

The futures of pastoralism in the Horn of Africa: pathways of growth and change

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Summary

This paper reviews pastoralism in the Horn of Africa region with reference to the basic socio-economics of pastoralism, and the use of mobile livestock production to generate income and food for human consumption. The paper also examines long-term trends in pastoralist areas which, at first sight, appear to be contradictory. The first trend is the growth of a substantial domestic and export trade in livestock and meat across the region, driven largely by supplies from pastoralist areas and local and international demand. This trend indicates robust and responsive livestock production and marketing in pastoralist areas, despite recurrent drought, conflict and weak governance. In contrast, the second trend sees increasing levels of poverty and destitution in pastoralist areas, and continued high levels of human malnutrition. The co-existence of economic growth and increasing poverty in 'high-export' areas is explained by human population growth, drought, and the private control of pastures and water by wealthier producers. All of these factors combine to push poorer producers out of pastoralism. In areas with lower market orientation, other forms of declining land access are often evident, including the appropriation of land for mechanised farming, hydroelectric schemes, and bush encroachment. These changes, plus population growth and drought, also push people out of pastoralism. In all areas, pastoralism will continue to be the main economic activity but, at the same time, increasing numbers of people are seeking other livelihoods.

Keywords

Commercialisation – Drought – Economics – Humanitarian – Market – Nutrition – Pastoralism.

Introduction

Although there is no standard definition of pastoralism, it has often been described as a livelihood in which at least 50% of a household's food and income is derived from livestock. In addition, pastoralism is characterised by mobility and, in particular, the seasonal movement of livestock to access grazing resources and water (1). This paper focuses on the Horn of Africa region, which approximates to the region covered by the Intergovernmental Authority for Development (IGAD), with the Member States of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda (www.igad.int). In these countries, pastoralists occupy vast arid and semi-arid zones with very high spatial and temporal variability of rainfall. In these dry areas, the strategic movement of livestock is a rational and productive

response to uncertain availability of pasture and water, and includes substantial cross-border movements of animals (1). Typically, livestock rearing produces milk for direct household consumption, as well as offspring for sale, or for exchange for cereals. These are the basic elements of pastoralism which, in general terms, have remained unchanged over hundreds of years. Yet pastoralism across the region not only has diverse forms, but is also robust and highly dynamic, responding to market opportunities and a range of other economic, social and environmental influences over time.

Major droughts and conflicts in the Horn of Africa in the late 1990s and early 2000s led to renewed debate on the future of pastoralism in the region. With international media coverage focusing on high levels of humanitarian assistance

and food insecurity, many professionals and policy-makers concluded that pastoralism was in crisis, and was a problem that needed to be solved. The proposed solutions centred on transforming pastoralists into more market-orientated livestock producers or into agriculturalists, and had much in common with the failed pastoral development policies and programmes in the region from the 1960s (2, 3). Much of the underlying thinking was that pastoralism was an unproductive and irrational livestock production system, averse to market engagement and resistant to change. However, these perceptions of pastoralism contrast with a substantial body of research from the 1970s onwards, which explained the ecological and economic rationale for mobile livestock production in Africa's drylands (4, 5), and described or predicted the commercialisation of these systems in areas such as Somalia (6, 7), the Borana plateau of southern Ethiopia (8), and Maasai areas of Kenya (9). Research conducted for IGAD in 2009 showed that, despite droughts, conflicts and human population growth, some pastoralist areas were continuing to supply high volumes of livestock to domestic and international markets through a mix of formal and informal channels (10). Economically, pastoralism was performing well in these areas, and livestock sourced from pastoralists dominated some domestic and export markets. Therefore, in contrast to the common perception at policy levels of pastoralism as an unproductive subsistence system, there were many examples of pastoral livestock production and marketing arrangements that outperformed agricultural and settled livestock producers (5).

However, these transitions of pastoralism towards more commercialised systems have not been uniform across the region, and many pastoralists have experienced substantial declines in their access to land and, in some cases, their share of important livestock markets. For example, in the huge central and eastern rangelands of Sudan, the appropriation of land for mechanised farming started in the 1860s and was still expanding in the late 2000s, with land deals for foreign investors (11, 12, 13). In Darfur, the export-driven commercialisation of sheep led not to widespread benefits for pastoralists, but opportunities for farmers, large-scale livestock traders and absentee herd owners, who started to produce sheep to supply the market (14). In Ethiopia, Afar pastoralists began losing access to vital dry-season grazing areas along the Awash River in the 1970s, due to land appropriation for mechanised farming and hydroelectric schemes (15).

Recent efforts to reduce drought-related humanitarian assistance in pastoralist areas of Ethiopia and Kenya include large-scale government safety-net programmes, involving regular transfers of cash (Kenya, Uganda) or food (Ethiopia) to vulnerable households, with international aid donors covering most of the costs. In Uganda's Karamoja region, a consortium of agencies has implemented labour-intensive

public works programmes since the early 2000s. This is in addition to regular cash transfers for approximately 15% of Karamoja households through the Ugandan government's Social Assistance Grants for Empowerment programme. In Kenya, the Hunger Safety Net Programme covers Mandera, Marsabit, Turkana and Wajir counties, and statistics on average household size (16) and programme coverage indicate that approximately 94% of the population are registered and at least 25% receive regular cash transfers. In Ethiopia, the Productive Safety Net Programme includes the pastoralist Afar and Somali Regions, and pastoralist areas of Oromia Region, and between 2008 and 2012 it aimed to cover more than 2.5 million people in these areas with regular food distributions (17).

These examples show that, across the region, there are very different pathways of pastoralism, associated with different futures. Pastoralism is performing well for some people in some areas. However, increasing numbers of people are also becoming impoverished or food insecure, as exemplified by the 2011 Horn of Africa crisis, which affected 13 million people in the region, largely in dryland areas. In mid-2015, severe drought was once again affecting the northern areas of Somali Region and the southern Afar Region of Ethiopia, with approximately two million people needing food aid in these areas (18). Moreover, pastoralist areas are still characterised by very high levels of child malnutrition, with global acute malnutrition (GAM) in children under five often exceeding 10%, and reaching levels as high as 20% (19). The World Health Organization (WHO) categorises a GAM of 10% or greater as an emergency. Pastoralist areas also have some of the worst healthcare indicators in the world. Health services are particularly weak for women and girls, and this partly explains why women and girls can have a higher mortality rate than men and boys. For example, in the Somali Region of Ethiopia, life expectancy is estimated at 56 years for men but only 53 years for women (20), and the government census reported 115 men for every 100 women in the region, compared to 95 men to 100 women in Ethiopia nationally. Approximately 23% of all deaths in the Somali Region were linked to childbirth, approximately four times the proportion of people dying from old age (20).

This paper explains the basic economics of pastoralism in the Horn of Africa, but also describes how long-term economic, environmental and demographic trends, as well as crises such as drought, determine how pastoralism and pastoralist areas change over time. The paper also presents a simple analytical framework for understanding how the futures of different pastoralist households will vary according to two critical factors, i.e. market access and access to natural resources.

The basic economics of the pastoralist household

The basic economics of pastoralism combine the need to manage risk and to increase financial assets in a context of uncertain rainfall and therefore uncertain access to pasture and water for livestock. In addition, pastoralists consume foods that are sourced directly from their livestock, especially milk, or they obtain other important foods, such as cereals, through livestock sales. Therefore, pastoral livestock ownership and production is not only a matter of managing financial assets, but also of managing household food security. In arid and semi-arid areas, where rain-fed agriculture is not viable, livestock convert natural vegetation into milk and meat. The financial returns from livestock are high because livestock assets grow quickly, relative to other investments, such as cash savings. However, a critical aspect of the pastoral economy is that household-level behaviour depends on herd size (21). For poorer households with smaller herds, the objective is to maximise herd growth while maintaining household food security (22). These households tend to sell livestock only to meet basic domestic needs, whatever the market conditions. As the herd grows, household food requirements are easier to meet and surplus animals become more available for sale. Therefore, wealthier households with more animals contribute most to domestic, regional and export markets, as illustrated in Table I. An important but often misunderstood policy issue is that the economic strategy used by poor pastoral households, of maximising herd growth and limiting sales, is economically rational.

However, herd growth is affected by multiple shocks and stresses in non-equilibrium environments. Pastoralists must manage their herds in the face of frequent animal losses due to drought and, to a lesser extent, disease. Drought-related losses can be substantial and, for example, were reported at 37% in Borana herds in Ethiopia over a 17-year period

between 1980 and 1997 (23). More recent research in Ethiopia estimated losses of up to 43% in a drought year, with starvation accounting for most of the excess mortality, compared to a normal year (24). This scale of loss has immediate and serious impacts on pastoralist households during drought, primarily by limiting the capacity of pastoralists to sell livestock and buy cereals for household consumption. The problem is compounded because traders and markets may be physically inaccessible and, as the drought progresses, the value of livestock falls and the price of cereals increases, meaning less favourable terms of trade for pastoralists. Drought-related livestock mortality also has major impacts on herd growth in the long term, because it takes many years to rebuild herds back to pre-drought levels. During this rebuilding phase, further droughts or other crises can also occur. Various strategies are used by pastoralists to manage drought and disease risks, as summarised in Table II.

Herd growth is central to pastoralists' own definitions of wealth and poverty, as herds represent economic assets, sources of food and buffers against drought and other shocks and stresses (22). Examples from different pastoralist areas of Ethiopia are shown in Table III. A household needs a minimum number and type of livestock before it can maintain a livelihood based on pastoralism, and in most settings 'wealth' is highly correlated with herd size (28, 29). A 'minimum herd size' varies according to location, ecology, social organisation and various other factors, such as non-livestock sources of income. As discussed below, an increasing number of households are unable to acquire this minimum herd, and fall into 'very poor' or 'poor' wealth groups. Furthermore, these types of household do not face a linear path of herd growth but, instead, fall into a 'poverty trap', from which substantial increases in livestock assets are needed to reach a more secure economic status (27). As described below, trends such as livestock commercialisation and the private control of rangelands and water further limit the ability of poorer households to achieve substantial herd growth.

Table I

Annual pastoral household income from livestock sales in selected areas of Kenya, Ethiopia and Sudan (10)

Income data compiled from household economy data from 2004 and 2008. The annual household income from livestock sales is expressed in US\$ by using the exchange rate from when the study was undertaken for the three countries, i.e. 2004 or 2008. Livestock equivalents sold by each wealth group are expressed only as sheep or goats for the purposes of comparison (for conversion purposes, 10–11 sheep or goats = 1 tropical livestock unit [TLU]). Price information was obtained from data for Darfur and North-East Kenya, and from exporters and local traders for Borana, as explained in the source document in 2009 (10). The exchange rate at the time was US \$1 = 74 Kenyan shillings (Kenya) = 11 birr (Ethiopia)

Area	Income (US\$) by pastoral wealth group (equivalent sheep or goats)			
	Very poor (minimal herds)	Poor (small herds)	Middle wealth (medium herds)	Better off (large herds)
Mandera, Kenya	\$105 (3.5)	\$229 (7.5)	\$702 (24)	\$1,787 (60)
Wajir, Kenya	\$42 (1.5)	\$169 (5.5)	\$677 (22)	\$1,105 (37)
Borana, Ethiopia	\$114 (5)	\$202 (8.5)	\$714 (31)	\$2,100 (92)
Borana-Guji, Ethiopia	\$132 (5.5)	\$231 (10)	\$768 (34)	\$1,500 (66)
North Darfur, Sudan	–	\$115 (4)	\$615 (21)	–

Table II
Strategies of pastoralists for managing drought and disease risks

Risk management strategy	Description
Mobility	During drought, mobility enables pastoralists to access more distant grazing and water resources; migration during drought years tends to be more extensive than in normal years (25). Mobility also enables avoidance of disease-affected areas. During the drought in Ethiopia, Borana herders hired trucks to move selected cattle to distant grazing areas (26)
Herds of mixed livestock species	In many areas pastoralists keep different species of livestock with varying susceptibility to drought and disease. Camels and goats are more drought tolerant than cattle and sheep, and some important livestock diseases are species-specific. Though there are specialist producers of certain species in some areas, even these specialists tend to rear mixed-species herds
Herd splitting	Herd splitting allows pastoralists to maximise the benefits of mobility and the ownership of different livestock species. For example, camels are herded in more remote areas with less water than cattle, which need more water
Herd growth	Possessing large herds is widely regarded as a form of insurance against losses due to drought (27). Although absolute losses are higher in larger herds, proportional losses are higher in smaller herds, as is the risk of substantial herd depletion
Livestock feed supplementation	Pastoralists make increasing use of shrub/tree fodder during drought (25), and buy feed from farmers or private fodder producers. Adult breeding stock are often prioritised to receive feed as these animals are needed for rebuilding herds after drought. In Ethiopia, the distribution of cereals by safety-net programmes, intended for human consumption, has provided pastoralists with a free source of feed for livestock
Livestock slaughter	Pastoralists may selectively slaughter specific types of livestock at the onset of drought to support the survival of other livestock. For example, calves may be slaughtered to reduce production stress on their dams
Local safety nets	In addition, many pastoralist societies have traditional social support systems which assist poor or destitute households after a crisis, and aim to help these households rebuild their herds
Changing herd composition	Pastoralists may change the species composition of their herds after drought or famine (14), or in response to long-term changes in land access or climate

A further level of complexity relates to climate trends, with analysis of rainfall data indicating no long-term trend of diminishing rainfall in eastern Sudan (32) or cross-border areas of Kenya, Ethiopia and Somalia (33), and general uncertainty over future rainfall patterns generated by climate models (34). However, at local and policy levels, there are many reports of increasing severity or frequency of drought in pastoralist areas. These reports, however, might be explained by the increasing impacts of drought, due to the rising number of vulnerable people in pastoralist areas who are exposed to them, rather than long-term trends in rainfall.

Livestock and human nutrition

As indicated above, achieving household food security is an integral part of managing livestock in pastoralist areas because, in comparison to farming communities, pastoralists consume large quantities of animal-sourced foods. In particular, milk is an important part of the diet for pastoralists across the region, and there is a clear association between milk supply and consumption, and nutritional status. For example, milk accounted for 75% of the daily

energy needs amongst Rendille pastoralists in northern Kenya (35), 66% of energy needs of Areal pastoralists (36), and 62% of energy needs for Turkana pastoralists (37). Milk was also the main source of protein for these communities, providing up to 100% of daily protein requirements. High levels of basic nutrient intake from milk were also reported among Somali (6) and Borana (38) pastoralists. Milk is consumed in various forms. It can be drunk fresh, left to ferment, or processed into yoghurt, ghee, cheese or forms of dried milk. Milk is an especially important food for young children, and is often used to supplement breast milk from an early age. Within the household, milk for children is prioritised (19).

Cereals are also an important part of the diet of pastoralists and, in general, are acquired through the sale of livestock. Therefore, the capacity of a household to buy cereals depends on the size of its herd and the species composition, as well as the price of livestock relative to the price of cereals. In normal years, these livestock–cereal exchanges can be very favourable for pastoralists in terms of food energy conversion, with up to 15 times more energy consumed from cereals than from a single animal (39). The combination of high milk consumption and high livestock–cereal energy conversion explains why, in northern Kenya,

Table III
Livestock assets owned by pastoralist households, grouped by wealth

Compiled from livelihood baseline reports (30, 31)

Zone	Species	Wealth group			
		Very poor	Poor	Middle wealth	Better off
Fik, Somali Region 2004–2005	Sheep/goats		30–50	60–90	150–200
	Cattle		4–6	5–15	10–20
	Camels		4–6	25–35	45–70
Shinile, Somali Region 2004–2005	Sheep/goats		30–60	70–100	130–170
	Cattle		3–5	8–10	15–25
	Camels		3–5	10–16	20–40
Hawd, Somali Region 2004–2005	Sheep/goats		65–85	115–165	150–235
	Cattle		9–13	45–60	85–105
	Camels				
Afdar, Somali Region 2004–2005	Sheep/goats		20–38	55–95	100–200
	Cattle		6–10	10–20	30–50
	Camels		3–5	30–40	60–80
Teltele, Dilo, Dier, Borana 2006–2007	Sheep/goats	7–9	12–14	75–95	150–190
	Cattle	0–4	5–8	65–85	130–170
	Camels			5	10
Moyale, Borana 2006–2007	Sheep/goats	1–3	4–8	17–29	35–47
	Cattle	1–3	5–7	15–25	35–45
	Camels		0–2	6–8	15–20
Borana-Guji, Borana 2006–2007	Sheep/goats	3–5	7–10	20–30	40–60
	Cattle	5–7	8–10	60–80	110–130
	Camels			5–7	10–15

mobile pastoralist children have been reported to have higher nutritional status than sedentary children (40).

The main flaw in the use of livestock as a direct or indirect source of food in pastoralist areas is high rainfall variability and drought. In normal years, milk supply is seasonal and, by the end of a long dry season, very little if any animal milk is available. This is a particular risk in terms of child nutrition, because children consume relatively more milk than adults. Even though cereals may be available, for young children cereals are not easily digested unless they are mixed with milk into porridge or similar foods (19). These conditions worsen during drought, with a complete cessation of animal milk supply, declining livestock prices and rising cereal prices. Historically, these aspects of food supply partly explain high levels of human malnutrition during the dry season and drought in pastoralist areas, but especially high levels of acute malnutrition in children. In

addition, as malnourished households congregate around water points or feeding centres during drought, there is an increased risk of disease outbreaks, and diseases such as measles and cholera are more severe in children. For these reasons, human mortality is high in pastoralist areas during drought, and mortality among children can be extraordinarily high. For example, an infant mortality rate of 615/1,000 was reported among Issa pastoralists during famine in Ethiopia in 1974 (41), and during famine in Karamoja, Uganda, in 1980, infant mortality increased by a factor of 10, relative to baseline figures, and 21% of the population died (42).

Since the 1970s, various, large-scale pastoral development projects in the region have aimed to improve food security through a range of interventions, including livestock development, drought management, and livelihood diversification, among others. However, high levels of chronic and acute child malnutrition are still evident in pastoralist areas across the region. In the Afar Region of Ethiopia in 2013, chronic malnutrition (stunting) in children under five was reported at 67.8%, and GAM at 12.8% (43) – higher than the WHO cut-off point for emergencies. In northern Kenya, the government Hunger Safety Net Programme reported levels of moderate and severe stunting in children under five at 31.5% and 15.1%, respectively, and moderate and severe wasting at 17.3% and 3.5%, respectively, in households not receiving regular cash transfers (44). Even in households receiving regular cash transfers from the programme, moderate wasting was 23.1% and severe wasting was 6.2%.

Trade in livestock and livestock products – domestic, regional, international

Despite droughts, conflicts and weak governance across many pastoralist areas of the region, these areas supply large volumes of livestock to domestic, regional and export markets, as well as milk and other products to local markets. In Kenya, beef accounts for approximately 80% of the domestic red meat market and, of this, approximately 85% is derived from pastoralist areas of Kenya and neighbouring pastoralist areas of Somalia, Ethiopia and Tanzania. In 2009, around 1.8 million cattle from pastoralist areas of Kenya entered domestic markets, and around 633,000 cattle were imported from neighbouring pastoralist areas (45). Assuming an average cattle sale price of US \$322 in 2009 (13), this trade can be valued at approximately US \$783 million. In addition, camels with an estimated value of US \$2.6 million were sold in Kenya in 2009 (45). Over all, Kenya is a net importer of livestock,

especially through southern Somalia and the Garissa market in the east of Kenya (46), and exports of live animals and meat are minor (45). In contrast, pastoralists in Ethiopia and Somalia contribute substantially to both formal domestic and export markets, and informal regional and export markets. Table IV shows formal livestock and meat exports from Ethiopia from 2005 to 2013, with pastoral areas supplying the bulk of these animals. In terms of informal exports, these are partly captured in the livestock export figures from Berbera, Somaliland (Fig. 1), where it is commonly assumed that approximately 60% or more of the animals originate in the neighbouring Somali Region of Ethiopia. Note that these figures from Kenya, Ethiopia and Somalia for 2009 total US \$1.09 billion, and exclude domestic market supply from pastoralist areas in Ethiopia and Somalia. In Sudan, approximately 90% of livestock are owned by pastoralists and, although they dominate the important camel export supply (47), they supply relatively few animals to the main sheep export market (12). However, Sudan's export market represents only about 2% of the domestic livestock market, and pastoralists are major contributors to the latter (12).

Table IV
Formal live animal and meat exports from Ethiopia, 2005–2013

Source: National Bank of Ethiopia

Year	Live animals		Meat	
	Number	Value (US \$1,000)	Amount (tons)	Value (US \$1,000)
2005/06	163,000	27,259	7,717	15,598
2006/07	234,000	36,507	7,917	18,448
2007/08	298,000	40,865	5,875	15,471
2008/09	150,000	77,350	6,400	24,480
2009/10	334,000	91,000	10,000	34,000
2010/11	472,041	148,000	16,877	63,200
2011/12	800,000	207,100	17,800	78,800
2012/13	680,000	150,000	16,500	68,000

While it can be very difficult to obtain accurate livestock marketing data in the region, especially for informal trade, the figures above directly contradict the view of pastoralists as universally market averse and, in a general sense, support the data in Table II. Furthermore, there are many examples of pastoralists responding to new market opportunities. The expansion of the Somali livestock export trade from the 1970s was a response to increasing demands for meat in the Gulf States (7), and, in Somalia's Bay Region, pastoralists responded by changing the species composition of their herds (48). Also in the 1970s, an extensive commercialised camel-milk chain evolved to supply Mogadishu, supplying

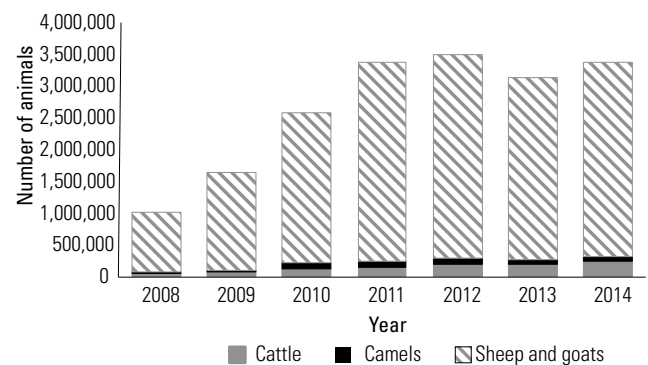


Fig. 1
Live animal exports from Berbera, Somaliland, 2008–2014

The main importing countries were Oman, Qatar, Saudi Arabia, Yemen, Egypt and Bahrain

Source: Somaliland Chamber of Commerce (www.somalilandchamber.com)

up to 5,000 litres of milk daily from pastoralist herds up to 150 km from the capital (49). More recently, a comparable but smaller-scale operation has been developed to supply camel milk to Gode town in Ethiopia (50).

Pastoralists in Kenya and Ethiopia also responded to new opportunities to market camels, due to a growing demand for camels in the Middle East and Egypt (51). In Ethiopia, a similar trend has emerged with increasing sales of camels from lowland to highland areas (52). Some camels are being retained by highland farmers as draught animals and others are being moved through northern Ethiopia to markets in Sudan (52).

Emerging livestock marketing trends in Borana, southern Ethiopia, also indicate a major shift in the direction of the flow of trade herds. The growing demand for Boran cattle, sheep, goats and camels by traders and exporters in Ethiopia is redirecting the flow towards the centre of the country, for subsequent export. Nearly all the animal feedlots (now numbering over 200 in central parts of the country) source their supplies from Borana and, to some extent, from the lowlands of Bale. More than half of the million sheep and goats slaughtered for chilled meat exports in Ethiopia in 2009–2010 were sourced from Borana (53).

These examples show a wide range of market responses by pastoralists in the region and, notably, most of these responses occurred in the absence of aid or government projects. It is also notable that women have played a major role in the marketing of livestock and milk. The large camel-milk supply chain to Mogadishu in Somalia was controlled by women (49), and, traditionally, women often managed the production and marketing of small ruminants (54).

Futures of pastoralism

The previous sections illustrate some potentially confusing and contradictory pathways, and multiple possible futures of pastoralism. In terms of macro-level economic growth, certain areas are performing well and are major contributors of livestock to local and international markets. At the same time, food insecurity and malnutrition are persistent problems, and increasing numbers of people are leaving pastoralism, either by choice or due to declining herd sizes and, in some areas, influenced by government policies, which favour sedentarisation over pastoralism. These apparently contradictory trends can be explained by a mix of drivers, including: the basic economics of pastoral production, changing market demand and access, increasing land pressures, changing ecological conditions and human population growth (55, 56, 57).

The relative importance of these different factors driving change varies by location, but growing market engagement and the commercialisation of pastoral systems lead to important changes, such as increasing socio-economic differentiation, changing gender roles, and displacement of some from the pastoral economy. A good example is Central Somalia, where a distinct new phase of market-orientation started in the 1970s in response to demands for meat in the Arabian Peninsula (46). To illustrate the extent of the Somali livestock exports at this time, a year after a severe drought in 1974–1975, Somalia still exported animals valued at one-sixth of the world's total livestock exports. In the 1980s, however, owners of smaller herds were displaced from the pastoral system because they did not have enough surplus animals to sell (6). Similarly, on the Borana plateau of Ethiopia, commercialisation was associated with increasing disparities in wealth and the 'pauperisation' of some pastoralist households (8).

The emergence of commercial pastoral production enables wealthier herders to remain in the system while excluding poorer herders with smaller herds. For example, with increasing wealth and influence, there is a clear practice of commercialised herd owners taking private control of hitherto communal rangelands and water (20, 58, 59). This private control of key resources provides benefits to specific users, but it also excludes access to other users; or at least offers access only to those who can pay for pasture or water. Commercialisation can also undermine intra-community social support systems because commercial herd owners no longer need to rely on these systems for assistance and feel less obliged to contribute to them (53). Therefore, various aspects of commercialisation benefit wealthier herders while also reinforcing poverty traps for poorer herders. A further impact of commercialisation is that men take over the control of livestock which were previously managed and marketed by women, as described in Maasai areas of Kenya (60) and Central Somalia (53).

Typically, pastoralists aim to keep larger herds as an insurance against drought, and poorer households with smaller herds experience relatively higher livestock losses during drought. For example, between 1980 and 1997 in southern Ethiopia, drought-related livestock losses were 60% in poor households but only 25% in middle-wealth and wealthy households (23). Although absolute losses may be higher in larger/wealthier herds, the proportional losses are higher in smaller herds, as is the risk of these herders being pushed out of the pastoral system (27). While drought risks have always been a primary concern for pastoralism, in a context of declining access to pasture and water, rising human population growth, and less responsive traditional social support systems, poorer households are at greater risk of herd loss.

Over time, these factors lead to diverging pathways for the more wealthy and poorer pastoral households – and further differences between men and women, as well as between younger and older people – and the co-existence of strong livestock marketing activity with high levels of poverty and destitution. Different individuals and groups have varying abilities or capacities to deal effectively with shocks and stressors. In other words, they have differing levels of resilience, which is a requirement for attaining other measures of well-being, such as nutrition, and food and health security (61). Commercial pastoral producers who are strongly linked to markets, with large herds and flocks, will be influenced by drought and climate change, but will be more immediately affected by price shocks and changing market conditions.

In non-drought years, livestock disease is often the main cause of losses in pastoralist herds (24, 57), but with proportionally higher losses in poorer/smaller herds. Mortality due to disease was averaged at 11.4% annually in pastoralist herds in Ethiopia in 2009, and these losses were valued at US \$798 million or considerably more than the value of formal live animal and meat exports that year (Table IV).

Livestock diseases also have other important impacts, in the form of livestock export bans imposed by importing countries. Examples include bans due to rinderpest (now eradicated) and Rift Valley fever, with relatively greater impacts on wealthier herders who provide most of the animals for export. These bans have affected both the formal and informal livestock export trade from the region (10). Other diseases, such as foot and mouth disease, also affect the formal livestock and meat trade, although appear not to affect the more substantial informal trade in live animals from the Horn to the Gulf States.

Examples of the diverging pathways of different types of pastoralism are shown in Fig. 2, for the Somali Region

of Ethiopia, and Fig. 3, for the adjacent Afar Region. The diagrams use a simple framework that has four main livelihood pathways: pursuing traditional mobile pastoralism; engaging in export trade and commercialisation; adding value to livestock and diversifying; and leaving pastoralism and seeking alternative livelihoods (62). The

extent to which different pastoralist households move towards the main four livelihood pathways in a given area largely depends on their access to pasture and water resources (the upper and lower limits of the diagram), and their market access (the left and right limits of the diagram). Socio-economic differentiation within pastoral systems,

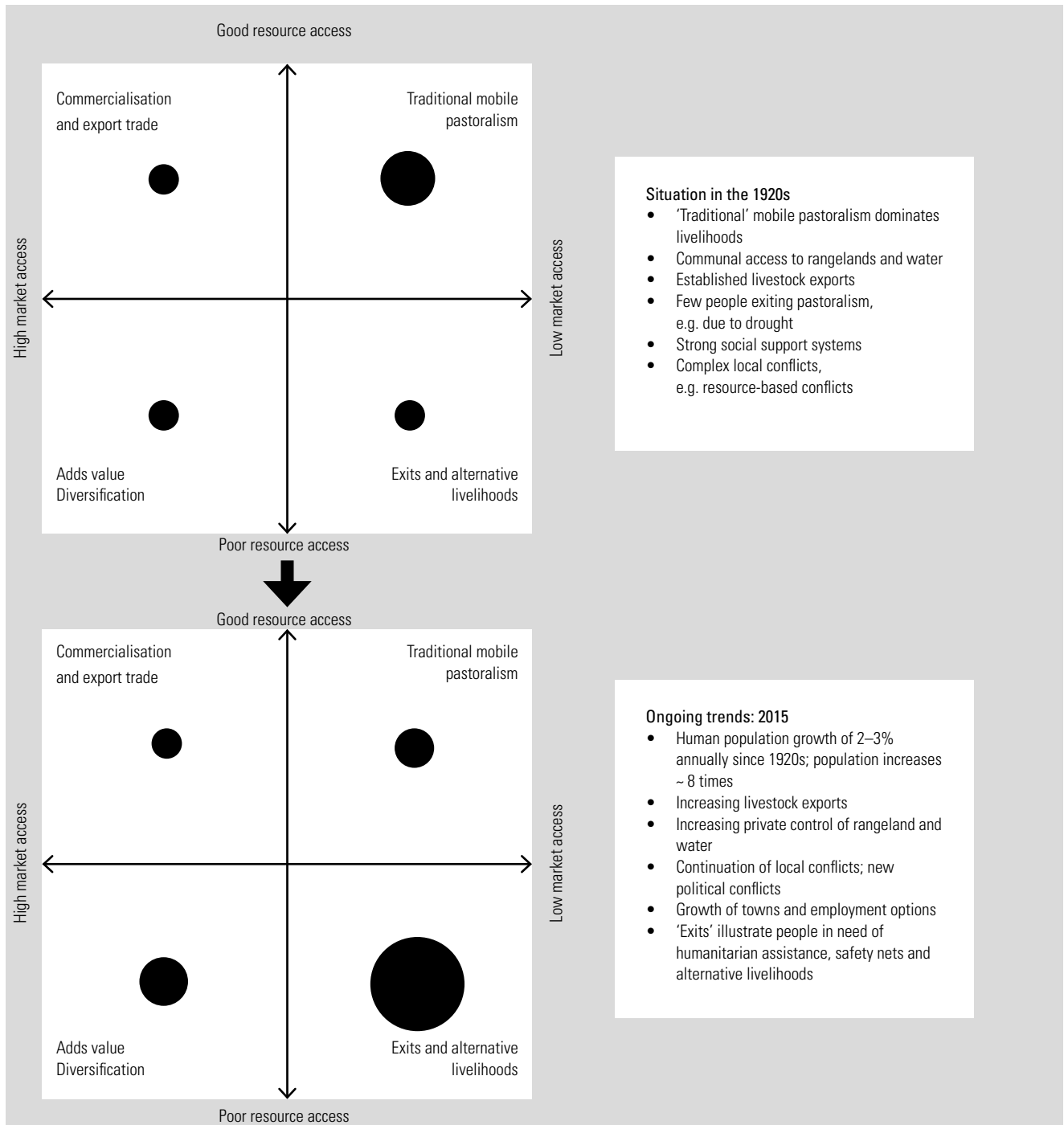


Fig. 2
Diverging pathways for pastoralist livelihoods over time, Somali Region, Ethiopia
 The size of the spheres represents numbers of people

and the increased significance of wealth in determining access to key resources, means that individuals and groups follow diverging pathways. Furthermore, these economic transitions occur in a wider context of human population growth of 2% to 3% annually, equivalent to a doubling of population every 30 years or so.

Looking back to the 1920s, the Somali Region of Ethiopia was largely an area of 'traditional pastoralism', but with some livestock exports through Somaliland, as well as sales of animals and milk to local markets (Fig. 2). As is the case today, drought was a major concern. Moving forwards nearly 100 years, the human population has

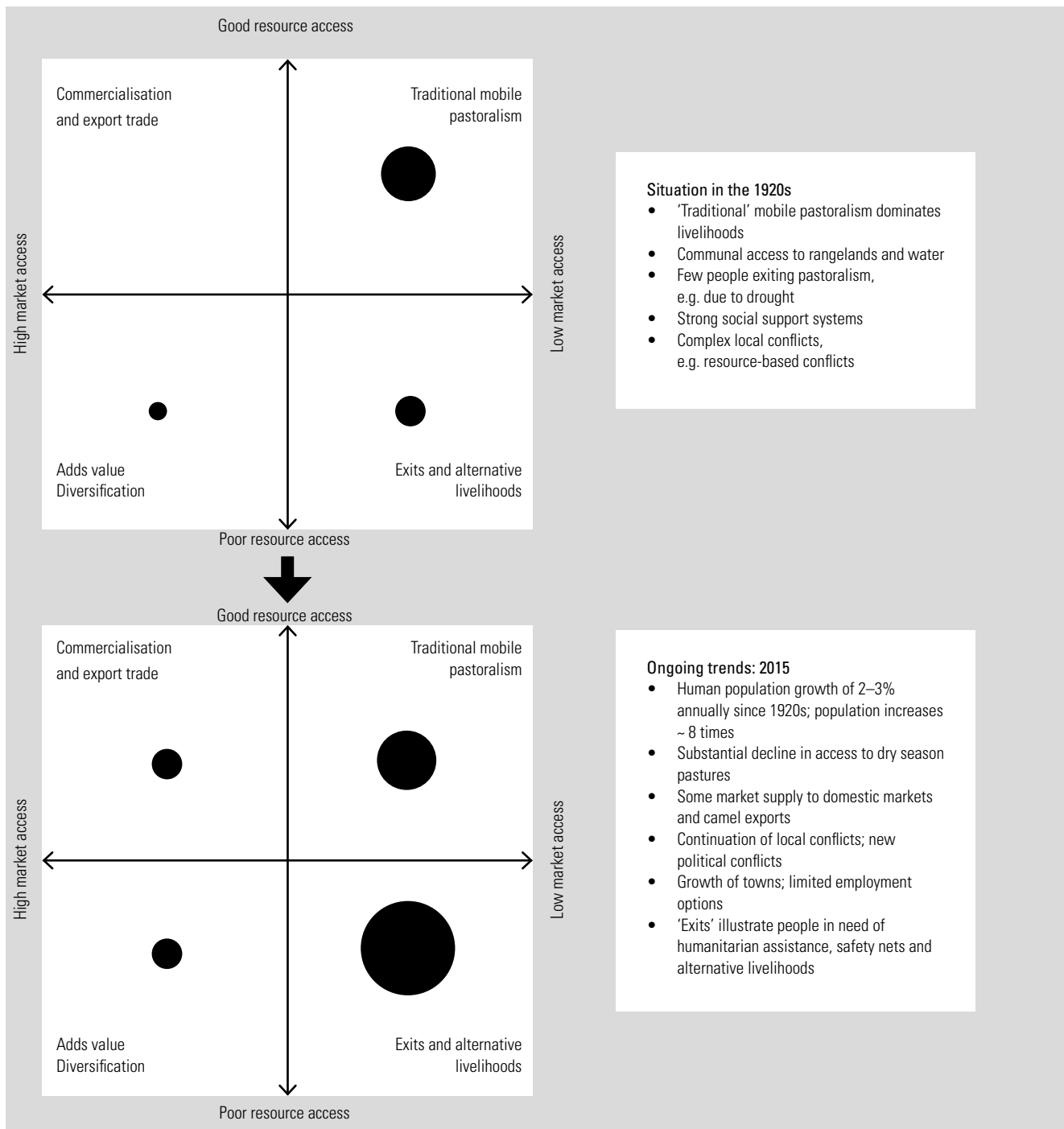


Fig. 3
Diverging pathways for pastoralist livelihoods over time: Afar Region, Ethiopia
 The size of the spheres represents numbers of people

increased approximately eight-fold, and there has been a marked increase in both livestock exports and the supply of livestock and milk to growing towns in the region. As some pastoralists settle in towns, diversified livelihoods become more important, including work related to livestock marketing and milk processing. The main suppliers of these markets are wealthier herders who, over time, secure private control of key grazing resources and water points, while also investing in property and businesses in towns. Therefore, livestock production and marketing continue to provide very substantial economic benefits in these areas, including support to various types of added value and livelihood diversification. However, these changes, together with recurrent drought, lead to a gradual transfer of livestock from smaller to larger herds and increasing numbers of poorer herders being forced out of pastoralism. More commercialised forms of pastoralism survive, drawing on both mobility and the use of private grazing enclosures and water. More recently, 1.6 million people were targeted for regular food transfers under the Ethiopian government's safety net programme, representing approximately 36% of the population.

In the 1920s, the adjacent Afar Region of Ethiopia (Fig. 3) was very similar to Somali Region in terms of pastoralist livelihoods, but with less involvement in livestock exports. However, during the next 95 years, Afar Region became characterised by substantial losses of communal grazing areas along the Awash River, due to dams for hydroelectric power, and large-scale irrigated cotton and sugar schemes (15, 63). Unlike Somali Region, where pasture and water started to fall under the private control of other Somalis, in Afar the decline in land access was mainly due to external appropriation of land, supported by central government. In addition, in the 1970s an invasive plant, *Prosopis juliflora*, was introduced into the region, reportedly by the Ministry of Agriculture, and large areas of grazing land became thick bush that could not be used by livestock (64). By 2008, an area of 700,000 hectares had been affected, equivalent to 15% of the region's productive land. While Afar pastoralists continued to sell livestock at local markets, commercialisation related to livestock exports did not occur. In 2015, the government of Ethiopia aimed to target approximately 560,000 people in Afar under its safety net programme: equivalent to 40% of the population.

In both Somali and Afar Regions of Ethiopia, the extensive nature of the government safety net programme indicates that many former pastoralists in these areas have yet to find an alternative livelihood, independent of external assistance. Apart from livestock production, there are typically limited economic opportunities in pastoralist areas, despite the growth of small towns and some crop production in riverine and higher rainfall areas. In other parts of the world, trends such as commercialisation and population growth among pastoralists have been accompanied by substantial out-

migration, and these trends are well described in parts of North Africa and the Middle East (65, 66). There is a risk that safety net programmes in the Horn of Africa may assume that substantial long-term, non-livestock economic opportunities will become available in pastoralist areas, whereas this seems not to be the case.

Conclusions

This paper has explained how pastoralism may offer different futures for different pastoralists in the Horn of Africa, but is still central to livelihoods in the region. In some areas, commercialised forms of pastoralism have evolved over decades and pastoralists are major suppliers of livestock to domestic and export markets. This trend is likely to continue as demands for meat increase in the Arabian Peninsula and in domestic urban markets in the Horn. However, commercialisation is also associated with increasing private control of pasture and water which, when coupled with human population growth and recurrent drought, limits the future of poorer pastoralists. In other areas, reduced access to rangeland takes various forms, e.g. pastoralists are prevented from accessing land because of conflict and wildlife conservation, encroachment upon land by farmers, and land allocations for mechanised irrigation schemes and hydroelectric schemes. When combined with limited market access, population growth, and drought, the outcome is a continuation of subsistence pastoralism for some, but increasing destitution for others.

Pastoralism, including more commercialised types of pastoralism, will continue to dominate the economies of dryland areas of the Horn of Africa, and has proven to be a remarkably robust and adaptable form of livestock production. However, although livestock commercialisation and the growth of towns in pastoralist areas provide new employment and income-generating opportunities, there are still many people seeking alternative livelihoods. The most challenging questions are how to support alternative livelihoods, food security and nutrition for people moving out of direct involvement in pastoral production, while seeking ways in which more people can benefit from increasingly market-orientated pastoral systems through employment and other economic opportunities in pastoral regions.



Les perspectives d'avenir du pastoralisme dans la Corne de l'Afrique : les voies de développement et de changement

A. Catley, J. Lind & I. Scoones

Résumé

Cet article consacré au pastoralisme dans la Corne de l'Afrique au regard de ses principales caractéristiques socio-économiques décrit les utilisations du bétail nomade pour générer des revenus et produire des aliments destinés à la consommation humaine. Les auteurs analysent également les tendances à long terme des régions d'élevage pastoral, qui apparaissent à première vue comme étant contradictoires. La première tendance observée dans cette région a trait à la croissance d'un commerce important d'animaux et de viandes destiné aux marchés nationaux et d'exportation, sous l'impulsion conjointe de l'offre émanant des zones d'élevage pastoral et de la demande tant locale qu'internationale. Cette tendance démontre l'existence dans les zones d'élevage pastoral de capacités de production et commerciales robustes et adaptables, en dépit des épisodes récurrents de sécheresse, des conflits sociaux et d'une gouvernance déficiente. En revanche, la deuxième tendance révèle une aggravation croissante de la pauvreté et de la précarité dans les zones d'élevage pastoral, accompagnées d'une malnutrition importante et persistante dans les populations humaines. La coexistence d'une croissance économique et d'une plus grande pauvreté dans des zones à dominante exportatrice s'explique par la croissance démographique, par les sécheresses et par la mainmise des producteurs les plus riches sur les terres de pâture et sur l'eau. Ces facteurs cumulés détournent du pastoralisme les éleveurs les plus pauvres. Dans les régions à vocation exportatrice moins prononcée, le déclin de l'accès aux pâturages prend d'autres formes clairement identifiables, par exemple l'appropriation des terres en vue de leur exploitation mécanisée, la production d'énergie hydraulique ou l'extension de la brousse. Ces changements s'ajoutant à la croissance démographique et à la sécheresse rendent le pastoralisme beaucoup moins attractif pour les individus. Certes, le pastoralisme restera la principale activité économique des régions étudiées mais en même temps, de plus en plus de gens vont s'orienter vers d'autres moyens de subsistance.

Mots-clés

Commercialisation – Économie – Humanitaire – Marché – Nutrition – Pastoralisme – Sécheresse.



Porvenir del pastoreo en el Cuerno de África: sendas de crecimiento y cambio

A. Catley, J. Lind & I. Scoones

Resumen

Los autores pasan revista al pastoreo en la región del Cuerno de África, haciendo referencia a sus fundamentos socioeconómicos y a la producción de ganado móvil como medio de generar ingresos y alimentos para el consumo humano. Además, señalan la existencia de tendencias a largo plazo en las zonas de pastoreo que,

a primera vista, parecen contradictorias. La primera es el auge de un comercio nacional o exportador de ganado y carne de considerables dimensiones en toda la región, impulsado básicamente por los suministros procedentes de las zonas de pastoreo y por la demanda local e internacional. Esta tendencia pone de manifiesto procesos robustos y flexibles de producción y comercialización de ganado en las zonas pastorales, pese a la recurrencia de sequías y conflictos y a la mala gestión de los asuntos públicos. La segunda tendencia, en acusado contraste, pone de manifiesto niveles crecientes de pobreza e indigencia en las zonas de pastoreo y niveles constantemente elevados de malnutrición humana. La concurrencia de crecimiento económico y pobreza en aumento en zonas eminentemente exportadoras se explica por el crecimiento de la población humana, las sequías y el control privado de los pastos y el agua que ejercen los ganaderos más pudientes. Todos estos factores se combinan para expulsar del pastoreo a los productores pobres. En zonas menos orientadas hacia el mercado aparecen a menudo otras causas de acceso decreciente a la tierra, como la apropiación de suelo para la producción agrícola mecanizada, la instalación de centrales hidroeléctricas o el avance de la maleza. Estos cambios, sumados al crecimiento demográfico y a la sequía, también inducen a las personas a dejar el pastoreo. Y aunque este seguirá siendo la principal actividad económica en todas las zonas, cada vez hay más gente que busca otras formas de ganarse la vida.

Palabras clave

Comercialización – Economía – Humanitario – Mercado – Nutrición – Pastoreo – Sequía.



References

1. African Union (2010). – Policy framework for pastoralism in Africa. African Union Commission, Addis Ababa. Available at: rea.au.int/en/sites/default/files/Policy%20Framework%20for%20Pastoralism.pdf (accessed in August 2015).
2. Broch-Due V. & Storås F (1983). – The fields of the foe – factors constraining agricultural output and farmers capacity for participation: a socio-anthropological case study of household economy among the inhabitants on Katilu Irrigation Scheme, Turkana, Kenya. Report of a Norwegian Agency for Development Cooperation (NORAD) Consultancy Team. University of Bergen, Norway.
3. Hogg R. (1987). – Settlement, pastoralism and the commons: the ideology and practice of irrigation development in northern Kenya. In *Conservation in Africa: people, policies and practice* (D. Anderson & R. Grove, eds). Cambridge University Press, Cambridge.
4. Behnke R.H. & Scoones I. (1992). – Rethinking range ecology: implications for rangeland management in Africa. Environment Working Paper 53/Drylands Issue Paper E33. World Bank, Washington DC & International Institute for Environment and Development, London, 33 pp.
5. Scoones I. (ed.) (1995). – *Living with uncertainty: new directions in pastoral development in Africa*. Intermediate Technology Publications, London, 210 pp. doi:10.3362/9781780445335.
6. Abdullahi A.M. (1993). – Economic evaluation of pastoral production systems in Africa: an analysis of pastoral farming households in Central Somalia. In *Pastoral production in Central Somalia* (M.P.O. Baumann, J. Janzen & H.J. Schwartz, eds). Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany, 129–148.

7. Reusse E. (1982). – Somalia's nomadic livestock economy: its response to profitable export opportunity. *World Anim. Rev.*, **43**, 2–11.
8. Coppock D. (ed.) (1994). – The Borana plateau of southern Ethiopia: synthesis of pastoral research, development and change, 1980–1991. International Livestock Center for Africa, Addis Ababa, 393 pp. Available at: www.fao.org/Wairdocs/ILRI/x5461E/x5461E00.htm (accessed in August 2015).
9. Bekure S., de Leeuw P.N., Grandin B.E. & Neate P.J.H. (eds) (1991). – Maasai herding: an analysis of the livestock production system of Maasai pastoralists in eastern Kajiado District, Kenya. ILCA Systems Study 4. International Livestock Centre for Africa (ILCA), Addis Ababa, 172 pp. Available at: www.fao.org/Wairdocs/ILRI/x5552E/x5552E00.htm (accessed in August 2015).
10. Aklilu Y. & Catley A. (2009). – Livestock exports from pastoralist areas: an analysis of benefits by wealth group and policy implications. Report for the Intergovernmental Authority for Development and Food and Agriculture Organization of the United Nations. Feinstein International Center, Tufts University, Addis Ababa. Available at: fic.tufts.edu/assets/LivestockExports.pdf (accessed in August 2015).
11. Babiker M. (2013). – Mobile pastoralism and land grabbing in Sudan. In *Pastoralism and development in Africa: dynamic change at the margins*. (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 177–185.
12. Krätli S., Hassan El Dirani O., Young H., Mohammed Ahmed S., Mohammed Babiker O., Adam Ismail M., Hassan A. & El Bushra A. (2013). – Standing wealth: pastoralist livestock production and local livelihoods in Sudan. Feinstein International Center, Tufts University, Somerville, Massachusetts & United Nations Environment Programme, Nairobi. Available at: fic.tufts.edu/assets/TUFTS_1339_Standing_Wealth_5_online.pdf (accessed in August 2015).
13. Morton J. (1988). – The decline of Lahawin pastoralism. In *Pastoral Development Network Paper 25c*. Overseas Development Institute, London.
14. Young H., Monium Osman A., Malik Abusin A., Asher M. & Egemi O. (2009). – Livelihoods, power and choice: the vulnerability of the Northern Rizaygat, Darfur, Sudan. Feinstein International Center, Tufts University, Medford, Massachusetts. Available at: fic.tufts.edu/assets/Livelihoods-Power-Choice-2009.pdf (accessed in August 2005).
15. Kloos H. (1982). – Development, drought and famine in the Awash Valley of Ethiopia. *Afr. Stud. Rev.*, **25** (4), 21–48. doi:10.2307/524399.
16. Kenya National Bureau of Statistics (2010). – The 2009 Kenya Population and Housing Census, Volume C: Population distribution by age, sex and administrative units. Kenya National Bureau of Statistics, Nairobi, 532 pp.
17. Sabates-Wheeler R., Lind J. & Hoddinott J. (2013). – Implementing social protection in pastoralist areas: how local distribution structures moderate PSNP outcomes in Ethiopia. *World Develop.*, **50** (Issue C), 1–12. doi:10.2139/ssrn.1997339.
18. Anon. (2015). – Humanitarian requirements document 2016. Joint Government and Humanitarian Partners Document, Addis Ababa. Available at: reliefweb.int/sites/reliefweb.int/files/resources/ethiopia_hrd_2016.pdf (accessed in December 2015).
19. Sadler K., Kerven C., Calo M., Manske M. & Catley A. (2009). – Milk matters: a literature review of pastoralist nutrition and programming responses. Feinstein International Center, Tufts University, Medford, Massachusetts & Save the Children, Addis Ababa. Available at: fic.tufts.edu/assets/Milk-Matters-review.pdf (accessed in August 2015).
20. Devereux S. (2006). – Vulnerable livelihoods in Somali Region, Ethiopia. IDS Research Report 57. Institute for Development Studies (IDS), Brighton. Available at: www.ids.ac.uk/files/Rr57.pdf (accessed in August 2015).
21. Barrett C., Bellemare M. & Osterloh S. (2006). – Household-level livestock marketing behaviour among northern Kenyan and southern Ethiopian pastoralists. In *Pastoral livestock marketing in Eastern Africa: research and policy challenges* (J. McPeak & P. Little, eds). Practical Action Publishing, Rugby, UK, 15–38. doi:10.3362/9781780440323.002.
22. Dahl G. & Hjort A. (1979). – Pastoral change and the role of drought. SAREC Report No. 2. Swedish Agency for Research Cooperation in Developing Countries (SAREC), Stockholm.
23. Desta S. (1999). – Diversification of livestock assets for risk management in the Borana pastoral system of southern Ethiopian rangelands. Utah State University, Logan, USA.
24. Catley A., Admassu B., Bekele G. & Abebe D. (2014). – Livestock mortality in pastoralist herds in Ethiopia during drought and implications for drought response. *Disasters*, **38** (3), 500–516. doi:10.1111/disa.12060.
25. Morton J. (2006). – Pastoralist coping strategies and emergency livestock market intervention. In *Pastoral livestock marketing in Eastern Africa: research and policy challenges* (J. McPeak & P. Little, eds). Practical Action Publishing, Rugby, UK, 227–246. doi:10.3362/9781780440323.013.
26. Abebe D., Cullis A., Catley A., Aklilu Y., Mekonnen G. & Ghebrechirstos Y. (2008). – Livelihoods impact and benefit-cost estimation of a commercial de-stocking relief intervention in Moyale district, southern Ethiopia. *Disasters*, **32** (2), 167–189. doi:10.1111/j.1467-7717.2007.01034.x.
27. Lybbert T.J., Barrett C.B., Desta S. & Layne Coppock D. (2004). – Stochastic wealth dynamics and risk management among a poor population. *Econom. J.*, **114**, 750–777. doi:10.1111/j.1468-0297.2004.00242.x.

28. Tache B. & Sjaastad E. (2010). – Pastoralists' conceptions of poverty: an analysis of traditional and conventional indicators from Borana, Ethiopia. *World Develop.*, **38** (8), 1168–1178. doi:10.1016/j.worlddev.2010.01.001.
29. Dahl G. & Hjort A. (1976). – Having herds: pastoral herd growth and household economy. Stockholm Studies in Social Anthropology. Stockholm University Press, Stockholm.
30. Livelihoods Integration Unit (Ethiopia) (2008). – Livelihoods profile Oromia Region, Ethiopia – southern pastoral and agro-pastoral livelihood zones. Livelihoods Integration Unit, Addis Ababa.
31. Save the Children United Kingdom (2005). – Livelihoods baselines, Somali Region. Save the Children UK, Addis Ababa.
32. Hermance J.F. (2014). – Historical variability of rainfall in the African East Sahel of Sudan: implications for development. Springer Briefs in Earth Sciences, Cham, Heidelberg, New York, Dordrecht, London, 123 pp. doi:10.1007/978-3-319-00575-1.
33. Catley A. & Aklilu Y. (2013). – Moving up or moving out? Commercialization, growth and destitution in pastoralist areas. In *Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 85–97.
34. Erickson P., de Leeuw J., Thornton P., Said M., Herrero M. & Notenbaert A. (2013). – Climate change in sub-Saharan Africa: what consequences for pastoralism? In *Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 71–81.
35. Field C.R. & Simkin S.P. (1985). – Camel production in Kenya. In *Significance and prospects of camel pastoralism* (S.E. Migot-Adholla, ed.). IDS Occasional Paper No. 45. Institute for Development Studies (IDS), University of Nairobi.
36. Fratkin E. (1991). – Surviving drought and development: Ariaal pastoralists of northern Kenya. Westview Press, Oxford.
37. Galvin K. (1985). – Food procurement, diet, activities and nutrition of Ngisonyoko, Turkana pastoralists in an ecological and social context. PhD thesis submitted to the Department of Anthropology, State University of New York, Binghamton, New York.
38. Cossins N.J. & Upton M. (1988). – The impact of climatic variation on the Borana pastoral system. *Agric. Syst.*, **27**, 117–135. doi:10.1016/0308-521X(88)90025-X.
39. Swift J. (1979). – West African pastoral production systems. Center for Research on Economic Development, University of Michigan, Ann Arbor, USA. Available at: pdf.usaid.gov/pdf_docs/PNAAM592.pdf (accessed in August 2015).
40. Nathan M.A., Fratkin E.M. & Roth E.A. (1996). – Sedentism and child health among Rendille pastoralists of northern Kenya. *Social Sci. Med.*, **43** (4), 503–515. doi:10.1016/0277-9536(95)00428-9.
41. Seaman J., Holt J. & Rivers J. (1978). – The effects of drought on human nutrition in an Ethiopian province. *Int. J. Epidemiol.*, **7**, 31–40. doi:10.1093/ije/7.1.31.
42. Biellik R.J. & Henderson P.L. (1981). – Mortality, nutritional status and diet during the famine in Karamoja, Uganda 1980. *Lancet*, **2**, 1330–1333. doi:10.1016/S0140-6736(81)91349-0.
43. Fentaw R., Bogale A. & Abebaw D. (2013). – Prevalence of child malnutrition in agro-pastoral households in Afar Regional State of Ethiopia. *Nutr. Res. Pract.*, **7** (2), 122–131. doi:10.4162/nrp.2013.7.2.122.
44. Oxford Policy Management, Hurrell A. & Sabates-Wheeler R. (2013). – Kenya Hunger Safety Net Programme monitoring and evaluation component. Quantitative Impact Evaluation Final Report: 2009 to 2012. Oxford Policy Management, Oxford. Available at: www.hsnp.or.ke/index.php/component/content/article?id=68 (accessed in August 2015).
45. Behnke R.H. & Muthami D. (2011). – The contribution of livestock to the Kenyan economy. IGAD–LPI Working Paper No. 03-11. Intergovernmental Authority for Development (IGAD) – Livestock Policy Initiative (LPI), Djibouti. Available at: cgspace.cgiar.org/bitstream/handle/10568/24972/IGAD_LPI_WP_03-11.pdf?sequence=1 (accessed in August 2015).
46. Little P.D. (2003). – Somalia: economy without state. James Currey, Oxford & Indiana University Press, Bloomington, USA, 206 pp.
47. Young H., Osman A.M., Aklilu Y., Dale R., Badri B. & Fuddle A.J.A. (2005). – Darfur – livelihoods under siege. Feinstein International Center, Tufts University, Medford, Massachusetts. Available at: fic.tufts.edu/assets/Young-Darfur-Livelihoods-Under-Seige.pdf (accessed in August 2005).
48. Al-Najim M.N. (1991). – Changes in the species composition of pastoral herds in the Bay region of Somalia. Pastoral Development Network Paper 31b. Overseas Development Institute, London.
49. Herren U.J. (1990). – The commercial sale of camel milk from pastoral herds in the Mogadishu hinterland, Somalia. Pastoral Development Network Paper 30a. Overseas Development Institute, London.
50. Abdullahi A., Mohammed S. & Eid A. (2013). – Town camels and milk villages: the growth of camel milk marketing in the Somali Region of Ethiopia. In *Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 119–127.

51. Mahmoud H.A. (2013). – Pastoralists' innovative responses to new camel export market opportunities on the Kenya/Ethiopia borderlands. *In Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 98–107.
52. Aklilu Y. & Catley A. (2011). – Shifting sands: the commercialization of camels in mid-altitude Ethiopia. Feinstein International Center, Tufts University, Addis Ababa. Available at: fic.tufts.edu/publication-item/shifting-sands/ (accessed in August 2015).
53. Aklilu Y. & Catley A. (2011). – Mind the gap: commercialization, livelihoods and wealth disparity in pastoralist areas of Ethiopia. Feinstein International Center, Tufts University & Department for International Development, Addis Ababa. Available at: fic.tufts.edu/assets/mind-the-gap.pdf (accessed in August 2015).
54. Talle A. & Abdullahi A.M. (1993). – Labour resources in pastoral production: some implications of increased trading. *In Pastoral production in Central Somalia* (M.P.O. Baumann, J. Janzen & H.J. Schwartz, eds). Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany, 113–128.
55. Catley A., Lind J. & Scoones I. (2013). – Development at the margins: pastoralism in the Horn of Africa. *In Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 1–26.
56. Homewood K. (2008). – Ecology of African pastoralist societies. James Currey, Oxford.
57. McPeak J.G., Little P.D. & Doss C.R. (2011). – Risk and social change in an African rural economy: livelihoods in pastoralist communities. Taylor & Francis, London.
58. Behnke R.H. (1988). – Range enclosures in central Somalia. Pastoral Development Network Paper 25b. Overseas Development Institute, London.
59. Tache B. (2013). – Rangeland enclosures in southern Oromia, Ethiopia: an innovative response or the erosion of common property resources? *In Pastoralism and development in Africa: dynamic change at the margins* (A. Catley, J. Lind & I. Scoones, eds). Routledge, Abingdon & New York, 37–46.
60. Talle A. (1988). – Women at a loss: changes in Maasai pastoralism and their effects on gender relations. *Stockholm Studies in Social Anthropology*, No 19. Department of Social Anthropology, University of Stockholm, Stockholm, 292 pp.
61. Constan M., Frankenberger T. & Hoddinott J. (2014). – Resilience measurement principles: toward an agenda for measurement design. Food Security Information Network Technical Series No. 1. World Food Programme, Rome.
62. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) (2007). – The future of pastoralism in Africa. UNOCHA – Pastoralist Communication Initiative, Addis Ababa.
63. Rettberg S. (2010). – Contested narratives of pastoral vulnerability and risk in Ethiopia's Afar Region. *Pastoralism: Res., Pol., Pract.*, 1 (2), 248–273.
64. Admassu D. (2008). – Invasive plants and food security: the case of *Prosopis juliflora* in the Afar Region of Ethiopia. FARM Africa, Addis Ababa. Available at: http://cmsdata.iucn.org/downloads/invasive_plants_and_food_security___final.pdf (accessed on 14 April 2016).
65. Barth F. (1961). – Nomads of South Persia: the Basseri tribe of the Khamseh Confederacy. Little, Brown & Company, Boston.
66. Behnke R.H. (1980). – The herders of Cyrenaica: ecology, economy and kinship among the Bedouin of eastern Libya. *Illinois Studies in Anthropology* No. 12. University of Illinois Press, Urbana, Illinois, 197 pp.

