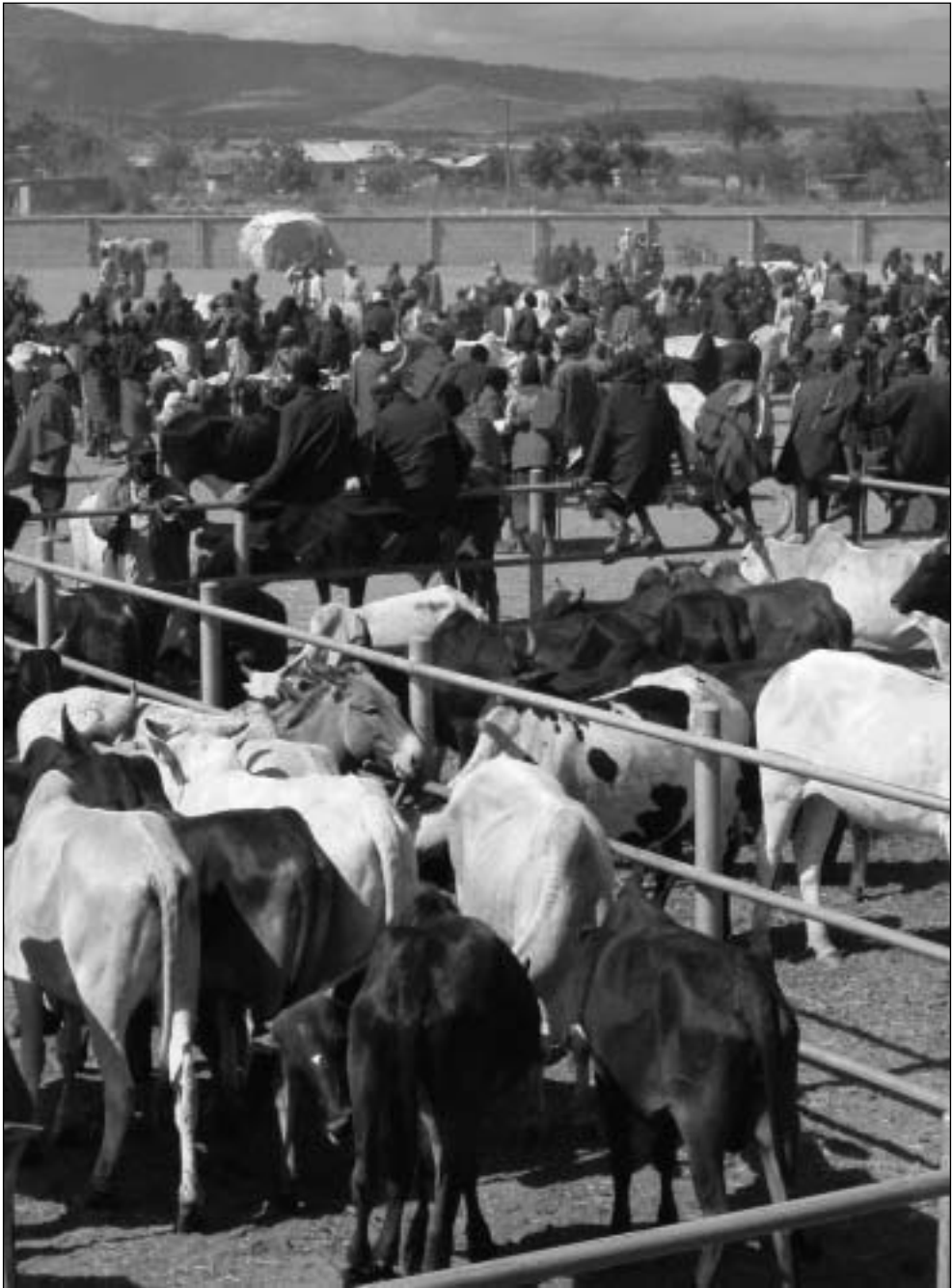
Acronyms

ASAL	Arid and Semi-Arid Lands
CBA	Cost-Benefit Analysis
DDC	Drylands Development Centre
GDP	Gross Domestic Product
GNP	Gross National Product
IIED	International Institute for Environment and Development
ILRI	International Livestock Research Institute
IUCN	The World Conservation Union
NRA	Natural Resource Accounting
NTFP	Non-Timber Forest Products
RECONCILE	Resources Conflict Institute
SCBA	Social Cost-Benefit Analysis
SDC	Swiss Development Cooperation
TEV	Total Economic Value
UNDP	United Nations Development Programme
WISP	World Initiative on Sustainable Pastoralism

Summary

- Many policy makers in East Africa have **preconceptions** about the value of pastoralism as a land-use system believing it to be economically inefficient and environmentally destructive.
- Yet, this is **not evidence-based**. Not only is there no consensus on what is a dynamic economic model of pastoralism, no mechanisms exist to inform government decision-making of its comparative advantages over alternative land uses.
- Existing national statistics are **inadequate** and **inaccurate**. *Direct values* of pastoralism include production of milk, beef and hides for subsistence and export, but these are rarely included in the national accounts, even when as inputs to the formal sector. *Indirect values* of pastoralism include income from tourism, sustainable land use and risk management in disequilibrium environments, biodiversity conservation and improved agricultural returns, but these too are rarely captured in national statistics or recognised by policy makers.
- Governments consequently **undervalue pastoralism** and promote policies that in seeking to change or replace it create a vicious circle of impoverishment, conflict and environmental degradation in dryland areas.
- Pastoralism is a **diverse** and **dynamic** livelihood system integrating livestock husbandry with other activities including agriculture and NTFP. Although livestock are raised for economic reasons these are framed within strong social, environmental and cultural objectives. Pastoralism is also well-adapted to, and able to generate significant returns from, dryland environments characterised by scarce and unstable resources.
- Pastoralism is a **rational economic land use system** in which maximum returns, be they economic, social or environmental, are sought from investments. Demonstrating the logic underpinning pastoral livelihood systems requires a 'tweaking' of the conceptualisation of rational economic models rather than a re-invention.
- A **new conceptual framework** is needed to assess the value of pastoralism that goes beyond conventional economic criteria in order to provide fresh insights to its contribution to poverty reduction, sustainable environmental management and the economic development of dryland areas of East Africa in the context of increasing climate uncertainty. This paper proposes such a framework.





Pastoralists selling livestock to livestock traders in Meserani Market, Monduli District, Arusha, Tanzania

1. Introduction

All governments in East Africa have embarked on a radical agenda of institutional reform centred on the modernisation of the agricultural sector as the motor of economic development for poverty reduction.³ Within this, the replacement of pastoralism either by a livestock sector based on western models of animal husbandry or alternative land use systems is promoted as a key objective.

Pastoral land is shrinking and with it the opportunities for pastoral people to make a viable living. Political and economic factors are combining to replace pastoral grazing land with other allegedly more beneficial land uses. This paper addresses these issues. It asks if replacing pastoral access to prime grazing land with alternative commercial land use is a rational and efficient decision, particularly since the value of pastoralism as a land use, both in comparison with alternative land uses and to the national economy, is unclear. It is certain that pastoralism has social functions and impacts on its environment. But without better data, conventional cost-benefit analysis is difficult. While social impacts can be captured through an extended cost-benefit analysis (i.e. a social cost-benefit analysis), assessing environmental impacts that are far less tangible particularly in relatively short time periods (e.g. 2-3 years) requires more complex tools. Total Economic Value (TEV) is such a tool, providing a more complete picture of the impact and value of pastoralism.

Total Economic Value measures market and non-market values that people hold for a given sector. It provides an aggregation of the main values or benefits provided by a given ecosystem, including use and non-use values. TEV analysis aims to provide the basic data to enrich other types of widely-used analysis, such as SCBA, which is an increasingly standard tool for public decision-making when markets fail to deliver efficient outcomes. TEV has been used mostly to capture and order data and information to preserve under-protected environmental assets, particularly conservation areas. There is a strong link between the pastoral sector and environmental assets; both are under-protected, under-valued and the unintended victims of uninformed policy, perverse incentives and donor interventions. TEV has also been used in other ways: valuing European council services, mountain ranching communities in the USA, Amazonian deforestation, accident reduction in California, Canadian livestock breeding and borana cattle in Ethiopia (see Zander, 2005).

Pastoralism's decline is a vicious circle: pastoral land use is undervalued, and either ignored or appropriated for alternative uses, thus making pastoralism less viable and ripe for persistent neglect or appropriation for alternative uses. This represents a missed opportunity to capitalise on the significant economic potential this livelihood system offers, particularly in the arid and semi-arid regions of East Africa. These areas are not suited to widespread agriculture or more intensive or sedentary forms of animal husbandry. Thus, investing in pastoralism has low opportunity costs. Pastoralism offers the most cost-effective way of supporting relatively large populations in these areas and at minimal environmental cost. Furthermore, and perhaps more significantly, it offers East African governments a major opportunity to capitalise on the rapid projected growth in demand for livestock products over the next 15-20 years (Delgado et. al 1999). Finally, the continued neglect of pastoralism carries huge potential costs as poverty, envi-

3. Programme for modernisation of agriculture (Uganda); the Strategy for revitalisation of agriculture (Kenya); and the Agricultural sector development programme (Tanzania).

ronmental degradation and conflict are likely to increase as local people lose their livelihood base and struggle for survival.

Some of the preconceptions (Box 1) read like political and economic justifications for inaction on pastoral issues. But pastoralism's future requires more than a positive public relations exercise; it needs to be first placed under scrutiny. The absence of an appropriate conceptual framework and monitoring system to identify and track the true and various contributions of pastoralism is a major constraint.

This paper argues that pastoralism does make a significant contribution to society and that, with better understanding, planning and data collection, its value can be demonstrated. It adopts a revised TEV approach for identifying the range of values that can be attributed to pastoralism. Identifying goods and services from an informal sector such as pastoralism, determining who values them and how best to measure them, is not a straightforward process. Many of the goods and services are not traded on commercial markets and therefore have no easily calculated market value. The values of non-market goods and services need to be measured and expressed in monetary terms, when this is possible and appropriate, so that they can be weighed on the same scale as commercially traded components.

The main purpose of the paper is thus to contribute to on-going debates and analysis on what should be the key parameters of an economic valuation framework that permits an accurate assessment of the contribution pastoralism makes to national economies in East Africa.⁴ The presentation of the TEV framework in this paper is to enable a discussion on the subject, its intricacies and conceptual and methodological challenges. And to challenge others to develop better versions of this framework! Such a debate will contribute to the design of a more appropriate methodology for assessing the benefits of pastoralism that goes beyond conventional criteria relating to livestock and their by-products (beef, milk, skins and hides).

While the paper focuses on East Africa, much of the analysis is applicable to pastoral systems in other regions of Africa.

Box 1. Common preconceptions of pastoralism

- Nomadic pastoralism is an archaic form of production, whose time has passed; modern scientific methods need to be introduced.
- Mobility is inherently backward, unnecessary, chaotic and disruptive. It is a predatory and extractive way of using resources.
- Most rangelands are degraded because of pastoral over-grazing.
- African pastoralists do not sell their animals; they prefer to hoard them, admire them and compose poems to them.
- Pastoralists contribute little to national economic activity.
- Pastoralism has very low productivity. Sedentary cattle raising is more productive than mobile systems and uses less resources and space than mobile pastoral systems.
- Pastoralists need to settle to benefit from services.
- All pastoralists are rich; alternatively, all pastoralists are poor and food insecure.
- Men because they own and control livestock are the "real" pastoralists and women therefore depend on them for their livelihoods.

Source: UNDP (2003); Hodgson (2000, 1999).

4. IUCN's East Africa regional programme, the World Initiative for Sustainable Pastoralism and UNDP's Drylands Development Centre are all involved in various research initiatives on the economics of dryland areas of East Africa.

2. Challenges of valuing pastoralism

2.1 Defining pastoralism

Defining pastoralism is problematic. Pastoral systems in East Africa are complex, diverse, and extremely dynamic as pastoralists seek to adapt to evolving social, political and economic conditions at local, national and regional levels. They include the relatively sedentarised Maasai in southern Kenya that manage highly diversified livelihood strategies only partly dependent on livestock, agro-pastoral Karimojong in north-eastern Uganda, highly mobile Turkana, predominantly camel-rearing Somali and Rendile in arid north-eastern Kenya, and the highland Maasai in Ngorongoro, Tanzania.

There is also huge differentiation within pastoral communities. Some households are rich, others extremely poor. There is no pure pastoral ideal either. Some families are heavily dependent on livestock for their livelihoods, others less so. In some cases, there are households who practice a predominantly livestock based livelihood; others who are diversifying while retaining some livestock; while some require exit options which do not end in destitution. Gender differentiation is also critical, defining not only divisions of labour but access to and control over key political, economic and social factors of production and reproduction (Hodgson 1999, 2000). While capturing this diversity in the form of an all-encompassing definition is difficult, most pastoral systems display, to varying degrees, a number of common characteristics (Box 2).

Box 2. Key characteristics common to different pastoral systems in East Africa

- Families depend on livestock for a significant proportion of their food and income.
- Many pastoralists cultivate crops and carry out other economic activities to meet their subsistence needs.
- Livestock are raised for a mix of subsistence (particularly milk) and market needs (e.g. livestock sales to buy food, to pay taxes, etc.).
- Livestock herds are composed mainly of indigenous and cross-bred breeds.
- Livestock represent more than just economic assets. They are social, cultural and spiritual assets too. They define and provide social identity and security.
- Livestock are dependent on natural pastures for their diets including crop residues in some systems.
- Pastoralism depends on the work and expertise of all family members, usually divided by gender and age.
- Key livestock management strategies include: herd mobility, herd diversification, raising several species of animals in one herd, herd splitting, and maintenance of a high proportion of female livestock.
- Natural resources are managed through a mix of common property and private regimes where access to pastures and water are negotiated and dependent on reciprocal arrangements.
- Pastoralism is characterised by adaptation and evolution to external constraints of climate, economic change and opportunities facing them.

Pastoralism is also defined by the dynamics of dryland ecosystems and the livelihood objectives of pastoral communities in response to key environmental and market drivers. Understanding the dynamics of these drivers is critical to understanding the rationale of pastoralism in East Africa.

Low, unpredictable, scattered and **variable** rainfall from one season to the next and one year to the next is the defining feature of the drylands of East Africa. Rainfall variability is normal in these areas and represents the single most important factor determining the quantity and quality of natural pastures and water on which the majority of livestock in pastoral and agro-pastoral systems depend for their survival.⁵ In the face of this variability, pastoral families are seeking to balance three factors upon which the success of pastoralism depends:

- The **number of animals versus the availability of natural pastures and water**, particularly in the dry season. If there are too many animals, the family herd will not find sufficient pasture and the animals will lose weight and become weaker and more susceptible to disease. There is also a danger of over-grazing and resource degradation, particularly if livestock mobility is constrained. On the other hand, if there are too few animals, pastoral families lose an opportunity to have a larger herd and greater insurance against future drought. They also lose access to the various internal benefits associated with larger herds such as improved living standards and greater social security, while incurring the danger of resource degradation because of under-grazing (Kinyamario and Imbamba, 1992; Naveh and Kutiel, 1990).⁶
- The **size and age-sex ratio of the herd versus the size and age-sex ratio of the family** it supports and on which it depends for its management. If the family is too small or composed of many young or old members or an unbalanced number of men or women, livestock may not be properly managed, particularly in the dry season when pastoral work often is more labour intensive (e.g. watering, driving the animals to distant pastures). Poor management can result in lower milk production and weaker animals more prone to disease and fatigue. But if the family is too large relative to the size and composition of the herd, subsistence requirements particularly in milk will not be met and more and more animals will have to be sold to buy cereals and other foods. Over time, the family will lose their herd and fall into poverty if they cannot find alternative livelihoods to support them.
- Other **market roles and relationships**, which have a primary aim to spread current and future risk through accumulation of a diverse portfolio. Included here are non-livestock sources of income such as Non-Timber Forest Products (NTFPs), and reciprocal arrangements with other pastoralists and sedentary agriculturalists.

Maintaining an optimal balance between pastures, livestock and people in a highly uncertain and variable environment, to meet both their immediate and future livelihood needs, is a critical objective of pastoral families. Their ability to maintain this balance within acceptable limits is a key characteristic of their livelihood system based on complex social, economic and environmental strategies (Thébaud, 2004; 2002).⁷

5. In East Africa, topography, fire management, soil fertility and grazing intensity are other key but secondary determinants of pasture quantity and quality.

6. Under utilisation of rangelands can result in bush encroachment and the colonisation of unpalatable species.

7. The relatively slow natural growth rate of livestock in East Africa (about 2-3% per year) as well as its vulnerability to external shocks such as drought or disease makes the task even harder.

It is a constant juggling act, which requires families to maximise the size and the returns from their livestock herd in good years to generate a surplus for the inevitable bad years. These returns are not simply the accumulation of livestock, but also the relationships and social networks that will prove significant factors in the survival of the family and their herd during times of drought, disease or raiding. The strategy consists of an optimum use of resources without jeopardising their longer-term sustainability. Pastoralists are very careful environmental managers who have evolved a range of strategies to enable them to adapt to, rather than change or damage, the environment in which they live (Box 3).

In seeking to value pastoralism, it is essential to recognise that it is more than a livestock-based production system and is not, as such, a traditional form of ranching. Rather, it is a livelihood system that integrates livestock husbandry, in combination with other activities, as a rational economic activity with strong social, environmental and cultural objectives. It is a system regulated by ecology and complex modes of social, political and economic organisation, which does adapt to the opportunities and constraints of present-day African economies often while minimising environmental costs (Homewood, 1993). It is highly diverse, differentiated by gender, ethnicity and wealth, and dynamic as different groups and households members adapt to evolving social, political, economic and environmental conditions at different levels.

Box 3. Pastoral strategies to maintain an optimal balance between pastures, livestock and people

- Raising different species and breeds of livestock to make optimum use of different ecological niches, particularly in the dry season when resources are scarce. Indigenous breeds are better able to make optimal use of scarce resources, and are more resistant to drought and disease. 2
- Controlling access to water to manage pasture use, particularly in the dry season.
- Managing the age-sex composition of their herds and allocating different rights of use over different animals to meet the day-to-day needs of the family while ensuring the future viability of the herd and family. Management here includes sale of mature males or unproductive females into traditional livestock markets.
- Practicing mobility to track fresh pastures, avoid over-grazing and evade disease, conflict or drought conditions.
- Splitting their herds to lessen the risks of over-grazing and exposure to disease and other risks.
- Investing in animals, particularly fertile females, to build up herd size as an insurance against drought, disease and raiding.
- Selecting animals not only on the basis of cultural values, but also genetic potential (e.g. drought resistance, fertility, good milk yields, etc.).
- Loaning animals “surplus” to subsistence requirements to family and friends to help them rebuild their herds and develop social relations as a form of social capital as a hedge against drought and other risks. It also allows families to maintain a functional balance between herd and family size.

Notes

1. Cattle and sheep are predominantly grazers feeding of grasses, while camels and goats can survive in harsher environments by browsing leaves and feeding off the pods and fruits of trees.
2. The capacity of Zebu breeds rapidly to put on weight during the rains (compensatory growth).

2.2 Preconceptions driving policy

These words illustrate the enduring preconceptions held by many decision-makers in Africa of pastoralists and their way of life. The over-riding perception of pastoralism by decision-makers in those African countries with substantial pastoralist populations is negative. It is considered an inefficient use of land that does not contribute to national growth, poverty reduction or sustainable environmental management. Many governments see it as backward and environmentally destructive, and as preventing their country from developing a modern livestock sector. These preconceptions have a direct impact on policy leading many policymakers to conclude that pastoralism does not have a role in modern African society because it does not provide economic benefits on a scale commensurate with its land use requirements (Box 4).

*"We will take deliberate measures to improve the livestock sector. Our people must change from being nomadic cattle herders to being settled modern livestock keepers. We will take measures to improve pastures, veterinary care, cattle dips and auctions. It is the duty of all Regions, Districts and Local Authorities to set aside pastoral land, especially in those areas with much livestock."*⁸

Box 4. Policy perspectives on pastoralism

- Although there are valid driving forces towards their movements, pastoralists do more harm to overall economy than better due to continuous mobility haphazard mobility fuels conflicts with agro pastoralists (particularly farmers) and makes diseases control difficult (URT, 2001, p.32).
- 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". (RoK, 2005, p.7).
- 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. This low productivity in Uganda can be traced to a virtual absence of modern inputs such as....improved varieties of crops and livestock breeds (RoU, 2005).
- 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 archaic ways of livestock farming. I therefore create a separate ministry for livestock (Hon Jakaya M. Kikwete, President, URT in a press conference announcing his Cabinet, 4th Jan. 2006).
- 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 through social networks as is the case currently. Improving pastoral productivity by upgrading both the environment and the genetic composition of livestock through selection and improved animal husbandry practices (RoK, 2005, p.28).
- In the long run, a comprehensive scheme including the provision of pasture and water could be designed to limit seasonal migration and conflict. Resettlement scheme designs similarly to those adopted by the Kenyan government for the Pokot should be considered (RoU, 2002b. Cited in Markakis, 2004).

Yet, this is not evidence-based. Not only is there no consensus on what is a dynamic economic model of pastoralism, no mechanisms exist to inform government decision-making of the comparative advantages of pastoralism over alternative land uses. Even when policies are broadly supportive of pastoralism (e.g. Kenya's National policy for the Sustainable development of ASALs, RoK 2005), they still advocate for increasing its productivity through "modernisation" (Box 4). These negative preconceptions result in

8. Speech by the President of the United Republic of Tanzania, his excellency Jakaya Mrisho Kikwete, on inaugurating the fourth phase parliament of the United Republic of Tanzania, Parliament Buildings, Dodoma, 30 December 2005.

minimal government investment in support of pastoral development with parallel efforts either to modernise it or to replace it by expropriating the land and other natural resources on which it depends for other uses.

Policies dispossessing pastoralists of their land – especially their best lands on which ability to mitigate risk and enhance resilience depends – and converting it to conservation or irrigated often commercial agriculture are perpetuating a vicious circle of increasing poverty, resource conflict and environmental degradation that reinforces the very preconceptions and misunderstandings surrounding pastoralism as a livelihood system. The persistence of such misunderstandings is paradoxical given the wealth of research that exists demonstrating the ecological, and to a lesser extent, the economic viability of pastoralism in environments characterised by scarce and erratic rainfall.⁹ The inability of pastoralists themselves to articulate the rationale of their livelihood system, the scope and scale of its values and to make economic arguments for pastoralism further exacerbates their marginalisation.

Indeed, problems underlying policy maker's "blind spots" over pastoral society's contribution to economic growth are similar to those faced by "traditional" small-scale agriculture. Conventional wisdom is of a falling contribution of the agricultural sector, and particularly that of smallholders, to economic growth in developing countries since the 1970s. Yet, its actual national contribution is often hidden since core activities are often undervalued owing to a focus on final products (such as meat or hides) that misses the value-added contributions from industry participants along the supply chain (such as informal butchery and food services – see Box 6 on nyama choma below). For instance, agricultural products often form a cheap input into a range of processing industries and manufacturing processes enabling economic growth in other sectors (Clay *et al*, 2005). This can lead to an apparent irrational policy focus; for instance, in Kenya the livestock sector receives between 1-2% of recurrent expenditure while contributing an estimated 10% to GDP.

Changing policy makers' perceptions of pastoralism is a complex and long-term process. An important starting point is to improve their understanding of its dynamics and economic rational, particularly the direct economic contribution it makes to national economies.¹⁰ Demonstrating the economic contribution of pastoralism today is however, problematic as the following section demonstrates.

2.3 Absence of reliable and pertinent data

Looking at national level statistics it is easy to believe that pastoralism is of little or no economic importance to East Africa as its contribution to national economic activity is largely ignored. This largely because actual methodologies of data collection and summation are not adapted to assessing pastoral activity (see Box 5).

9. Key texts include: Behnke, R.H & Scoones, I (1993); Lane, C. & Moorehead, R. (1994); Leach, M. & Mearns, R. (1996); Sandford, S. (1983); Scoones, I. (1995).

10. It is argued, however, knowledge on its own is unlikely to bring substantial changes since policy formulation is a political process, controlled by the State, which favours dominant groups. And that pastoralists as a group are considered by many politicians to be a minority vote (Hesse & Odhiambo, 2006).

Box 5. What do governments understand by economic activity and growth?

An economy's growth is measured by the change in the volume of its output or in the real incomes of persons resident in the economy. There are several methods for calculating this growth; most popular is by measuring Gross Domestic Product (GDP). The volume of GDP is the sum of value-added, measured at constant prices, by households, government, and the industries operating in the economy. GDP is estimated by measuring the quantity of goods and services produced in a given time period, valuing these at an agreed set of base year prices, and subtracting the cost of intermediate inputs.

Each industry's contribution to growth in the economy's output is measured. This method requires detailed information on the structure of prices of inputs and outputs. Yet, in many industries value added is extrapolated from severely limited data. For instance, value added in constant prices is often calculated from labour inputs, such as real wages or the number of employees employed by the industry. Informal economic activities such as pastoralism pose a particular measurement problem, especially in developing countries, where much economic activity may go unrecorded. For example, pastoral labour in the maintenance of key resources such as wells or bores is rarely recorded. Obtaining a complete picture of the economy requires estimating household outputs produced for home use, sales in informal markets, barter exchanges, and illicit or deliberately unreported activities. The consistency and completeness of such estimates depend on the skill and methods of the compiling statisticians and the resources available to them.

Source: World Bank 2005. World Development Indicators. <http://devdata.worldbank.org/wdi2005/Tables4.htm>

Official data, when properly collected, can reflect the extent of economic activity of formal economic sectors such as mining, but are far weaker when quantifying a sector with a significant informal dimension such as pastoralism or small-holder farming. For instance, there are no reliable data on pastoral population numbers in East Africa since national census figures do not disaggregate by ethnic group or livelihood. Indeed, only approximate figures can be deduced from district level population data. Without data on the exact numbers of people practicing pastoralism, there is no simple way for official data to reflect the size of the pastoral economy or its contribution to economic growth.

A significant but unknown proportion of the pastoral economy does not pass through official markets but occurs within the community, while the economic returns on pastoral labour are unknown as the majority of pastoralists do not draw salaries nor pay income tax. Using shadow prices to estimate the value of pastoral produce, such as milk or butter, can also be complex as the relative scarcity of these products on local markets inflates their market value. Using conventional methods to record the economic outputs of pastoralism at a national level is thus difficult, and there are significant methodological challenges to overcome in designing methods that are more appropriate.

However, governments in East Africa do collect some data on the livestock sector. Examples of these data sets are presented in Tables 1 to 4 to illustrate the nature of the statistics collected and what they tell us, if anything, about the contribution of pastoralism to national economies.

Table 1 shows that agriculture and its sub-component livestock are significant in all three countries. Agriculture contributes between 16% and 45% of overall GDP while

Table 1. Estimates of the contribution of pastoralism to national economies in three countries (2004)

Factor	Kenya	Tanzania	Uganda
Contribution of agriculture sector to GDP	16%	45%	32%
Contribution of livestock to agricultural GDP	50%	30%	19%
Significance of pastoralists as livestock owners	n/a	n/a	90%
Significance of indigenous cattle in national herd	75%	97%	95%
Significance of milk production from pastoralism (% of total national milk production)	24%	n/a	85%
Pastoralist population ¹¹	6 million	1+ million	2+ million

Source: *World Development Indicators* database; Markakis, 2004; <http://www.tanzania.go.tz/livestock.html>; http://www.oxfam.org.uk/what_we_do/issues/livelihoods/landrights/downloads/afd_lrs_5_pastoral_issues_for_nl_p_uganda.pdf; <http://www.iss.co.za/AF/profiles/Uganda/Economy.html>; UNITER republic of Tanzania: <http://www.tanzania.go.tz>; Institute for Security Studies: <http://www.iss.co.za>; Uganda Investment Authority, 2003; RoU, 2002a; ILRI, 2005.

livestock represents between 19% and 50% of agricultural GDP.¹² However, this data fails to disaggregate the relative contributions of the different livestock production systems that exist in East Africa (e.g. dairying, ranching, agro-pastoralism, pastoralism) and so it is not possible to establish from official figures just how important pastoralism is within the livestock sector.

To do this, a number of estimated or proxy indicators were identified from a variety of sources in order to try and construe what might be the scale of its contribution. For example, official figures indicate a very high proportion of indigenous cattle in the national herds (75-97%), and given that such animals are predominantly reared by pastoral and agro-pastoral communities, it is reasonable to infer from these figures that pastoralism is a major contributor rather than dairying or ranching.

Within the livestock sector, official data are routinely collected on the export of hides and skins as this industry is an important employer and foreign exchange earner – see Table 2.¹³ Within the region, Kenya is the chief importer to supply its growing footwear manufacturing industry. The leather industry is anticipated to grow as efficiency in production and processing increases (RoU 2002a). The contribution of pastoral livestock to the leather industry is unclear. However, given the dominance of pastoral livestock in the national herds in East Africa (see Table 1), it is likely to be a significant supplier of hides.

11. These data are an indicative minimum since there is no consensus on who is a pastoralist.

12. Owing to the informal nature of agricultural and livestock systems in East Africa, we expect the true significance of these sectors to be far higher.

13. Countries that import Ugandan hides and skins include Hong Kong, India, Indonesia, Italy, Japan, Kenya, Spain, Turkey, France, Netherlands, Switzerland, United Kingdom, United States, China, United Arab Emirates, Pakistan and Portugal (Muhereza 2004).



Country	1998	1999	2000	2001	2002
Uganda	6.09	2.97	12.89	25.53	9.81
Tanzania	6.13	5.83	5.68	5.81	14.55
Kenya	0.05	0.09	0.11		

Source: UBOS (2003: 192, 193); Aklilulu, 2002; Ministry of Water and Livestock Development Report (2001): Cited in United Republic of Tanzania (2002): Tanzania Mainland-Basic Data Agricultural Sector 1994/95 – 2000/2001. Statistic Unit, Ministry of Agriculture and Food Security.

Tables 3 and 4 provide additional examples of the nature of data collected on the dairy and beef industries in East Africa and the contributions made by animals reared under pastoral systems. In Kenya, of the 2.6 billion litres of milk produced in 2004, pastoralism contributes 24% to national milk production (Table 3) and 19% of marketed beef by volume in 2000 (Table 4).

Tables 1 to 4 while providing some data on the livestock sector in East Africa are more revealing in their demonstration of the severe limitations of official data sets in capturing the contribution of pastoralism to national and local economies and society. In practice, a lot of data in East Africa are the result of a series of assumptions, imperfections, estimates and best guesses by a range of actors involved with statistical collection, collation and analysis. Little reliable data exists on even the simplest of measures, such as beef or milk production, and where it does, these focus exclusively on sales in the

Species	Breed	Estimated size of national herd ('000 head)	Pastoral herd (% of national herd)	Contribution to milk production (%)	Pastoral contribution to national milk prod (%)
Cattle	Improved dairy type	3,120	0%	59.80%	0%
	Zebu	9,067	40%	24.60%	9.95%
Camels	<i>Camelid dromedaries</i>	800	100%	12.50%	12.5%
Goats	Indigenous	9,975	58%	3.00%	1.70%
	Improved dairy type	34	0%	0.10%	0%
TOTAL				100.00%	24.15%

Source: Nyariki (2004)

Table 4. Beef production (tonnes), 2000			
Producer	Tanzania	Kenya	Uganda
Total production (tonnes)	181,000	290,000	N/a
Pastoral contribution (% slaughtered cattle)	N/a	19%	N/a
Accorded value in national accounts (USD)	\$0	\$0	\$0

Source: Ministry of Water and Livestock Development: Cited in United Republic of Tanzania (2002): Tanzania Mainland-Basic Data Agricultural Sector 1994/95 – 2000/2001. Statistic Unit, Ministry of Agriculture and Food Security.

formal sector and are estimates built on estimates. Data are frequently of poor quality, resulting from aggregated figures from surveys of an unrepresentative sample of industry participants. This is often because data is collected primarily for other reasons such as raising tax revenue or directing extension services. Trade from the informal sector, for example, is rarely quantified. Plus, variations between countries in the rigour with which data are collected makes cross-country comparisons between sectors with informal dimensions difficult. Official data sets have thus to be treated with a great deal of caution, as the tables above demonstrate.

Data are not gender specific and thus fail to capture the contribution women pastoralists' make to both the household and the broader economy through their market activity in dairying, the collection and processing of NTFPs and the provision of labour in rearing specific categories of livestock. Data that is collected tends to focus on livestock, ignoring the economic contribution of other key resources within pastoralism (e.g. NTFPs). Furthermore, information that is collected on the livestock sector focuses on cattle. There is much less information available to demonstrate the economic outputs of sheep, goats and camels, key resources in many pastoral economies and a major source of trade both within and outwith the region. Information on donkeys is virtually non-existent. These biases reflect both colonial and post-colonial perceptions of pastoralism as a traditional form of animal husbandry as well as their interests in rearing beef for national and export markets. Available data are not disaggregated according to the different systems in which livestock are reared or to recognise the contribution of different 'groups' of stakeholders (such as ranches or smallholders).

The virtual absence of pertinent and reliable data confirming pastoralism's contribution to national economies provides the underlying rationale for a general lack of support, and drives the desire for land-use change, even replacement. Alternatives appear more attractive, particularly those considered to deliver higher economic returns such as export-oriented commercial farming, ranching or private hunting blocks, and which are relatively simple to monitor to assess their direct economic contribution (e.g. foreign exchange earnings). Yet, this confuses direct financial returns with wider economic, social and environmental benefits accruing to society as a whole. These values are presented and discussed in the next section.

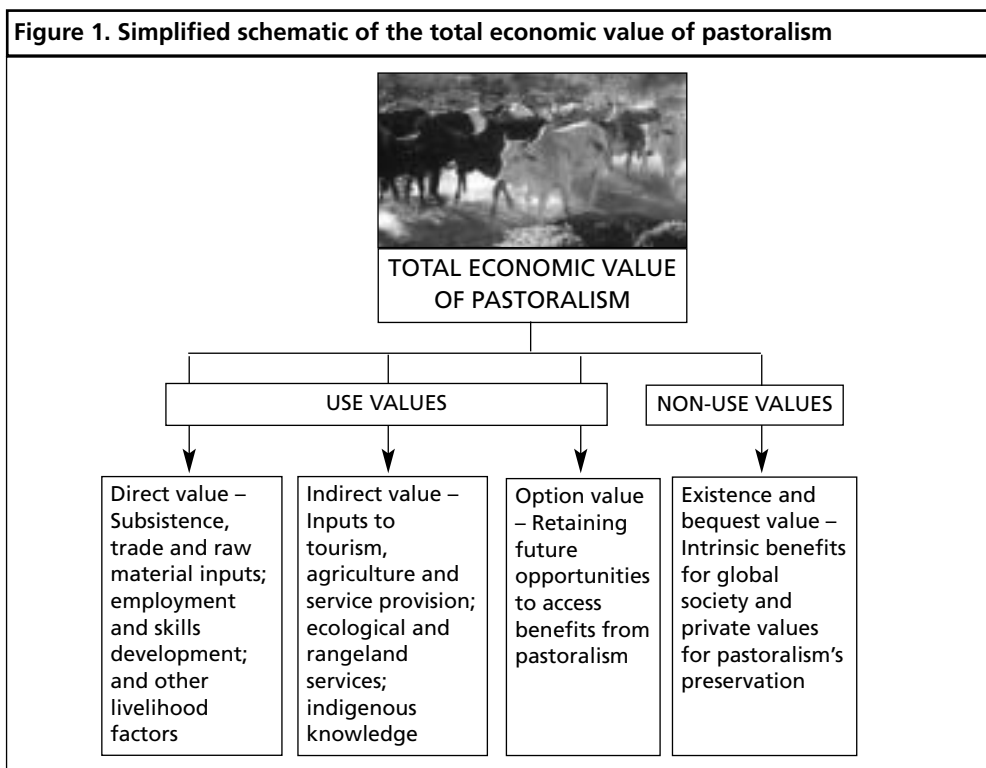


3. Total economic value of pastoralism

Pastoralism is a livelihood system regulated by ecology and complex modes of social, political and economic organisation with risk-spreading strategies well-adapted to dryland environments. It is, as indicated in chapter 2 and will be further demonstrated below, more than just a form of “traditional” livestock keeping. As such, it is essential to extend the concept of pastoralism’s economic benefits beyond the value of livestock products (milk, meat, hides) to include all “values” associated with it. These values also need to be disaggregated within pastoral systems and households and between them and the broader national economy.

Figure 1 presents a conceptual framework composed of four “values” with which to assess the total economic value (TEV) of pastoralism to a national economy. It is misleading, however, to assume this is simply a process of monetising all aspects of these benefits. Rather it proves a useful tool to explore the full range of costs and benefits emanating from an activity, which can then be applied to design an appropriate data collection system.

For the purposes of this paper, we will focus on the **direct and indirect values** leaving option and non-use values of pastoralism as the subject of later research for the following reasons:



- Option value refers to the future flow of costs and benefits that will accrue to the national economy as a result of a policy decision ensuring pastoralism endures and can be 'engaged with' in the future. In other words, decisions should be taken now with a sharp eye on the future; there are benefits that will accrue to society in the future from ensuring pastoralism continues to exist, and these need to inform our current decision-making. Yet, for pastoralism, this is a difficult and costly measurement that would require extensive field-based research on the broad range of different pastoral livelihood systems ranging from the very mobile to the more sedentary and including future agro-pastoral communities in dryland ecosystems.
- Existence and bequest value refers to values that are held by global society for the persistence of an entity or activity. This is best conceptualised with reference to the large mammal debate. People around the world would be willing to invest some of their disposable income now and into the future to ensure the survival of the blue whale as a species although most will never see or engage with this species. Yet, they derive private benefits from knowing the species exists and would be willing to invest in this species' conservation. The same private values are likely to exist for pastoral society; held, for example, by former pastoralists or descendants of pastoralists as well as non-pastoralists worldwide. Not only is the calculation of existence value complex and contentious, finding ways to realise these benefits in practice is not easy. Yet, current flows of funding from developed country donors to NGOs and governments in pastoral zones hint at the scale of existence values held by global society.

Direct and indirect values are useful in helping governments identify the tangible benefits that can be obtained and sustained from pastoralism if they design policies in its favour. Table 5 is an initial framework for identifying some of the key direct and indirect values of pastoralism. Total economic value of pastoralism would involve valuation and aggregation of all these direct values and value-added portions of indirect values.

Table 5. Conceptualising the direct and indirect values of pastoralism	
DIRECT VALUES	INDIRECT VALUES
<p>Subsistence and livelihood factors:</p> <p>a. Subsistence and the rangeland: production for household and community consumption; includes <i>flows</i> of livestock products (e.g. milk, meat, blood) and forest and NTFPs such as firewood, honey, fruits, medicine, as well as <i>stock</i> accumulation.</p> <p>b. Service provision: insurance, savings and risk management.</p> <p>c. Other factors: Socio-cultural values and development of social capital (peace).</p> <p>Economic activity:</p> <p>a. Marketed: Sales and exports of milk, livestock, hides, leather and NTFPs.</p> <p>b. Raw material production: inputs to supply chains involving informal or quasi-formal economic activity – butchers, traders, transporters.</p> <p>Human capital:</p> <p>a. 'Employment'</p> <p>b. Skill development and indigenous knowledge.</p>	<p>Economic activity:</p> <p>a. Inputs to agricultural production.</p> <p>b. Inputs to tourism.</p> <p>Environmental benefits:</p> <p>a. Ecological and rangeland services.</p> <p>b. Maintaining the balance and stability of pastures.</p> <p>c. Tree regeneration.</p> <p>d. Maintenance of natural ponds.</p>



Demonstrating the direct use values of pastoralism is likely to be the prime motivator for policy makers to effect policy change in its favour. Yet, as we have seen in chapter 2, existing national data sets are inaccurate and so aggregated as to provide insufficient evidence to adequately inform policy on the merits of supporting pastoralism as a land and livelihood system. A more effective system for collecting data on the production and marketed outputs of beef, milk, hides, etc. could and should be developed, which differentiates the contribution made by animals reared in pastoral systems by different categories of producer.

Such a system, however, would only partly capture the total contribution of pastoralism. Pastoralism has other “values”, many of them indirect, which enable other sectors of the economy to flourish and contribute to national development - such as tourism, which successfully promotes East Africa as a wilderness tourist destination often on the basis of pastoral imagery. These values too have to be considered and an appropriate method devised to capture the extent of their contribution. As with any complex social and environmental livelihood system, pastoralism is replete with inter-linkages between values, across the categorisation in Table 5. We recognise this and Section 3.2 aims to identify the key factors and their values.

3.1 Direct values of pastoralism

In addition to the sale of livestock and their by-products (dairy trades, hides and skins), pastoralism directly contributes to the economy in the following key areas, none of which are either fully recognised or captured by official data sets.

i) Subsistence and livelihood factors

(a) Subsistence and the rangeland management

The herd is important both as a **stock of animals**, with a balanced age-sex structure, and as a **flow of benefits** from those animals. The herd performs multiple roles in the pastoral economy that provide a range of benefits to individuals, families and the community as a whole as well as other groups such as neighbouring farmers.

It provides a persistent **flow of returns** to pastoralists through animal births, milk, blood, meat and fat and opportunities to earn cash through traction and manure without reducing its value. Some of these returns are perishable yet easily convertible – e.g. milk can be sold for cash or bartered to acquire another product such as cereals. In agro-pastoral systems like those of the Karimojong, livestock manure is used to fertilise gardens and cultivated fields thereby improving crop yields. These returns are maximised in pastoral systems by the adoption of management strategies such as livestock mobility, and herd diversification and splitting. Research has shown livestock mobility is a highly rational and productive method for making the best use of dispersed resources characteristic of East Africa’s drylands. It enables animals to be driven to where the most nutritious and abundant pastures exist thereby optimising weight gain and milk production (Sandford, 1983; Scoones, 1995; Abel and Blaikie, 1990).¹⁴

14. Ranches, however, have higher outputs per head of livestock than pastoral systems.

Furthermore, recent research findings from Niger in the Sahel demonstrate how animals reared under mobile systems are generally more productive than those raised under sedentary conditions. Table 6 shows how cattle raised in nomadic and transhumant pastoral systems are more fertile, have a lower rate of calf mortality and produce more milk and for longer periods than cattle raised under sedentary systems.¹⁵

Sector	Annual rate of reproduction of breeding herd (%)	Mortality rate of calves under 1 year (%)	Calf weight at 300 days (kg)	Average number of days in lactation	Quantity of milk for human consumption in 1 lactation cycle (L)
Sedentary	61	11.1	98.1	285	575
Transhumant	65	0	80.6	295	615
Nomadic	69	5.9	88.3	321	668

Source: Colin de Verdière P. 1995 (adapted)

(b) Service provision

- As a **financial investment**. Livestock assets perform a range of linked roles in pastoral life, a central one being as a 'store of value'. Pastoralists do not use banks because they invest in their herd. Livestock has been described as the best and often the only investment available to rural people without access to a formal reliable banking system. Livestock sales are estimated to contribute over 60% of total household income in selected pastoral communities in Kenya (Mizutani et al, 2005) and up to 85% of Barabaig household income in northern Tanzania (Lane, 1996). Their sale can be delayed without affecting their inherent value to the pastoralist; an appropriate price can be waited for. Importantly, it remains relatively simple to convert livestock into other valuable commodities either through barter or cash (Bonfigliani, 1992; Zaal, 1998; Muhereza, 2004).¹⁶ And while livestock are subject to the maxim that 'stocks can go up as well as down', in general, the herd will appreciate over time owing to births and as animals grow and mature. Indeed, returns on investments in the herd are often higher than bank returns. Although net natural herd growth rates for cattle numbers are quite low at about 2-3% per year, the increase in monetary value of animals as they grow older is high. Hence, successful pastoralists keep recycling their earnings in form of purchases of more livestock. A strategy also practiced by other groups including farmers, civil servants and urban-based businessmen. The risks of storing excess income in herd are vulnerability to drought, disease and raiding. Risks that pastoralists have traditionally managed through a number of strategies including mobility, and herd diversification and splitting.

15. Calves raised under sedentary systems do however put on more weight than those raised in mobile systems.

16. One reason for the absence of markets in credit, insurance etc might be poor data. Without good data no private enterprise can judge the worth and the risk in developing or piloting such schemes in rural areas. For instance, weather-based index-linked livestock insurance proposed for Mongolian pastoralists relies on good data on weather trends and on livestock numbers (Skees and Enkh-Amglan, 2001). Start-up costs, educating pastoralists and underwriting the insurance all prove significant at dissuading private sector outreach. But formal credit programmes has a dismal record in Africa (Meyer et al, 1992 in Scoones, p82).



Box 6. Pastoral marketing

Contrary to popular belief, pastoralists have always been integrated with local and regional markets, and have a long history of involvement in livestock trade and agricultural input outside their communities well before colonisation (Kerven, 1992; Bates and Lee, 1977). There is increasing evidence of a persistent demonstration of market behaviour (barter within pastoral communities as well as with other groups), an association with traditional markets (input to agriculture, livestock sales) and an element of rational market insight and acumen (i.e. not selling livestock when prices are depressed or animals at below optimal weight or condition).

Evangelou (1984) estimates the rate of livestock off-take from pastoral herds in Kenya at 10% per year. Although this is lower than for ranches estimated at 25% per year (Coppock 1992, Nyariki & Munei 1993) it reflects considerable pastoral involvement in the market as well as the differing production objectives of the two sectors. There is good evidence that pastoralists maximise the benefits from sale, such as selling unofficially across international borders, which can be significant such as between Kenya and Tanzania (Homewood, 1993; Kerven, 1992; Ackello-Ogutu and Echessah, 1999). Clearly, these sales of livestock will not be included in national statistics as contributing to national income.



Photo: David Keith Jones, FRPS

Samburu warriors with cattle. Livestock raised under mobile systems and common property regimes make optimal use of scarce and dispersed resources while contributing to collaborative relationships between different groups.

- **As a labour investment:** Investing in livestock generates a level of wealth far out of proportion to the level of labour invested in their upkeep (Crotty, 1980; Nyariki and Munei, 1993; Homewood, 1993; Nyariki and Wiggins, 1999; Nyariki, 2004). Indeed, there is a strong relationship between the amount of labour invested in livestock management and the value of the animal. This relationship is well understood by pastoralists whose strategy is to sell livestock (ideally steers) only when they have reached their optimal condition (i.e. aged five years or more) and thus fetch the highest possible price. In looking to maximise monetary returns, many pastoralists

are not necessarily seeking to make a financial profit, as would a rancher, for example. Rather they are seeking first, to minimise the number of animals they have to sell to buy the goods and services they require (e.g. cereals, tea, sugar, clothes, school fees, etc.). In this sense, they have a target income to meet a specific level of need and if the price of livestock rises, they will sell less animals to meet that need (i.e. backward bending supply curve). And second, to recoup the high labour investments they have made when the animal is young and most vulnerable to disease and drought, and when their herding knowledge is essential to ensure it grows to realise its full potential. This allows the herder to maximise returns on his or her investment. In other cases, however, there are pastoralists who may respond positively to increasing market prices for livestock to maximise monetary returns on their investments. Furthermore, beef is a staple food, and demand tends to persist even as prices rise. This helps make livestock a viable hedge against inflation and hence accumulation of livestock can be seen as a form of precautionary saving (Homewood, 1993).

- **Insurance:** In the absence of external insurance services, the size of a herd represents the risk profile of a pastoral family. The greater the number of animals owned by a family the greater their chances of addressing risks and surviving adversity. This is for several reasons. First, households with larger herds are able to split them into smaller units each going in different directions. This spreads the risk of losing all ones animals in a drought. Second, the larger the herd, the greater the ability of the family to share out its animals among kin and friends, thereby spreading risk and investing in social capital. Third, the more animals one has after a drought, the faster the herd as a whole will grow. The larger residual herd will also have a greater diversity of animals (species, age, sex) for the family to rely on. Risk, however, is felt at two levels: *individual* risks include those associated with individual pastoral families such as accidents, predation, theft, and some diseases; while *covariant* risks affect all households in a particular area at the same time, such as widespread drought and epizootic diseases. Insurance and identity are strongly linked (see below).

(c) *Social reproduction and peace*

- As **social identity and persistent social association**, livestock represent the means through which the continuity of pastoral institutions, traditions and cultural ties are assured and are the currency for building relationships (or social capital) between families, groups and communities. Livestock inheritance within families from parents and relatives to children is critical to enabling new household units to form and society as a whole to reproduce itself. Livestock loans or gifts further maintain the social fabric of society helping households and individuals to gain access to key resources such as pasture and water in certain areas, and can provide preferential access to pasture and water during drought. In addition, there is loaning of livestock to friends and family. Livestock are a key indicator of social status and are linked to marriage norms of paying a bride price. In some pastoral groups raiding serves to rebuild herds after drought or to enhance the status of young males (Hendrickson *et al.*, 1996).
- As **social capital and the profitable use of common property resources**. Pastoralism, through the process of accessing and managing scarce, dispersed and variable natural resources under common property tenure regimes requiring constant negotiation and reciprocal, non-exclusive arrangements between different users, makes a huge contribution to building trust and peace between communities. Investing in such processes and relationships enables relatively large populations of people and

livestock to live in, and draw profit from, harsh and unstable environments. The very action of negotiation, involving time and the exchange of livestock and the forging of alliances through marriage, builds the social capital so essential in times of stress. Rising conflict in many pastoral areas in recent years, though while not new phenomena and one that is highly complex and driven by multiple economic, social, political and environmental factors, is a reflection, in part, of the increasing breakdown in dialogue and trust between communities, partly a result of the privatisation of formally communal areas.¹⁷ Designing an appropriate method to capture the economic and social benefits of using common property regimes to manage the drylands is an area which is not sufficiently recognised or conceptualised, particularly among East African governments and statistical services.

ii) Economic activity

(a) Marketed

Chapter 2 presented available data on sales and exports of milk, livestock, hides and leather. Other marketed produce includes timber and non-timber forest products such as fruits, berries, honey, and medicines, which are harvested from the bush (see below). These goods are critical sources of income for women and poorer individuals within



Livestock raised under mobile systems and common property regimes make optimal use of scarce and dispersed resources while contributing to collaborative relationships between different groups.

17. Other inter-locking factors include rising population, increasing competition over access to scarce resources, the proliferation of small-arms, deliberate political destabilisation, annexation of land by private often foreign investors, contradictory land and natural resource legislation, etc.

pastoral communities, particularly in drier areas. Barrow (1990) in his research on the Turkana's tree tenure system in northern Kenya not only confirmed the critical role of trees and their produce in enabling communities to survive the long dry season, but that these resources are managed by complex and persistent tenure system to ensure their sustainable use and survival. Capturing the contribution these products make to pastoral household economies and the broader economy is essential.

(b) Raw material production

Pastoralism provides inputs to a wide range of formal and informal industries such as the meat and restaurant trade. One such informal industry is the *nyama choma* trade – see box 7.¹⁸ Pastoralism also supports significant industry supply chains involving raw materials found on the rangeland or forests – such as gums, resins, fruits and foods, and medicines. Many of these resources and supply chains provide employment to pastoral women and/or poorer members of the community whose livestock holdings are small as well as urban people such as traders, transporters, etc.

iii) Human capital

(a) Employment

'Employment' of pastoralists accounts for a large unmeasured proportion of the pastoral economy. A minimum of 9 million (and as high as 20 million) pastoralists live in East Africa, of which an estimated 60% are adults of working age gainfully employed in raising livestock and other subsidiary activities (e.g. livestock trade). In arid and semi-arid rural areas, pastoralism and agro-pastoralism are often the only form of employment. A range of skills are required to successfully manage a herd promoting division of labour among the pastoral family group. In general, men manage the large stock (cattle and camels) taking the animals to pasture, watering, veterinary care, marketing, etc. Women are responsible for milking (though there are variations between pastoral groups), looking after the calves, marketing milk and its by-products and often veterinary care. Children generally tend small stock. Employment numbers are important since displacement of pastoralism will result in unemployment, urban drift, migration and a host of issues that have very direct and tangible costs for the national economy (e.g. conflict).

(b) Skill development and indigenous knowledge

As noted in 3.2(i)(a)&(b), pastoralists are specialised livestock herders and breeders. Since optimal herds are not gender or age balanced, they invest a huge amount of time and skill in shaping their herd structures to maintain an ideal "portfolio" of animals to meet their long and short-term objectives.¹⁹ Adult cows are needed to produce milk in the short-term and give birth to calves that later will grow into adults, thus ensuring the future survival of the family. Adult steers are needed for sale or major ceremonial purposes. A bull is needed to inseminate the cows. Heifers are needed to replace the cows while young steers need to be fattened for future sale. A sufficient supply of small stock (sheep and goats) is also essential to meet the family's more routine needs (cash

18. *Nyama choma* means roast meat in Kiswahili.

19. These are supplemented by other subsistence, income and survival options such as use of Non-timber forest products (NTFPs), tourism, and employment in urban centres (i.e. remittances).



Box 7. The *nyama choma* economy in Arusha, Tanzania

A study carried out in November 2005 sought to quantify the scale and extent of the *nyama choma* (NC) business in Arusha city to provide proxy data to further understand the contribution of pastoral society to the national economy of Tanzania.

Historically, *nyama choma* (roast meat) was a traditional pastoral economic activity where pastoral men served roasted meat on market days. It has since expanded to all urban and trading centres of Tanzania. It has a short supply chain, with usually only one middleman who arranges slaughter at the abattoir. The abattoir sells the meat to the town butchers, who then sell it to *nyama choma* businesses. These are located within pubs and bars selling alcohol and are thus integrated within the market fabric of localities and are an important element found in all trading centres. In Arusha town, 94% of the meat slaughtered at the abattoir comes from pastoral areas. Interviews with several NC businesses confirmed that the meat they sell is exclusively from pastoral areas as customers prefer its taste.

Nyama choma businesses are largely in the informal sector, but have formal commitments at a local level. This includes paying medical examination fees for each employee, land and property taxes, business licences, refuse collection. The supply chain also contributes to meat examination fees at three levels – pre-harvest, at abattoir and in the market – which accrue to the municipality for paying employees involved in veterinary services. Plus, the supply chain includes businesses in the formal sector, such as the abattoir, that pay taxes.

Since 1991, slaughter has been centralised and its cost subsidised to some extent by donor funding. Centralisation enables grading of meat for sale (four grades) and hence higher returns, higher hygiene standards. In general, meat produced in pastoral systems is the lowest two grades. Other economic characteristics include:

- NC sector is very competitive.
- NC businesses are an efficient system for using all possible parts of a slaughtered animal.
- NC was traditionally seasonal, but now is part of daily life and as such, demand for slaughter is year-round, potentially freeing pastoralists from seasonal sale constraints. In 2005, over 31,000 cattle were slaughtered in Arusha mostly for NC.

In Arusha, there are 601 NC businesses, employing 5,600 people, with an estimated 25,000 dependents. Plus, an estimated 2.4 jobs are supported along this supply chain for each NC worker - involved with ancillary services in butchery, middlemen and of course primary beef production. It is estimated 6.6% of the population of Arusha receive crucial livelihood support through the meat supply chain for NC from pastoralist cows. If we assume these data are applicable to the entire country, 2.2 million people obtain some of their income from the pastoral meat trade and supply chain through 15,600 NC businesses with an annual turnover of USD 22million.

Further evidence from this research provides an added glimpse of the economic significance of pastoralism, indicating that each pastoral cow slaughtered supports the following outside of the pastoral economy: 0.24 full-time jobs in the Tanzanian economy; 1.07 dependents; and USD 172 worth of economic value-added in the economy.

Source: Letara, J. (2006).

to purchase tea and sugar, meat to offer a passing visitor) without resorting to the sale of the cattle or camel herd, which represent the main resource of the family. And donkeys and camels are critical for providing transport. Trade (barter or sale) and the exchange of specific animals with family and other members of the community to maintain the ideal herd structure is a continuous activity and major example of good livestock management practice.²⁰

Maintaining this portfolio in a context of scarce natural resources under shifting conditions and with changing risk profiles demands considerable indigenous technical knowledge of animal husbandry, sustainable rangeland management, and informal livestock markets. In addition, pastoralists have a sophisticated understanding of livestock genetic selection processes. Intimate knowledge of herd genealogies and the genetic characteristics of individual animals passed from one generation to another, allows them to select those animals with preferential traits (e.g. good milk producers, high fertility and fecundity levels, good walkers, etc.) and sell those without. Over time, this knowledge contributes to animals well-adapted to their environmental conditions.



Photo: Juliana Letara

Nyama Choma at Panama, Arusha Town, northern Tanzania

20. Whenever possible, pastoralists prefer to acquire livestock from within the community where the genealogy and history of the animal are well-known rather than purchase them on the market.



Furthermore, this knowledge conserves genetic diversity owing to cultural concepts about how to use animals and apply differing quality selection procedures and pedigree-keeping (Kohler-Rollefson, 2005). Such values contribute to poverty alleviation within pastoral communities. For example, the Maasai practice a customary system of clan-based solidarity called *ewoloto* whereby clan members give livestock to a destitute member of their clan in order to provide them with the means of gaining a livelihood and thereby re-integrate society (Potkanski, 1997).

Furthermore, as global climate change brings greater environmental, social and economic uncertainty, harnessing pastoral knowledge and experience on how to raise livestock in an environmentally sustainable manner will prove invaluable in managing Africa’s dryland areas. This is one example of an “option value”, which though difficult to “measure”, would constitute a major benefit under recent climate change scenarios, while its loss would have a very direct and tangible cost for the national economy.

3.2 Indirect benefits of pastoralism

i) Economic activity

Pastoralism supports economic activity in a number of other non-traditionally affiliated industries in the formal sector through the supply of inputs, some of which are large employers and key foreign exchange earners. Table 7 provides data on two examples – agriculture and tourism. Although both sectors derive benefits from pastoralism, these are not captured by official government statistics.

Country	Tourists	Tourism as a % GDP	Agriculture as a % GDP
Kenya	1,132,000	12.2%	16%
Tanzania	566,000	9.7%	45%
Uganda	512,000	9.2%	32%

Sources: Central Bureau Statistics, Kenya (<http://www.cbs.go.ke>); WTTC, 2005a, 2005b; World Tourism Organisation, 2005

(a) Agriculture and agro-pastoralism

Agriculture and agro-pastoralism are significant sectors in most developing countries. Livestock reared in pastoral systems provide a range of inputs to agriculture often in interlocked markets of reciprocity. These inputs contribute significantly to maintaining and, in certain cases, increasing agricultural productivity, while the latter through improved harvests help to maintain the productivity of pastoral systems by providing crop residues as fodder to supplement livestock diets during the dry season. In certain pastoral systems, access to these areas is critical during drought years.

Key inputs include:

- *Manure* – Smallholder cultivators continue to use manure to fertilise their gardens and fields often in interlocked systems that combine grazing and post-harvest soil fertilisation. Formally, traded compost manure is becoming widespread, displacing these traditional practices.
- *Traction* – Livestock provide draught power for transport and ploughing; its significance depending on the nature of the soils. The value of animal traction for the agricultural sector hinges on relative attendant increases in both food production and its overall productivity.
- *Labour* – Pastoralism provides both seasonal labour inputs to the agricultural sector and reduces the labour intensity of agricultural production. The benefits to agriculturalists are unclear and depend on the net benefits afforded from the alternative use of their time, be it in other industrial endeavour, leisure or knowledge and skills building.
- *Access to pastoral technology and knowledge* – Pastoralism provides opportunities to farmers to invest in livestock, particularly cattle and utilise the technical know-how of pastoralists to raise their animals. Indeed, through selective breeding, indigenous herds have acquired genetic and physical traits more adapted to dryland environments than imported breeds. This indigenous knowledge has a potential value as a bank of information and genes for society. This is rarely quantified and requires more research.
- *Social capital accumulation* owing to exchange relationships, which help to reduce conflict and promote peaceful relations between pastoralists and other groups.

(b) *Tourism*

The contribution of pastoral society to the values perceived by tourists remains unclear. However, some key inputs from pastoralism to the tourism sector in East Africa do include:

- *Past pastoral "investment"*. Many protected areas in East Africa's drylands were originally pastoral dry season grazing areas populated by relatively abundant wildlife co-existing alongside domestic stock. The preservation of wildlife and dramatic scenery in these areas is largely due to the practice of pastoralism over other forms of land use such as agriculture or mining. Following their often forceful expropriation, few benefits have been returned to the displaced pastoral communities.
- *Co-existence* – Where parks promote co-existence of pastoralists and their livestock with tourism activities and wildlife there are substantial benefits to be harvested (Homewood and Rogers, 1984, 1991; Conant, 1982; Oba, 1992, quoted in Zaal, 1999: 11).²¹ For example, the complimentary interactions between wildlife and livestock as they relate to pastures in different ecological niches, contributes to rangeland conser-

21. For examples: In Uganda, Queen Elizabeth National Park; Semliki National Park; Lake Mburo National Park; Kidepo Valley National Park; Pian-Upe Wildlife Reserve and Katonga Wildlife Reserve. In Tanzania, Ngorongoro Conservation Area.



vation and biodiversity, keeps the grass heights low, increases access of certain species (e.g. gazelles) to browse thereby increasing the viewing opportunities for tourists. There is some evidence that the Ankole longhorn cattle found in Uganda have their own value in tourism viewing. Furthermore, evidence from Ngorongoro in northern Tanzania suggests that resident Maasai communities played a central role in conserving critical protected species such as the black rhino *Diceros bicornis*, whose numbers subsequently declined when they were evicted from the Crater (NCAA 2005, 1996).

- *Cultural tourism* – In addition to tangible benefit generation through handicraft sales, traditional village installations and cultural performances that directly bring some revenue to pastoral communities, the material culture of pastoralists benefits artisans and merchants and indirectly intensifies tourist interest in the culture and lives of pastoral and other rural communities.
- *Tourism brand contribution and recognition* – For many tourists, pastoral societies evoke feelings that attract initial and repeat visits to East Africa. Northern tour operators and their East African affiliates regularly use pastoral imagery to sell their products. A range of other industries including airlines, car manufacturers and mobile phone companies also use similar marketing practices.

Tourism contribution to national and local economies in Africa is often over-exaggerated owing to international ownership of domestic tourism industry and infrastructure and poorly distributed benefits within poorer communities (MacGregor *et al.*, 2005). Currently, tangible benefits are few for pastoralists, and recognition of this by officials is even lower. Future tourism development is likely to expect a mix of safari and cultural tourism, to which end the pastoral input will be harder consciously to omit or avoid.

Box 8. Positive effects of grazing

- Reduces the quantity of dead material accumulating on the soil surface.
- Opens up pasture; opened up pasture harbours less pests.
- Stimulates vegetation growth especially grasses.
- Dung is a source of fertilizer.
- Hoof action/trampling breaks soil crust, thus enhancing water infiltration into soil.
- Helps in seed dispersal thus maintaining pasture diversity.
- Enhances pasture seed germination for seeds that go through the animal gut.
- Prevents bush encroachment when properly managed.
- Enhances cycling of nutrients through the ecosystem.

Source: (Thébaud, 2004)

(ii) Environmental benefits

Using the TEV framework, the environment is treated as an indirect sector although it clearly underpins the existence of pastoralism while some its flows are traded either directly (e.g. NTFPs) or indirectly (e.g. tourism). Furthermore, natural resource accounting (NRA), is a set of innovative tools increasingly being used to develop a satellite set of national accounts that identify the contribution of a country's natural resources to economic growth. It helps to guide national policy over natural resource use by identifying the contribution of say forestry and hence guiding policy over prudent and efficient use, developing economic tools to guide sustainable and efficient extraction and to ensure government investment is appropriate in the natural resource base to ensure sustainability.

Pastoralism does not necessarily degrade the environment and can deliver positive environmental benefits. If livestock mobility is assured, it directly benefits rangeland management in number of ways (Box 8). It removes dead biomass at the end of the dry season thus paving the way for fresh grass to sprout at the onset of the rains. This is very important to prevent the accumulation of plant litter, which if allowed to continue results in bush encroachment, the risk of colonisation by unpalatable grasses and shrubs while increasing the risk of hot bush fires.²² Grazing livestock disperse plant seeds with their hooves and coats, while facilitating the germination of certain species that require their seeds to pass through an animal's gut if they are to germinate. Trampling so long as it is not repeatedly done in the same area (a risk when animals are sedentary) breaks-up hard soil crusts, facilitating water infiltration and seed burial. Livestock also provide manure.

More significantly, the shared management of common pool resources as practiced in many pastoral systems brings both direct environmental and economic benefits though these are not widely recognised or measured. For example, pastoralism avoids the need for costly fencing, surveillance, clearing the land or the introduction of exotic species or chemicals to regulate the ecosystem (Homewood, 1993). Research suggests that pastoralism is less damaging to the environment – owing to livestock mobility under different environmental conditions, particularly drought – than ranching. Walker *et al* (1981) demonstrates how pastures found in ranches managed under stable stocking rates (e.g. livestock numbers are not varied in response to variations in biomass production as a result of variable rainfall) become dominated by palatable but graze-sensitive grasses that are at greater risk to degradation in drought years. These areas, which have been managed for stability in areas of climatic instability, lose their resilience to cope with change.

22. Controlled bush fires have many beneficial impacts on the environment too (Trollope, W.S.W. and Trollope, L.A. 2002; Sabiiti, E.N., Wein, R.W. and Edroma, E.L. 1991.).



4. Conclusion

This paper presents a framework for assessing the full contribution of pastoralism in East Africa through the concept of Total Economic Value (TEV). The framework accommodates the collection of conventional economic data for assessing the productivity of livestock (e.g. milk, meat, skins and hides) while extending our understanding of additional criteria that would need to be factored in, in order to capture all the benefits associated with pastoralism. Pastoralists are rational beings who operate in logical livelihood systems. Our notions of value and economic systems only need to be tweaked not reformed to understand this. Pastoralism is a rational economic land-use system in which maximum returns, be they economic, social, environmental or cultural, are sought from investments.

Globally, livestock is growing faster than any other agricultural sub-sector, and it is predicted that by 2020 it will produce about 30% of the value of global agricultural output (Delgado et. al 1999). A significant, but unknown proportion of the national livestock herd in East Africa are raised in pastoral areas. Pastoralism is estimated to be worth US\$800 million in Kenya alone, and its value will increase as demand for meat and related products rise with a growing urban population (OAU/IBAR, Policy Briefing paper N° 1). Pastoralism has other benefits. Livestock raised under pastoral systems are very cost effective. Family labour and access to natural resources are the key inputs. According to OAU/IBAR (Policy Briefing paper N° 2), *“over 95% of the inputs for traditionally reared, extensively grazed ruminants come from the sun, and soil, and cost the producer very little.”* Yet, it supports an estimated 20 million people who otherwise would require alternative livelihoods (OAU/IBAR, Policy Briefing paper N° 2). It makes optimal use of scarce resources with minimal environmental costs, and represents an important reservoir of knowledge and experience of good environmental management under conditions of increasing climate change. Through common property resource tenure regimes it greatly contributes to social capital and nourishing collaborative and peaceful relations between different groups. It is also important for the success of key sectors of the East African economy (e.g. tourism, conservation, agriculture) as well as informal (e.g. *nyama choma*). Although under severe pressure due to a combination of rising population and inappropriate policies weakening its ability to respond to drought and other external shocks, pastoralism is still a key land use and livelihood system in East Africa; and likely to remain so for the foreseeable future.

Existing national statistics fail to capture these benefits. Data are inaccurate and inadequate, failing to disaggregate pastoralism from other forms of livestock keeping and focusing on a very limited set of direct outputs, which do not reflect the full contribution of pastoralism to local and national economies. Therefore, current government decisions are based on an under-valued pastoral sector. Of equal significance is the fact that government decisions on pastoralism have an option value (see section 3 above). Given poor information and irreversibility of changes to land use and society that arise

from policies designed without the benefit of sound knowledge, there is a strong argument for governments in East Africa quickly to take the decision to invest in collecting sound information on pastoralism.

This is of particular importance today as governments in East Africa are looking to invest in the livestock sector as part of their drive to modernise their agricultural sectors as the pathway out of poverty. The onus, couched in the rhetoric of poverty reduction, is on developing a livestock sector to boost trade and foreign exchange earnings (Scoones and Wolmer, 2006). While such an approach has its own dangers (e.g. costly investments in veterinary services and market infrastructure, exposure to global political processes), it also diverts investment away from a range of options to reflect the highly diverse settings in which livestock are raised in East Africa (Scoones and Wolmer, 2006). This is particularly true for pastoralism given government preconceptions of its value. Potentially, this represents a significant loss of future income that could be derived from pastoralism if it were supported in key areas (e.g. local marketing, decentralised veterinary care, improved crop-livestock linkages, pre and post drought strategies, etc.).

For policy makers, a key question is whether pastoralism offers the most cost-effective investment for the drylands of East Africa, particularly in a context of increasing climate variability because of global climate change. The challenge is to provide the evidence to convince government that it does. The TEV framework proposed by this paper is a contribution to this process, which now needs to be followed up with the design of an appropriate methodology and set of tools, followed by field-based research to gather hard evidence of the multiple contributions pastoralism does make to local and national economies.

Given major power imbalances between government and pastoral communities, developing an improved system for demonstrating the value of pastoralism has to be accompanied by a parallel process of building the capacity of pastoral communities to use data to make the economic argument in favour of their livelihood system. Such a strategy requires pastoral groups to develop multiple 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.



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