TOTAL ECONOMIC VALUATION OF KENYAN PASTORALISM

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This economic valuation report has been compiled by the World Initiative for Sustainable Pastoralism (WISP), a GEF programme, implemented by UNDP and executed by IUCN, the World Conservation Union. The report uses data collected through another IUCN project, "Kenya's Drylands: wastelands or an undervalued economic resource". The rationale behind this report is that pastoralism appears to be routinely undervalued, and this undervaluation allows the promulgation of inappropriate policies. Undervaluation of the livestock production system allows the promotion of alternative production systems that may be economically inferior, and that place greater costs on the environment. As a result, poverty and environmental degradation are unnecessarily commonplace in the drylands of Kenya.

This study attempts to draw attention to the multiple values of pastoralism, including those which are measurable in monetary terms and those which are not. It aims to illustrate that pastoralism provides numerous services that are not norm

Direct values

Value	*Data Source, type and quality*
Livestock sales	Up until 1995, good statistically viable data from regular surveys by KREMU Local case studies (e.g. at district level) can corroborate national data sets Great variation between data sources Which price should be used –

Indirect Values – Measured

Value	*Data Source, type and quality*
Inputs to tourism	Direct revenue accrued from tourism to people, groups and local governments (including benefit sharing) Opportunity costs of pastoral land lost for reserves (parks, forests etc.) Supplementary incomes generated from tourism through the use of pastoral culture and heritage
Input to agriculture (manure, traction, transport)	Manure Traction (cultivation, water, fodder, other goods) Need to segregate traction (an input to agriculture) from transport (an input to the household)
Forward and backward linkages to the economy	Using the experience from Namibia, multiply GDP by 1.8 to show the effects of secondary spending in the economy based on pastoralist-generated income from livestock (e.g. shops selling radios, products so that the monies are recycled out of pastoralism) This includes expenditure on goods and services by pastoralists, value added in the production chain and subsequent expenditures by those in related industries.
Taxes and levies	Tax revenues can be assessed from local and national records, although records may be weak due to corruption.
Inputs to dryland products e.g. gum arabic	Provision of labour, manure, improving water and mineral cycling. Such environmental services lead to locally captured benefits that may be hard to quantify unless comparison is made between areas under different grazing arrangements. Dryland products include aloes, sisal, honey, incense, gum, henna, dyes, medicinal plants, plus a range of provender (wild foods) and forest products.

Indirect Values – Unmeasured

Value	*Data Source, type and quality*
Ecological and rangeland services	Protecting and enhancing water sheds Carbon sequestration (perhaps an option value) potential – can be calculated based on IPCC (Inter governmental Panel on Climate Change) findings for different land use systems and vegetation types Cost of desertification and value of pastoralism in averting it
Agricultural services	'Financial' role of livestock towards agriculture In group ranches there may be data on loans issued against livestock
Global goods	Value of dryland natural resources, biodiversity, and scenery Value of system resilience and risk managing and coping strategies.
Socio-cultural values	As perceived by pastoralists
Animal genetic resources	Data on how much people/institutions are willing to pay to preserve rare breeds

Comments

- A number of indirect values have been removed from the IUCN Kenya report, including inputs to services and crop cultivation.
- Indigenous knowledge and institutions for management are considered as productive inputs rather than a value per se, and the value is the output in the form of livestock or environmental products.
- The same applies to animal husbandry knowledge and skills and dryland environmental management knowledge and skill – these are also productive inputs which if anything should be valued under employment and labour input.
- The value of timber resources has been removed since it is hard to ascertain the role of pastoralism in protecting such resources. The existence value of such resources is captured elsewhere.

Quantifying the values

Part of the challenge in interpreting data is the poor quality of livestock population data in Kenya and the fact that livestock population censuses are not equipped to cope with the dynamic nature of pastoral systems, and the rapid rates of herd growth and shrinkage according to climatic conditions. Though there is not a great deal of data on pastoralism in Kenya, and some of the data that exists is of questionable veracity, a few attempts have been

made to quantify the gross contribution of pastoralism to Kenya's economy. However, there is a tendency for national data to be focused on readily available information such as marketed off take rather than gross output. In a subsistence pastoral economy the difference can be striking.

Nationally Kenya's livestock sector if of great importance with milk the second largest contributor to agricultural GDP, after beef production (Tegemeo, 1999). Indeed, some sources indicate that milk production constitutes about 50% (over 40 billion Kenya shillings) of the total value of livestock products (Omore *et al*., 1999). The Government of Kenya (2000) indicate that 60% of Kenya's livestock are found in the pastoralist lands, and are worth approximately $6 billion, with an annual milk value of between $67-$107 million (though it is not certain as to

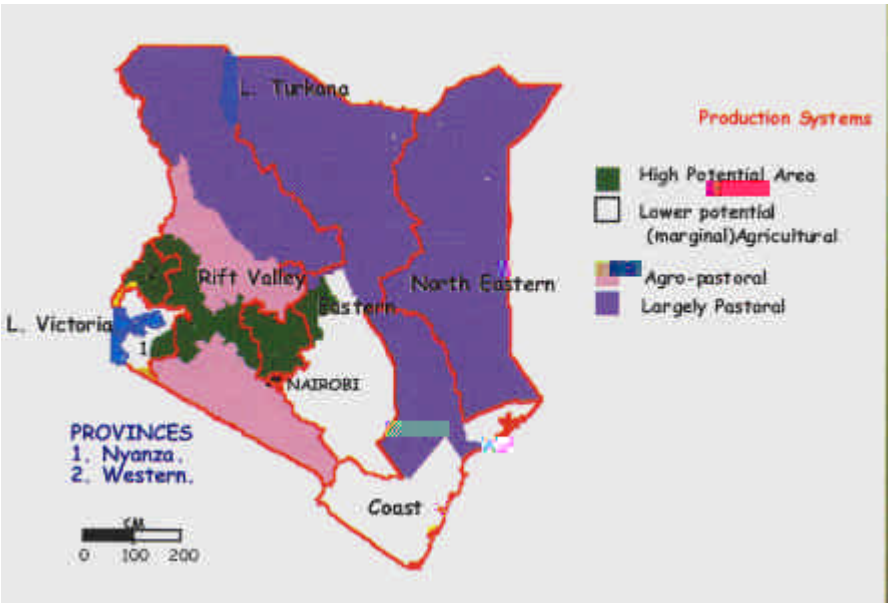

Table 2: Human and livestock populations ('000) in Kenya's 13 pastoral districts (RoK, 2000; 2003, cited in Nyariki, 2004)

District	People	Cattle	Camels	Sheep

Table 3: Livestock Distribution in Kenya (Muthee, 2006)

Species	Pastoral areas (millions)	

Table 5: Value of Pastoral Herds and Off-take (adapted from Nyariki 2004)[3]

	National Herd ('000?

There is also a challenge in estimating the real value of different products (i.e. the difference between the value received by the producer and the price received at the end market). The difference between producer prices and end market prices may reflect both transaction and production costs, raising a question over whether it is valid to use the end market price to estimate total value. However, the difference between the two prices is striking and local market prices do not give a fair indication of the real value of pastoral livestock, as Table 7 illustrates.

Table 7: National livestock prices vs. Turkana producer prices in Ksh

	Prices to producer	Prices marketed	% to producer
Cattle (indigenous)	5,000/= ($72)	10,000/= ($143)	50
Camels	7,000/= ($100)	10,000/= ($143)	70
Goats (indigenous)	800/= ($11)	1,500/= ($21)	53
Sheep (Indigenous)	700/= ($11)	1,500/= ($21)	47
Source	Mogaka (2006)	(Nyariki 2004)	

The level of milk sale from pastoral herds is generally significantly lower than consumption and a proxy market value can be assigned to calculate the subsistence value. Table 8 shows possible milk production values in Kenya.

Table 8: Value of Dryland Milk Production (adapted from Nyariki 2004)[5]

	National Herd ('000)	Drylands population	Contribution to Milk supply	% attributable to drylands	Value of Dryland milk production
Improved cattle	3,120				3,1205 D

This figure of US$437 million could be a substantial underestimate, considering that conservative values have been used for milk production, and meat consumption is omitted entirely. The following table compares the above data with two other estimates of direct value: that taken directly from the Turkana study, which may be an over-estimate; and

Disaggregating the contribution of pastoralism to tourism is difficult and no examples have been found. However, it is worth noting that a significant, and possibly growing, proportion of tourism is carried out on pastoral lands and that the lion's share of large game is found on grazing land rather than in game reserves. This game represents a huge economic cost to the pastoralists (perhaps upwards of 50%: Norton Griffths 2006) and to ensure its continued provision, there may come a time when the provider decides to only provide the service on the basis of appropriate compensation.

Table 12: selected industries support

Table 14: Estimated Value of Dryland Gums and Resins in Kenya (Chikamai & Odera, 2002)[13]

Year	*Gums and resins exported (tonnes)[14]*	*Value of gums & resins to collectors[15]*	*Value of gums and resins to marketers[16]*
1994	959.7	$479,850	$719,775
1995	710.3	$355,150	$532,725
1996	762.2	$381,100	$571,650
1997	837.2	$418,600	$627,900
1998	1,128.9	$564,450	$846,675
1999	473	$236,500	$354,750
Total	**4,871.3**	**$2,435,450**	**$3,653,475**
Average	**812**	**$405,942**	**$608,913**

Table 15: Household income from Gums and Resins in Kenya

	Gum Arabic & Talha	Myrrh	Hagar	Frankincence
Average per person per day (Kg)	5	5	5	3
Average collected per month (Kg)	100	150	150	90
Sale price Per Kg ($)	0.35	0.75	0.25	0.35
Monthly income per collector ($)	34	110	40	30

Charcoal represents a significant, if controversial, economic value of the drylands and by extension pastoralism (Mutimba & Barasa 2005). Over 40% of Kenya's 200,000 charcoal producers come from the drylands and these producers are roughly evenly split between part time and full time manufacturers. However, production methods in the dryland areas are inefficient and charcoal is produced more as a by product of other forms of land use change (e.g. clearing), and felling of whole trees, rather than lopping of branches as is the more customary pastoral practice of wood harvesting. This is not sustainable and places short term gain ahead of long term sustainability, leading to depletion of important dryland resources. Yet the charcoal industry in the drylands could be carried out on a more sustainable basis (using branches not whole trees, managing for sustainable use and regeneration for instance) and the value of charcoal is worthy of recognition.

Table 16

Indirect values, unmeasured

Environmental services

Table 18: Some Key Values of the Loima Hills to Turkana Pastoralism (source? Ed)

Attribute	*Value*
Dry season forage	$4.72 million per annum
Water values	$5.7 million per annum
45,000 livestock survive the 2005/06 drought on the 30,000 Ha of Loima Forest[17]	$1.4 million

The following table presents examples of the economic value of forest resources to different pastoral systems. The Tana River example illustrates the importance of riparian river systems which flow through large dryland areas, although clearly there are missing values, such as water for livestock. The Oldonyo Orok example shows the importance of rich patch vegetation, in this case on hills and small mountains, as critical dry season refuges for livestock.

Table 19: Economics of selected dry and high forests in Kenya[18] (Emerton 1996b, Brown & Emerton, 1997 ? check)

Table 20: Economics benefits of forest restoration in Shinyanga, Tanzania (Monela et al., 2005)

Issue	*Outcome*
Economic value of restored forest	$14 per person per month (pppm) (National average rural consumption is $8.50 pppm)
Wildlife damage as a result of restored forest	$65 per family per year (about $0.70 pppm)
Average value of the 16 natural resource products used per annum	Per household $1,200 per annum Per village $700,000 per annum Per district $89,620,000 per annum
Reduction in time for collecting various natural resources	Fuelwood 2 to 6 hours Pole 1 to 5 hours Thatch 1 to 6 hours Water 1-2 hours Fodder 3-6 hours
Percentages of households using forest products for various reasons in the 7 districts	Education 36% (10% - 61%) Diversify nutrition 22% (7% - 55%) Fodder and forage 21% (10% - 37%) Medicinal plants 14% (5% - 36%) Fuelwood 61% (54% - 63%)
Species of tree, shrub and climbers found in restored forest	152
Other flora found (dry season only)	Up to 30 different families of grass, and herbs
Bird species recorded (dry season only) and mammals	145 bird species and 13 mammals

Economic value of wildlife conservation

The following data was gathered from the 8,100 Ha Game Ranching Co. on the Athi Plains, where returns of $24,182 were realized per annum between 1987 and 1990, representing a return of $3 per hectare (using the dollar rates of the time). However these returns do not include the domestic livestock which are also found on the ranch (wildlife biomass exceeded livestock biomass by about 27% on the land). During the 1990's a number of commercial and group ranches were allowed to crop wildlife. However during the past six years wildlife cropping has decreased and is no longer an important economic option for land users.

Table 21: Economics of game ranching in Kenya (Sommerlatte & Hopcraft 1992)

	Total 1987-1990 in Kshs	Average per annum	$ value (5

livestock cannot be reared in the same place. Nevertheless, costs are invariably implied when one form of land use is promoted over another and it is prudent to make such choices on the basis of sound information regarding both the current and potential returns to land under different production strategies.

The paucity of data on pastoral production in Kenya creates challenges in understanding the opportunity costs associated with alternative uses of the drylands. Where net returns are used as a basis for measurement, they only consider cash income and thereby neglect a major part of the value that will be forgone. For this reason it is necessary to consider the potential returns based on monetised value of the subsistence economy. It is also desirable to project potential technological developments in the pastoral sector that could raise total productivity per land area. This creates many more challenges, since it is widely assumed that meat-oriented ranching

According to this data, the combination of agriculture with livestock is the optimal strategy for the higher rainfall areas of the Mara, whilst livestock and wildlife combined is ideal in lower rainfall areas. Not all of the scenarios above are additive, and indeed it is questionable whether any of the values should be simply added without consideration of the costs and benefits of one production system to another. However, livestock returns in particular are reduced by the presence of wildlife: 35-40% reduction in benefits through grazing competition alone (Norton-Griffiths, 1996) plus costs from predation.

It is worth comparing these estimates with the data gathered previously in this report. Nyariki (2004) find a direct return per hectare of $9, which does not compare favourably with the data gathered in the higher rainfall part of the Mara area, although it is considerably greater than the returns in the 300mm belt. In contrast, the data gathered from Turkana compares favourably with the rent from the 'agriculture only' strategy in the higher rainfall

- In September 2000 the mean discharge from streams in Muranga dropped by an average of 60%; Masinga dam water level dropped by 98%; Nairobi water supply decreased by between 55% and 70%;
- This resulted in economic losses of about US$2 million per day, and a total of between US$400-US$635 million by the long rains of April 2001 which is equivalent to between 3.8 and 6.5% of GDP;
- Time spent collecting water increased massively, incurring a huge labour cost, especially for women;
- Charcoal burning in the ASAL increased as an economic opportunity to supplement food, which resulted in increased degradation of the very resources needed for livestock and human sustenance in the drylands;
- Hydro-power dropped by 20% incurring losses of US$2 million per day, as well as the need to import expensive oil-based power generating plants;
- The El Nino event of 1997-1998 caused much flooding damage, and the effects were exacerbated by the La Nina event from 1998-2000;
- Forest fire losses in 1999-2000 were approximately 3,807 Ha (plantation, natural, and bush), costing Ksh 0.561 million in suppressions, and causing Kshs 36.625 million worth of damage;
- There was substantial drying of wetlands, so important for human life, especially in the medium and marginal land areas.

The same study analysed the contributing factors that exacerbated the drought and allowed famine to develop, many of which reflect long term policy and political failures that affect the drylands.

Some contributing factors to the 1999-2000 Drought (UNEP & GoK, 2000)

- Prolonged (rains failed for at least 4 seasons) affecting most of the country;
- Lack of national drought policy and strategy, and lack of policy for managing water and drought;
- Deforestation (leading to lost resilience);
- Ineffective enforcement of forest rules, and inadequate enforcement of the water act and other legislation;
- Breakdown of traditional weather forecasting and coping mechanisms;
- Blockage of wildlife migratory routes;
- Floods prior to drought;
- Inadequat

costs associated)		
Lost productivity in Nairobi due to water and power rationing	28,000 to 44,450	400 to 635
Forest losses	37	0.53
4.7 million people on famine relief (estimate of value based on 6 months at $1 per day)[21]	59,220	846
Total	**99,457 - 115,907**	**1,408.5 - 1,643.5**

As was mentioned at the outset of this section, although drought is an inevitable and unpredictable occurrence in the drylands, famine and associated loss are not inevitable and can be avoided. Pastoralism is one of the most resilient production systems in the drylands that can incur high drought related losses, whilst sustaining a human population and retaining its ability to recover in the aftermath of drought. However, in Kenya, as in much of Sub Saharan Africa, it is failing to do this. The continual encroachment on key pastoral resources, the persistent failure to provide basic support and social services, and the on-going efforts to settle pastoralists and undermine their production system are all factors in the creation of famine during drought.

If the value of pastoralism is better understood then the cost of abandoning pastoralism can also be recognised. These costs are sometimes overlooked because they are either not taken seriously, or because they are thought to accrue to the pastoralists and not to other Kenyans. In fact pastoralism contributes healthily to Kenya's economy and pastoral lands are crucial for Kenya's economic health. Far from being considered as out-moded and a drain on the country, on the evidence presented here, pastoralism should be elevated to status of a public good.

Missing values

As the previous sections illustrate, a great deal remains unknown about pastoralism in Kenya, yet it may be possible to prioritise certain important values for future research from this study. Some values are partially understood and with a little more research or verification a concrete figure could be presented. Some values remain to be qualified and cannot be measured, such as the cultural values of pastoralism. Other values will remain contentious, particularly the value of services that are ascribed to pastoralism, and require a lot more research to understand the role that pastoralists play in their provision.

It must be borne in mind that almost no consultations have been held with pastoralists over this document. The document has been drafted to test the methodology and the conceptual framework, but in doing so it negates some of the value of the framework.

A crucial oversight in this report is detail of the gender division of labour and perceptions of economic value2 4isint. Thed re.32t is faye d

their national economy, but also the indirect service values related to nature conservation that are not commonly