

# Economic growth in the arid and semi-arid lands of Kenya

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## Question

*What recommendations have been made by reputable experts to support long-term sustainable economic growth in the Arid and Semi-Arid Lands of Kenya?*

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# 1. Executive summary

The purpose of this rapid literature review is to help identify sustainable pathways out of poverty for those living in Kenya's arid and semi-arid lands (ASALs). The sources reviewed recommend a balanced portfolio of investment, the overall purpose of which should be to progressively expand the options open to dryland populations and their ability to capitalise on them. This approach should recognise that pastoralism and dryland farming are viable livelihoods that will remain the bedrock of dryland economies and should be appropriately strengthened. However, as populations grow and economic differentiation deepens, increasing numbers of people will need alternatives to natural resource-based livelihoods, both within and outside the drylands. These various livelihood pathways should reinforce each other, while also addressing the risks and opportunities that change inevitably brings for women and girls.

The ASALs account for approximately 89 percent of Kenya's land mass and one-third of its people (Republic of Kenya, 2012a). Within this large area there is inevitably significant diversity of production systems and economic opportunities. The challenges are particularly acute for the more arid counties to the north, which face both the legacy of political marginalisation and the operational constraints of low economic concentration and population density (Republic of Kenya, 2012b, pp. 1-8).

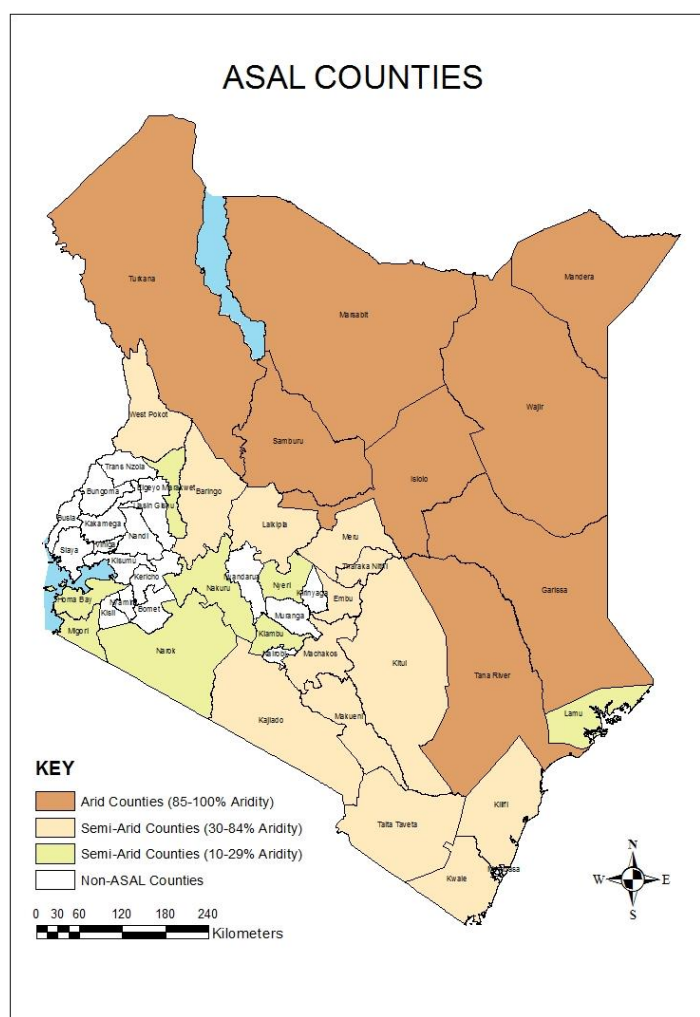


Figure 1: ASAL counties in Kenya  
Source: <http://www.devolutionasals.go.ke/county-information/>

The literature reviewed for this report draws on published material produced by experts on drylands and pastoralism in the Kenyan context, many of whom have studied the evolution of these areas for decades. The main recommendations to support sustainable livelihoods include:

- Ensure that any investment or programming decision is based on a sound understanding of dryland dynamics, given the long and damaging history of ill-informed interventions in pastoral areas in particular. Approaches that recognise and work with the variability, seasonality and informality of dryland systems are more likely to be successful.
- Expand the options open to dryland populations and their capacities to take advantage of them, rather than narrow down to a single response. The scale and breadth of the

challenges faced by the poorest households, and the naturally integrated nature of economic activity in drylands, demand collaborative planning and programming.

- Pursue a balanced strategy which recognises that pastoralism is an economically viable livelihood that will remain the foundation of dryland economies, but that fewer people are likely to practise it. Therefore a wider range of options, involving seasonal or permanent movement to pastoral towns and outside pastoral areas, will be required.
- Recognise that the opportunities for livelihood diversification and the best instruments to promote them will be locally specific. However, investing in human and physical capital is likely to reinforce a wide choice of livelihood strategies. Education alone will be insufficient without ensuring its appropriateness in drylands and addressing its link with the labour market.
- Consider the particular implications of livelihood transformation for women and girls. These include: (i) their demonstrable strengths in collective action and innovation; (ii) the double burden they experience as female entrepreneurs; and (iii) the risk that they are squeezed out of markets as commodities rise in value and trade becomes more formalised.
- Ensure that new economic activities are designed and pursued in ways which reinforce rather than undermine the livelihoods on which people currently depend, and that young businesses receive specialist and sustained support.
- Recognise that commercialisation is associated with growing wealth but also widening inequality. The more inclusive markets and value chains, in terms of both poverty and gender, are those associated with domestic and cross-border trade (rather than export), value chains for small stock (rather than large stock), and small-scale rather than large-scale irrigation.

The terms 'drylands' and 'ASALs' are used interchangeably, although technically the former includes, but is not synonymous with, the latter.<sup>1</sup> Four comments on the selection of sources may be helpful:

1. The literature on livelihoods in Kenya's ASALs is large and diverse, while the scope of this review is purposefully brief. Therefore priority was given to sources that capture the work of multiple experts, such as multi-agency initiatives or syntheses of research.
2. Much recent literature on the ASALs reflects the current interest in resilience. Some of this has been included if its recommendations focus on strengthening the economic prospects for dryland populations, and on the grounds that resilience is a necessary, if not sufficient, condition for poverty eradication (Cervigni & Morris, 2016, pp. 3-4).
3. Several sources are global or regional, but in all cases Kenya is among the countries covered.
4. The themes discussed in the report are not intended as a comprehensive agenda for economic growth in ASALs, but rather reflect issues discussed in conversation with DFID Kenya, such as the prospects for pastoralism, dryland farming and irrigation, markets, migration, and urban-based livelihoods.

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<sup>1</sup> There are four dryland sub-types: hyper-arid, arid, semi-arid and dry sub-humid.

## 2. Understanding dryland systems

A common observation in the literature is that any programme should be based on a sound understanding of dryland systems. This matters because of the long history of ill-informed investment, particularly in pastoral areas, that has contributed to their current predicament (Little, 2013; Odhiambo, 2013; Krätli, 2014). Three general recommendations are made in the literature reviewed: (i) to work with variability, rather than seek to control it; (ii) to recognise multiple livelihood pathways; and (iii) to plan on a scale that accommodates this variability and diversity.

### Variability

Rainfall in drylands is unpredictable and unevenly distributed. There is also significant variation in soil type, topography and vegetation. Consequently, dryland resources such as water, pasture and crops may vary significantly in time and space. Pastoralists and farmers respond to this variability by making flexible and real-time adjustments to their practices (Krätli, 2015).

Since variability is a structural feature of drylands, Krätli (2015, p. 82) advises against 'best' solutions or standard responses. Improving agricultural productivity requires working with uncertainty rather than seeking to control it. He recommends maximising the options open to small-scale producers, for example by strengthening the social ties that help them manage the risks to their livelihoods, or by delivering basic services in ways which accommodate their need for mobility and flexibility in unpredictable environments.

A recent paper by Catley (2017) summarises the evolution and principal findings of three decades of research in pastoral areas of the Horn of Africa by the Feinstein International Center at Tufts University. Like Krätli, Catley notes that high rainfall variability is normal in pastoralist areas and has not significantly changed.<sup>2</sup> He suggests that the worsening impact of drought is a consequence not of changing rainfall patterns but of factors such as population growth, impediments to livestock mobility, and the failure to manage conflict. These reduce the drought management options available to growing numbers of poorer herders (p. 15). Lind, Sabates-Wheeler and Kohnstamm (2016, p. 22) reach a similar conclusion in their review of the literature on change in East Africa's drylands, noting that the growing privatisation and consequent fragmentation of rangelands is restricting pastoralists' capacity to adapt.

A policy brief based on five years of research in seven countries (including Kenya) by the Pathways to Resilience in Semi-Arid Economies (PRISE) consortium concludes that climate-resilient economic development in drylands requires a shift in perspective, from one that regards mobility and seasonality as problems, to one that understands them as key to sustainable development (Jobbins, Ludi, Calderone, Sisodia & Sarwar, 2018). Catley, Lind and Scoones (2013) pose a similar challenge: they suggest reframing problems and solutions, arguing that 'by consciously moving our gaze from the centre [where development decisions are conventionally taken] to the margins [the drylands] the world begins to look different' (pp. 21-22).<sup>3</sup> The view from the margins also helps to reveal the diversity of actors and their livelihood pathways.

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<sup>2</sup> Data from rainfall stations across the Somali areas of Kenya, Ethiopia and Somalia for periods of up to 88 years indicated a statistically significant negative rainfall trend in only one location in Ethiopia (Catley, 2017, p. 15-16).

<sup>3</sup> A similar desire to reframe the drylands underpins Kenya's ASAL policy, approved by Parliament in 2012, in that it reverses a long-standing bias in public policy against drylands and pastoralism. The policy requires that all

## Multiple livelihood pathways

Lind et al (2016, p. 12) note the inter-connections between livelihood activities in drylands. Their study uses a model of a pastoralist livelihood system which is centred on livestock production and trade but complemented by other non-livestock-based productive activities. The authors identify two advantages of a systems approach: first, that it captures connections across borders and groups which may be missed in analysis limited to a defined administrative area, and second, that its long-term perspective reduces the risk of incorrectly interpreting short-term trends (Lind et al, 2016, p. 36). Krätli also argues that livestock-keeping and crop farming in drylands are much more closely integrated than is often thought, particularly on a regional scale, and that this integration allows producers to exploit variability (Krätli, 2015, p. 47).

A number of authors note that there is no single pathway out of poverty in drylands, and considerable risks in pursuing one strategy to the exclusion of others (Little et al, 2016, p. 83; Headey, Taffesse & You, 2012). Headey et al (2012, p. 33) caution against a single model of economic development and instead advise expanding pastoralists' livelihood options and their ability to make use of them. This may be done by investing in education and vocational training, microfinance, irrigation, and policies that facilitate migration and remittances.

In their policy brief drawing on recent research into poverty escapes in Kenya,<sup>4</sup> Shepherd and Scott (2018, pp. 12-14) comment on the multiple and complex barriers trapping people in poverty, noting that the poorest households require intensive support to overcome these. They recommend a portfolio approach, using either integrated programming or a well-coordinated linkage and referral system which connects clients of one intervention with another.<sup>5</sup>

## Planning scales

In a paper exploring the relationship between pastoralism and biodiversity, Notenbaert, Davies, De Leeuw, Said, Herrero, Manzano, Waitthaka, Aboud and Omondi (2012) note that land use planning and livelihood strategies need to be matched to the diversity found in drylands. They also advise careful examination of the potential trade-offs between different livelihood options. Others have been developing and testing frameworks to help policy-makers weigh up the merits of alternative investments in drylands (King-Okumu, 2015; King-Okumu, Wasonga, Jarso & Salah, 2016). In part, this work is driven by a concern that policy-makers often mistakenly assume that new forms of land use must necessarily be more profitable than pastoralism (DLCI, 2015; Behnke & Kerven, 2013).

In her review of rangeland planning in Kenya, Ethiopia and Uganda, Flintan (2014) similarly emphasises the importance of a holistic, landscape-level perspective. She notes the uneasy fit between the seasonality and flexibility required by pastoralism and the rigidity of formal planning systems that operate within administrative boundaries and annual planning cycles. Her paper analyses a number of initiatives with the potential to support the sustainable management of

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actors understand the distinctness of drylands and provide investment and services in ways that are fully reconciled with those realities (Odhiambo, 2013).

<sup>4</sup> One of the two focus counties was semi-arid Makeni.

<sup>5</sup> There are already some attempts to apply these intensive or collaborative approaches in Kenya's drylands, from the careful sequencing of interventions used by The BOMA Project (Gobin, Santos & Toth, 2017) to the common programming approach of the Ending Drought Emergencies framework (USAID, 2018a, pp. 24-25).

dryland resources and thus improve livelihoods. It identifies a set of principles for good development planning in rangelands, based on these examples, and directs recommendations to different groups of actors (pp. 43-44). Among those for donors are: (i) to provide long-term and flexible funding for planning in rangelands; (ii) to build the capacities of the two key actors (government and communities) to lead and participate in these processes; and (iii) to use their funding to leverage coordination and collaboration.

Jobbins et al (2018) similarly recommend a holistic, territorial approach to economic development in drylands, rather than one focused on a specific sector or thematic priority. Catley (2017, p. 42) argues that the growing need to find positive alternatives for pastoralists challenges the notion of a conventional 'project area'. The scope of livelihood analysis and planning needs to widen to explore opportunities outside pastoralist areas as well as within them – even as far as regions where migrants share cultural and linguistic ties (such as Djibouti or the Middle East).

### 3. The changing nature of pastoralism

The economic potential of pastoralism is routinely under-valued (King-Okumu, 2015; Krätli, 2014). Government statistics are generally based on commodities marketed through official channels. This overlooks the much larger proportion of exchange that takes place informally, as well as the value of production that is not marketed. It also takes no account of other direct and indirect benefits of pastoralism such as transport services, informal financial services, environmental services, and support to tourism (Krätli, 2014). These are some illustrations of the value of pastoral production:

- Across Africa, livestock contribute between five and 15 percent of total GDP – more, if indirect benefits such as organic fertiliser and traction are considered (De Haan, Robinson, Conchedda, Ericksen, Said, Robinson, Flintan, Shaw, Kifugo, Wane, Touré, Ickowicz, Corniaux, Barr, Martignac, Mude, Cervigni, Morris, Mottet, Gerber, Msangi, Lesnoff, Ham, Filliol, Nigussie, Paolantonio & Alfani, 2016, p. 77).
- The trade in livestock and livestock products in the IGAD region is estimated to equal US\$ 1 billion or more in foreign exchange annually, and possibly 5-6 times that amount in local currencies (Aklilu, Little, Mahmoud and McPeak, 2013, p. 1).
- Of the animals and animal products destined for export from the IGAD region, 90 percent or more originate in pastoral areas (Aklilu, Little, Mahmoud and McPeak, 2013, p. 7). More than 80 percent of the beef consumed in Kenya is produced by pastoralists, either domestically or in neighbouring countries (Behnke & Muthami, 2011, p. 19).
- Livestock's contribution to Kenya's agricultural GDP is 2.5 times higher than previously thought, and its contribution to national GDP more than twice previous estimates (13 percent compared with 5.6 percent), according to a recalculation of 2009 official data by the Kenya National Bureau of Statistics and IGAD (Behnke & Muthami, 2011).
- Officially recorded milk production in Kenya in 2009 constituted only five percent of total estimated national milk production (Behnke & Muthami, 2011, pp. 38-39). More than 80 percent of milk produced by smallholders and pastoralists in Eastern Africa is sold outside the formal dairy sector (CELEP, 2018, p. 2).
- Beef and milk consumption in Kenya is expected to increase by over 170 percent between 2010 and 2050, given rising demand from a growing and increasingly affluent urban population (FAO, 2017a).

However, the distribution of livestock wealth is becoming increasingly unequal. On current trends, and assuming no intervention, De Haan et al (2016, p. 81) estimate that 77 percent of pastoralists and 55 percent of agro-pastoralists across Africa will, by 2030, have insufficient livestock to stay above the poverty line and therefore be forced to seek alternatives.<sup>6</sup> Studies in Kenya confirm this inequality: for example, McPeak and Little (2017, p. 6) found that the upper ten percent of households in their study area of Marsabit and southern Ethiopia controlled 42 percent of total livestock wealth.

A key observation in the literature is that inequality in drylands is growing, as wealth becomes concentrated in fewer hands. Some studies use variants of a matrix to explore how livelihood options are diverging and to explain why significant wealth co-exists with widespread poverty. Lind et al (2016, p. 15) use access to markets and access to natural resources as the two critical factors determining pastoralist livelihood pathways (Figure 2), while McPeak & Little (2017) use herd size per capita and cash income per capita as their two variables (Table 1).

Figure 2: Livelihood pathways (Lind et al, 2016, p. 15)

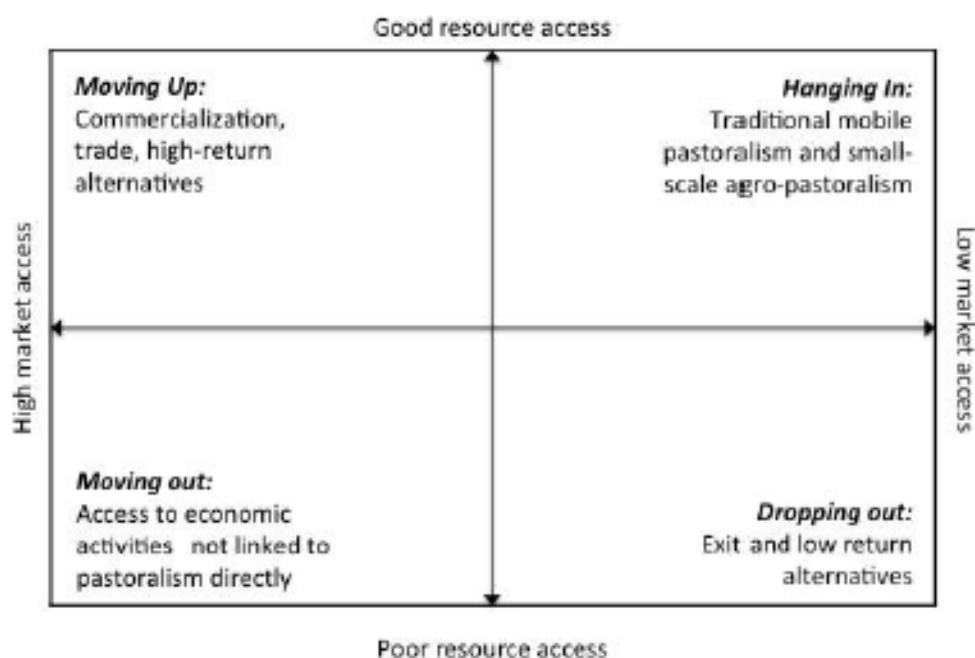


Table 1: Livelihood groups (McPeak & Little, 2017, pp. 3-4)

	Lower cash income	Higher cash income
Lower herd size	Left out	Moving from (a herd-based livelihood)
Higher herd size	Staying with (pastoralism, but less engaged with markets)	Combining (high involvement in pastoralism & the cash economy)

<sup>6</sup> The relative proportions for pastoralists and agro-pastoralists in Kenya are reversed, with the equivalent figures calculated by the authors as around 47 percent and 58 percent respectively.

Mburu et al (2017) also combine income-based and asset-based metrics in their analysis of panel data from Marsabit for the period 2009 – 2013. Their findings illustrate some of the general livelihood trends in pastoral areas:

- Livestock is the main source of household income (in the Marsabit case averaging 72 percent).
- But poverty is widespread (over 70 percent of households in the Marsabit sample were both income- and livestock-poor).
- The rate of livelihood diversification is increasing, particularly among livestock-poor households.
- The share of livestock-poor households is rising (in Marsabit from 79.9 percent to 88.6 percent over the study period).

Catley (2017, p. 24) describes pastoral livestock production as the core and most robust livelihood activity in drylands, but cautions that it is only available to those with sufficient animals and access to rangelands and markets (in line with Figure 2), and that their number is declining relative to the population as a whole (p. 6). Pastoralists and pastoralist areas are not universally poor, but, echoing De Haan et al (2016), a large majority of people lack the minimum number of livestock to function as pastoralists. Inequality is also widening over time, because wealthier herders are better able to protect themselves from shocks than poorer ones. Pastoralism is not in decline, but commercialisation is facilitating a transfer of livestock wealth from smaller to larger herds, described as ‘a process of classic class formation’ (Catley, Lind & Scoones, 2013, p. 18).

Little (2013, p. 248) projects that by 2030, pastoralism will not be practised by the majority but will nevertheless remain the economic foundation of the drylands of the Horn. Livelihood diversification should therefore complement not compete with it (Little et al, 2016). In their assessment of alternative investment options in pastoralist areas of the Horn, Headey et al (2012, pp. 25-26) also caution against neglecting pastoralism, given its size and comparative advantage and the consequences of doing so for employment, food security and inequality. They recommend a balanced development strategy which retains pastoralism as an important pillar while also facilitating movement out of it (p. 34).

## 4. Diversification and migration

Little (2016, p. 6) notes that livelihood diversification has been practised by pastoralists for more than 50 years, but that what has changed in the last two decades is the scale, range and persistence of diversification strategies and the pressures pastoralists face. Catley (2017, p. 19) distinguishes between:

- adaptations to the main livelihood activity
- diversified activities that complement the main livelihood activity
- alternative livelihoods that differ from it.

Mortimore (2013, p. 43) cautions that livelihood diversification is ‘case-specific’ and not amenable to generalised policy or action. Morton and Kerven (2013, p. 20) agree that livelihood opportunities in drylands, and the best instruments to promote them, are likely to be locally specific, and that identifying these will need both participatory diagnosis of supply and rigorous analysis of demand. They also recommend thorough documentation of local-level efforts to stimulate diversification. They give a number of examples of diversification:



- Labour migration, although this is often to low-income, low-status occupations
- Employment or self-employment in small pastoral towns, such as manual work, tailoring, petty trade, and haulage
- Herding or collecting feed for other pastoralists
- Processing and selling dairy products
- Collecting and producing natural resource products from rangelands, some of high value (gums, resins, honey), others low (charcoal)
- Fishing and collecting marine products
- Eco-tourism
- Horticulture
- Investing in businesses such as trade, transportation or real estate.

Morton and Kerven (2013) offer a framework to categorise these activities and understand their varying implications and impacts (Table 2). The table illustrates Maxwell’s recommendation (2017) that an important concern should be to diversify risk, rather than simply income and assets, since new activities may be vulnerable to old risks.

Table 2: Categorisation of diversified livelihood activities

Location	In the rangelands / in small towns nearby / in urban areas outside ASALs / in other countries
Gender	Whether the occupations are likely to be followed by men, women, or both
Level of income	On a spectrum from very low to high
Occupational security	Whether the income stream is reasonably guaranteed
Start-up costs	Requirement for capital investment
Level of skill	Requirement for training or formal education
Environmental sustainability	Variable, but low for certain commodities, such as charcoal
Relation to pastoralism	Dependent on livestock production / supplement to livestock production / temporary strategy to restock and move back to pastoralism / process of dropping out of pastoralism
Dependence on pastoral demand	Goods and services supplied to pastoralists (fodder, veterinary services) are vulnerable to crashes in the pastoral system; non-pastoral activities (marketing other dryland products, out-migration) are less so

Source: Morton & Kerven (2013, p. 12)

Catley (2017, p. 19) finds that many of the more positive diversification options are determined by a household’s wealth, proximity to urban centres, markets and services, and social and political capital. Access is also gendered, with the positive options more available to men and boys than women and girls. While for some there is a ‘clear pathway to resilience’ (p. 6) based on pastoralism, the options for many more are less certain, and likely to involve not just moving away from pastoralism but moving out of pastoralist areas.

## Urbanisation

In their recent literature review, Lind et al (2016, p. 170) find that urbanisation and small town growth in drylands is a relatively neglected theme, but that these dynamics are key to understanding the livelihood pathways of growing numbers of people. Lind and Barrero (2014, p. 18) note that while there is a large literature on de-agrarianisation, there is no comparable field of study or consolidated knowledge on how people exit livestock-keeping.

Coppock and Desta (2013) comment on the strong cooperative behaviour demonstrated by women's groups in Marsabit, where one advantage of sedentarisation is that it facilitates collective action. Atela, Gannon and Crick (2018) note the benefits of collective action for women-led micro, small and medium enterprises (MSMEs) in Narok, but also the tendency for women to be confined to sectors with higher risk and lower return. While women are dealing with the same practical constraints to their businesses as men (such as lack of electricity, transportation, water, and finance), they face additional barriers associated with their gender (such as fewer educational opportunities, or limited assets to use as security). The authors recommend giving greater attention to the 'double vulnerability' of women-led enterprises (p. 16), who may be simultaneously affected by pressures on both their households and businesses.

The PRISE research highlights the significance of the informal sector to dryland economies and the need to recognise the diversity of private actors (households, producers, businesses), including from a gender perspective (Jobbins et al, 2018; Gannon et al, 2018). Carabine and Simonet (2018, pp. 24-25) note that most policy-makers consulted during the PRISE studies consider a private sector actor to be a business employing more than one person and registered as a company. This overlooks both the contribution of informal economic activity and the contribution of social networks to economic stability.

Achiba (2018) finds that the expansion of settlements in Isiolo has created opportunities to absorb family labour not needed for herding, and that recent improvements in infrastructure and services, some of them associated with devolution, have improved the business environment and opened up new sources of income. All the non-pastoral income-earning activities are in the informal sector, where the capital and skills required are low. The main non-pastoral activities are petty trade, retail shops, and casual labour, but even these are not unconnected from the pastoral economy, since the main reason given by informants for engaging in them is to prevent the sale of livestock for small expenses. Diversification in this context is a means to support that portion of the household which is settled, particularly in the dry season when the herds are away.

Mahmoud's study of diversified and alternative livelihoods in Garissa (2016) also concludes that urban and rural links remain strong. Some families farming along the river keep herds, supply fodder from their farms, and restock themselves using income from the farm. Others supplement their income from livestock to meet the costs of education, health and food. His study illustrates the diversity in farming: for example, some households farm seasonally, during the wet season, while others split – women and children remain permanently involved in farming while men stay with the livestock. Mahmoud highlights the particular burdens and risks for women in urban areas, recommending that they be the focus of programmes to improve business skills, the protection of rights, and the reduction of risk at work. He also notes the growing demand for education in Garissa and the need to address both access and quality.

## Human capital

Headey et al (2012) describe urban migration as a promising route to absorb the growing population in drylands but only if complemented by investments in education and meaningful job creation. They identify a rapid expansion of education as the investment likely to generate the highest return in terms of positive economic diversification, because of its multiple benefits for employment, women's fertility, and political empowerment, and because of the high proportion of young people in pastoralist societies and the level of unmet need.

Morton and Kerven (2013, p. 20) also find a consensus in the literature that education is the most effective path to livelihood diversification in the long term. They unpack a number of challenges associated with education in drylands that are often conflated but must be addressed if this potential is to be realised (p. 15):

- To provide education that is compatible with mobility
- To provide education that is compatible with low population density
- To provide education that is compatible with children participating in and acquiring the skills for dryland livestock production and agriculture
- To provide education that does not culturally alienate children with negative messages about their own livelihoods
- To provide decent and secure schools that will not deter children from attending.

Shepherd and Scott (2018) suggest that the transition between education and the labour market could be improved by expanding the reach and quality of technical and vocational training, or through schemes in the informal sector that provide on-the-job technical and business training. The BOMA Project in Marsabit also focuses on the provision of human capital (in this case skills training and ongoing mentoring) alongside capital investment, and is demonstrating positive results for the incomes and savings of even the poorest women, 95 percent of whose enterprises involve the petty trade of consumer goods (Gobin, Santos & Toth, 2017).

However, migration brings new challenges. While the major risks in rural areas are covariate (drought, conflict, livestock disease), idiosyncratic risks, particularly ill-health, take on greater significance in urban settings. For this reason, Catley (2017, p. 44) argues that health, and not just education, is an essential foundation for escaping poverty traps and should be supported.

Morris, Cervigni and Brooks (2016) endorse human capital as a priority. They suggest that new livelihoods in drylands will need to be more reliant on human and physical capital than on natural capital, given the impact of population growth on the natural resource base and the uncertainties posed by climate change. They advise a gradual transition which involves both the evolution of existing natural resource-based livelihoods and the exit from them of significant numbers of people. In the medium to long term, their recommendations for strengthening human capital are education and vocational training, health and nutrition, and fertility management. Their recommendations for enhancing physical capital include transport infrastructure, communications, and urban housing.

## General recommendations on diversification

One general recommendation in the literature reviewed is to ensure that emerging enterprises are provided with appropriately specialised business support (USAID, 2018b, p. 53). Wren and Speranza (2010) reviewed four bio-enterprise initiatives in Mwingi, Laikipia, Kilifi and Baringo and

found that those set up and supported by the private sector were slowly growing, while those set up by development actors were less successful and demonstrated less understanding of the market. Businesses need sustained financial and capacity support to survive in the early stages, while mentoring was identified as another crucial success factor.

In the conclusion to his 2016 collection, Little identifies a number of policy and programme areas likely to build resilience in drylands in the context of livelihood diversification. Since these bring together several of the priorities suggested earlier, the list is reproduced below. Little emphasises the interconnections between pastoralism and the other livelihood activities that develop around it, noting that support for livelihood diversification should be careful not to undermine the region's key economic asset (livestock). Aklilu et al (2013, p. 26) illustrate how the same intervention can either reinforce or undermine pastoralism:

- Irrigation can be used to grow fodder crops, with stubble grazed after harvest and designated water points for livestock; alternatively, it can eliminate access to key seasonal resources which then undermines the pastoral system in its entirety.
- Urbanisation can create market hubs, opportunities for value-added finishing opportunities, and access to education, or it can limit mobility and lead to environmental degradation.

Little's recommendations are:

- i. *Land tenure policies* that are equitable and efficient.
- ii. *Value-added diversification in the livestock sector*, and mechanisms to keep more of this value within pastoralist areas.
- iii. *Extraction and trade in natural dryland products*, such as gum arabica and resins.
- iv. *Urban and peri-urban planning and infrastructure* that addresses water, sanitation, public security, animal health services, and environmental impacts on surrounding rangelands.
- v. *Strengthening domestic and cross-border trade*, since this generates more local benefits and engages larger numbers of herders than export trade.
- vi. *Reducing the nutritional and child health risks* often associated with settlement and diversification, such as reduced access to milk and increased exposure to disease, including in irrigation schemes.
- vii. *Education*, including reconciling delivery methods with the need for livestock mobility, and developing curriculum appropriate for pastoralists.
- viii. *Employment and training for youth and women*, by investing in education and vocational skill training, and facilitating low-capital start-up enterprises through the formation of savings and credit groups, which also help share risk, spread capital, and increase power when negotiating with others in the value chain.
- ix. *Governance and empowerment*: supporting dryland communities to control and manage their own lands and resources.

## 5. Livestock production and marketing

De Haan et al (2016) distinguish between priorities for pastoral and agro-pastoral systems. Since studies have consistently confirmed pastoralism's productive efficiency, they argue that the main opportunities for pastoralism lie in mechanisms that mitigate the extremes of its natural 'boom

and bust'. For agro-pastoralism, they focus on the intensification of production to increase the volume and value of commercial sales (p. 81). Table 3 summarises the suggested interventions.

Table 3: Interventions to maximise the opportunities from pastoral and agro-pastoral systems

	Pastoral systems	Agro-pastoral systems
Maintaining herd mobility, e.g. through access to unexploited rangelands, improving feed supply systems in remote areas, or land use planning	X	
Improving animal health services	X	X
Facilitating early destocking when drought is imminent	X	
Fostering better market integration, such as fattening young stock in areas of higher rainfall	X	
Improving animal genetics to accelerate growth and increase offtake		X
Exploiting complementarities between crop and livestock production systems to improve the quantity and quality of available feed		X
Strengthening livestock value chains to increase marketing opportunities.		X
Consolidating small livestock holdings into larger units that are more viable and resilient.	X	X

Source: De Haan et al (2016, p. 81)

The study then models the potential impacts of four interventions: (i) improving animal health services; (ii) improving access to feed resources; (iii) promoting offtake of young males for fattening outside the drylands; and (iv) introducing progressive taxation policies that result in a more equitable distribution of livestock ownership. One important finding is the importance of complementarity: for example, improving animal health services without also increasing feed supply could put further strain on the system (p. 87). Further, the modelling suggests that, while no single intervention has a transformational impact on vulnerability, their combined impact could reduce the number of vulnerable households by 2030 to 16 percent, and the proportion of those feeling pressure to leave the sector to 7 percent (pp. 91-92).

Finally, the authors identify the challenges and costs of each intervention, recognising that these will vary by location. Delivering two of the interventions (improved animal health services and early offtake of young male cattle) across the drylands of East and West Africa would cost an estimated \$0.5 billion per year – a substantial sum, but less than the \$4 billion per year spent on food aid in the Sahel and Horn of Africa. The authors also note that early offtake of young male cattle would have a positive and measurable impact on greenhouse gas emissions (p. 89).<sup>7</sup>

In their overview of market access and trade issues in the drylands of the Horn, Aklilu et al (2013, p. 19) observe the following:

<sup>7</sup> This is a regional study covering both West and East Africa. The impacts of the various interventions discussed in the chapters by De Haan et al and Walker et al (section 6) vary considerably by country. The authors subsequently divide countries into three groups, placing Kenya in the group where these interventions are the most fiscally achievable and have the greatest impact (Cervigni & Morris, 2016, pp. 217-219).

- There is room to improve producer incomes & well-being, since producer prices are generally 50 percent or less than the terminal market price in-country, and considerably lower for international markets (p. 19).
- Different groups benefit from different markets. Larger traders and wealthier owners capture the benefits from the higher-value markets, such as the export trade. Middle-wealth producers have easier access to domestic and cross-border markets, where product specification and capital outlay are less demanding. The poorest herders are more likely to be involved as hired workers than as sellers (p. 5)
- The trade in small stock is more inclusive than the trade in large stock, given that this is where poorer households, especially female-headed households, are represented (p. 5).
- Domestic and regional trade is less risky than export, with considerable potential for growth (including, the authors suggest, to countries such as Uganda and the Democratic Republic of Congo) as incomes and urbanisation rise (p. 8).

The authors identify three types of animal flow from the pastoral lowlands to the market. The first is the status quo, the second is growing, and the third is rare but could expand significantly with the right support (p. 17).

1. Livestock produced in the lowlands, purchased at half or less of the terminal market price, and transported to urban centres for consumption.
2. Livestock produced in the lowlands, finished in ranches outside the lowlands, and sold to higher-return markets or in urban areas.
3. Livestock produced and fattened in the lowlands, and sold to higher-return markets or in urban areas.

One of the constraints to offtake is the nature of pastoral production. The market tends to require young male stock, but pastoral producers traditionally prioritise milk production and herd reproduction; the female composition of pastoral herds is generally 65-70 percent or more (Aklilu et al, 2013, p. 16; also McPeak & Little, 2017). Moreover, the logical way for poorer herders to build their financial capital is to minimise offtake and maximise herd growth (Catley, 2017, p. 38). As Achiba (2018) finds in Isiolo, the desire to avoid livestock sales is a strong incentive to adopt non-pastoral income-generating activities. Herd growth is an important risk management strategy in uncertain environments: the more animals that survive a drought, the faster the herd will recover. Households with larger herds also have more management options, such as splitting the herd, holding a greater diversity of animals, or investing in social capital by giving some to others (Jenet, Buono, Di Lello, Gomarasca, Heine, Mason, Nori, Saavedra & Van Troos, 2017, p. 30).

Despite this essential logic of pastoral systems, there are numerous examples of pastoralists adapting to market opportunities (Catley, Lind & Scoones, 2013):

- In Laikipia, Lind and Barrero (2014, pp. 15-16) find growing market engagement, particularly by the young. The marketing characteristics of animals are now a stronger consideration for herders in deciding which to acquire – loosely characterised as the shift from a ‘breeding herd’ to a ‘marketing herd’.
- An evaluation of the USAID-supported REGAL-AG project in Isiolo and Marsabit illustrates the potential increase in offtake. Monthly market revenue in Oldonyiro, Isiolo, was close to Kshs. 70,000 when the project started in 2013. After the market’s construction, mean weekly revenue increased to Kshs. 60,000 in the dry season and

more than twice that amount in the wet season, while the number of trucks ferrying livestock rose from an average of 2-4 to 15 every market day (USAID, 2018b, p. 16).

While noting that markets are critical, Catley (2017, pp. 38-39) suggests that other types of infrastructure development, especially roads and communications, can be stronger enablers of livestock trade (also Aklilu et al, 2013, pp. 11-12).<sup>8</sup>

Two examples from the Kenyan literature illustrate how marketing practices are changing.

## Camel milk

Once produced solely for subsistence, camel milk is now a highly valued commodity (Anderson, Elliott, Kochore & Lochery, 2011). A number of factors lie behind this transformation, including better infrastructure and communications, the spread of technologies such as phones and motorbikes, and rising urban demand in places such as Eastleigh in Nairobi and the Dadaab refugee camp in Garissa (Anderson et al, 2011).<sup>9</sup> Mwaura, Wasonga, Elhadi and Ngugi (2015, p. 26) estimate the monthly gross turnover of the trade in Isiolo at Kshs. 10.58 million (approximately US\$ 105,000), of which 94 percent is attributed to demand from the Nairobi terminal market.

Anderson et al (2011, p. 11) highlight the agency of producers in northern Kenya, particularly women, in taking advantage of these opportunities. However, as the trade becomes more lucrative and formalised, there is a risk that the women who started it may gradually be squeezed out. This is illustrated by Achiba (2018), who finds that men have become more involved in the general milk trade in Isiolo as its commercial value has risen.

A briefing by the Coalition of European Lobbies for Eastern African Pastoralism (CELEP) notes that demand for dairy products in the region generally exceeds supply, and that supporting pastoral dairying has benefits for food security and nutrition, the incomes of poorer families, and women's empowerment (CELEP, 2018). This support should acknowledge the differences between dairying in pastoral areas and in highlands, such as the seasonal fluctuations in yield and the need for hygiene standards appropriate to the context.

## Fodder

The REGAL-AG evaluation describes the emergence of a vibrant fodder value chain in Isiolo and Marsabit. Hay-producing entrepreneurs supported by the project increased their yields by 95 percent over its five-year timeframe (USAID, 2018b, p. 46). Of the smallholder households interviewed, 27 percent now use fodder to feed their livestock (p. 34). Carabine and Simonet (2018, p. 58) also find that there is significant potential to improve and expand the fattening stage of the beef value chain in Kenya's northern rangelands.

Among the recommendations by Aklilu et al (2013) are: (i) producing fodder for value addition and to reduce drought-related losses, and (ii) improving fodder availability near market centres

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<sup>8</sup> Draft analysis prepared for DFID Kenya highlights a correlation between the 20 percent reduction in poverty in both Marsabit and Isiolo between 2005 and 2015 and the construction during this period of the tarmac road between Isiolo and Moyale.

<sup>9</sup> See also: <https://pastres.wordpress.com/2018/11/02/pastoralism-under-pressure-in-northern-kenya/>

and on trekking routes, since the best conditions for production are generally in areas remote from markets, restricting access to wealthier herders able to meet these costs. A recent FAO study on the region's livestock trade routes identified six examples of practices with the potential to reinforce livestock trade, one of which is a fodder group in Wajir. The group is a member of the Wajir County Farmers' Association which helps market both the fodder and the seeds by bulking the products in stores across the county. An important source of support has been the county government in Wajir, which bought some of the group's fodder and distributed it as relief during drought (FAO, 2017b, pp. 57-58).

## 6. Crop farming and irrigation

Walker, Ward, Torquebiau, Xie, Anderson, Perez, Ringler, You, Cenacchi, Hash, Rattunde, Weltzien, Koo, Carfagna, Cervigni and Morris (2016) assess the opportunities to improve the productivity of agriculture in drylands, distinguishing between rainfed and irrigated systems. They identify interventions likely to improve the management of rainfed agriculture: (i) accelerating the adoption of modern varieties of cereals; (ii) increasing the availability of hybrids; (iii) improving fertility management; (iv) improving agricultural water management; and (v) technologies to improve crop productivity.

Using a similar approach to De Haan et al (2016) for the livestock sector, the authors then model the impact of five different technologies on rain-fed agriculture: (i) drought-tolerant improved varieties; (ii) heat-tolerant improved varieties; (iii) fertiliser; (iv) water harvesting; and (v) farmer-managed natural regeneration of indigenous trees. The third of these – improving soil fertility – was found to have the most positive impact on production.

In their discussion of irrigation, Walker et al (2016) distinguish between small-scale and large-scale. They suggest that small-scale irrigation has more promise because of its lower costs, decentralised management, and likely higher levels of farmer participation. Further, while small-scale irrigation is being applied in a wide range of mixed farming systems used by many poor farmers for both subsistence production and sales, large-scale irrigation tends to be associated with specialised production that directly benefits fewer households.

The paper concludes with an assessment of the appropriate policy balance between rainfed and irrigated agriculture. The authors suggest that 'the potential for irrigation development in the drylands is substantial, but the likely impact on crop production pales in comparison to the impact on crop production that could be achieved by fully exploiting the available opportunities to develop rainfed agriculture' (p. 126). There is a trade-off between achieving small improvements for the large number of dryland households engaged in rainfed production, and large improvements for the relatively small number of households that could take advantage of irrigation technology. 'The policy choice thus pits small reductions in poverty for the many against large reductions in poverty for the few. And given the vast discrepancy in the numbers of households falling into each category, as well as the high cost of irrigation development, targeting dryland agriculture is likely to be the better choice'. (p. 132).

Mortimore (2013) also weighs up policy choices for agriculture in drylands, using scale and water source to distinguish between four (not mutually exclusive) strategies: large-scale rainfed, small-scale rainfed, large-scale irrigated, and small-scale irrigated. After evaluating their respective strengths, weaknesses, opportunities and constraints he concludes that the fourth of these (small-scale irrigation) has the strongest potential, particularly given evidence of spontaneous



uptake of irrigation by smallholders using private capital. Mortimore identifies the following principles of good practice in irrigation development (pp. 48-49):

- Land use plans that reconcile competing claims and apply democratic principles
- Freedom of choice for households in their livelihood strategies, avoiding a narrowly sectoral approach
- Recognising and realising the complementary benefits of livestock
- Conservation of soils and water and sustainable agronomic practice
- Broadening access to education to expand individual life chances
- Expanding appropriate extension services, and action research relevant to small-scale production
- Incentivising the adoption of new practices, for example through support to marketing, education or health.

Morton and Kerven (2013, p. 2) suggest that irrigated agriculture on family farms can be a profitable source of livelihood diversification where high-value crops can be produced for assured markets, but advise against large-scale commercial irrigation schemes that expropriate productive land from local residents. Headey et al (2012) also note that irrigation has a role in diversifying livelihoods and that there is scope to increase the irrigated area in Kenya's drylands, but not to the level of official estimates which do not appear to factor in the profitability of potential projects. The authors identify various biophysical, economic and institutional constraints on irrigation capacity, including the limited proportion of households that benefit, and the significant impact of the cost of implementation on estimated rates of return (p. 18).

Many of the recommendations about irrigation by Walker et al (2016) are echoed by Avery (2013) in the specific context of Kenya. He also notes the potential to improve small-scale crop agriculture in ASALs, and similar priorities for doing so, including the further development of drought and salt-tolerant crops, improvements in soil and water conservation techniques, extension services that match these priorities, and enforcement of measures to protect riparian zones. However, he emphasises the challenges to crop irrigation in ASALs, where water needs can be four times the requirement in the cooler highlands given high temperatures, solar radiation, and desiccation by dry winds, and is particularly cautious about large-scale irrigation projects which require challenging engineering and can have negative consequences for downstream users and other livelihoods. The location of these schemes in fertile riparian zones and alluvial flood plains excises these areas (which are often critical dry season grazing) from the pastoral system, rendering a much larger area unviable (also King-Okumu, 2015, p. 7).

The Drylands Learning and Capacity Building Initiative (DLCI, 2015) has identified a number of good practice principles on planning for water and irrigated crop agriculture in drylands. These are clustered in four broad areas:

1. *Feasibility assessments* that should look at water resources, legal and regulatory issues, environmental issues, social issues, and economic viability.
2. *Agronomic considerations* such as land capability, soil types, water requirements, soil infiltration/leaching rates, topography, local climate data, and the availability of extension support.
3. *Technology issues* including the appropriateness of proposed technologies in drylands.

4. *Implementation and monitoring*, covering management, operation and maintenance, and mechanisms for accountability and transparency.

However, despite noting the untapped potential of rain-fed agriculture, Walker et al (2016) close their paper on a cautionary note, in that while it is possible to improve the productivity and stability of dryland agriculture with positive results, farming on small landholdings may not generate sufficient income to bring people out of poverty. This is echoed by Shepherd and Scott (2018) in their paper on sustaining poverty escapes. While the sustainable intensification of production remains an important priority, smallholder farming is now a less effective route out of poverty given reduced landholdings, the higher cost of inputs compared with outputs, climate variability, and asset theft. Their recommendations cover a number of areas, including:

1. *Access to land, agriculture and food security*: such as improving the functioning of land rental markets, protecting women's rights to land, and tackling asset theft.
2. *Supporting migration and the rural non-farm economy*: maximising the benefits of remittances, improving the markets for goods, services and labour in small and medium towns to support job creation, and developing the rural non-farm economy.
3. *Improving the transition between education and the labour market*: further reductions in the cost of education, strengthening vocational and business skills training, and adult education.

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