The impact of drought and the outlook for Amboseli and eastern Kajiado

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Introduction

Amboseli Conservation Program (ACP) has monitored the rangelands, livestock, wildlife and human activity in eastern Kajiado since the 1960s. Our aerial counts in early 2022 signaled hard times ahead when 140,000 cattle migrated into the Amboseli area from as far as Narok and northern Tanzania. The influx doubled cattle numbers in the eastern Kajiado to 283,00 and within weeks stripped down the flush of grass produced by unseasonal rains in January and February. Our pasture monitoring predicted drought conditions later in the year in the event of poor long rains in April and May.

In mid-May we issued an extreme drought alert. The alert prompted the Amboseli Ecosystem Trust (AET) and the incoming Kajiado County government to convene emergency meetings to take stock of the drought and ways to lessen the impact.

In early October, ACP issued a further report comparing the current conditions to the 2009 drought when over half the livestock and wildlife died of starvation. In late October, ACP posted another update and projected outlook until the short rains. The report was presented to AET and the Southern Rangelands Coalition (SRC) meetings held in Amboseli at the end of October. Both meetings called for an updated report on the outlook once the outcome of the short rains in November became clear.

In this report we summarize the impact of the drought so far, and the outlook now that the short rains appear to have stalled. We use graphs of range conditions over the last five decades to highlight and explain the declining pasture conditions and impact on wildlife, livestock and the pastoral economy. We also look at the changing perceptions and responses to drought by livestock herders.

The impact of drought on the rangelands

We assess the health of the rangelands and pasture conditions by looking at the results of permanent vegetation plots that David Maitumo has monitored across Amboseli region since the 1970s. We cite references at the end of the report which outline the methods and findings in more detail.

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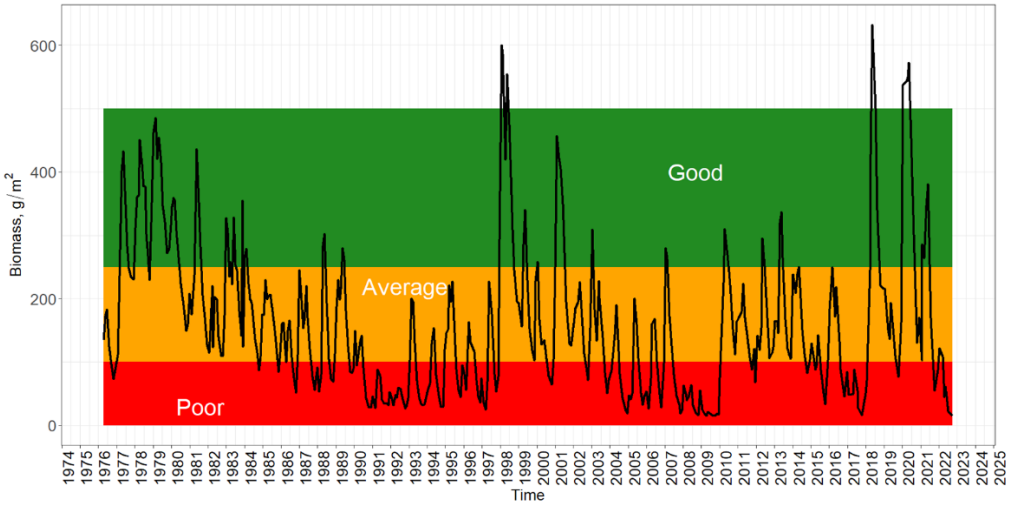

Figure 1: Monthly pasture abundance in the Amboseli region measured since the 1970s shows rangeland health to be declining, and poor years (red bar) becoming more frequent. In the 1970s pasture conditions recovered quickly after a prolonged drought and declined slowly in following years. The poor pasture years of the 1990s, which coincided with more permanent settlement, were relieved by the El Niño rains of 1998. Pasture conditions declined in the following years until the extreme drought of 2009 when over half the livestock and wildlife died. Heavy rains in 2018 and 2020 produced abundant forage but heavy grazing and a large influx of livestock led to severe pasture shortages within weeks.

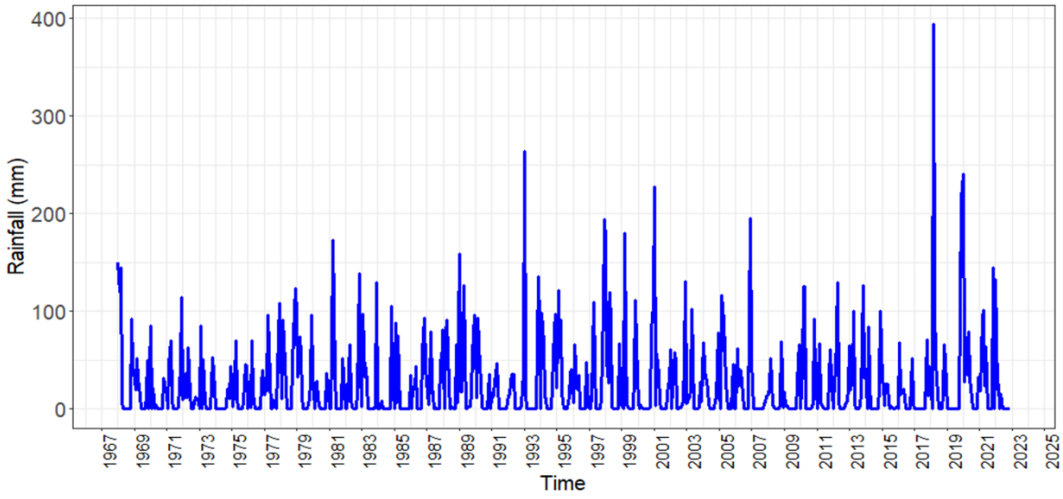

Figure 2: Rainfall in Amboseli shows no significant decline since the 1960s. The rains of 2018 and 2020 were the highest and third highest recorded and produced abundant forage into early 2022 (Figure 1).

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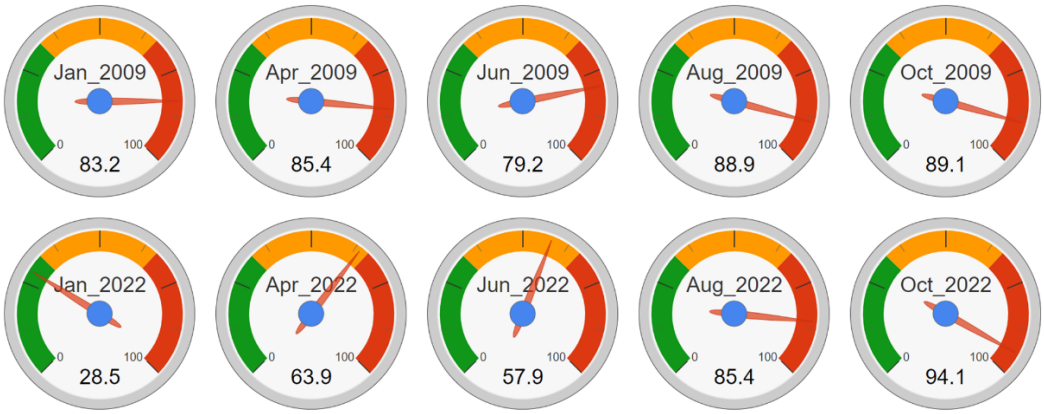

Figure 3: The 2009 drought was the worst recoded in over 50 years. Over half the livestock and wildlife died of starvation. 2022 began with fair pasture conditions and a low grazing pressure (green), a measure of the stocking rate. The influx of 140,000 cattle from across the southern rangelands depleted pasture and created an acute shortage of grazing (red). The weak long rains temporarily relieved the grazing pressure in May. However, by June conditions had worsened to the point of approaching the severity of 2009.

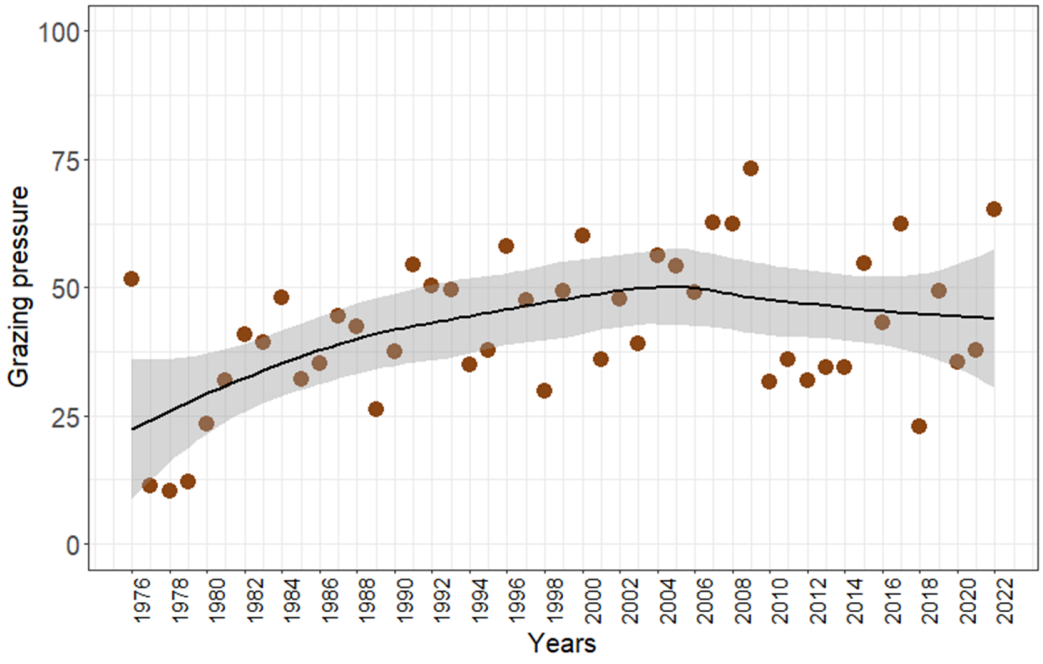

Figure 4: Grazing pressure has doubled since the 1970s due to shrinking open rangelands and the growth of permanent settlements in eastern Kajiado. The amount of forage per unit of rainfall has declined a third as a result, causing more frequent and intense forage shortages (Figure 1).

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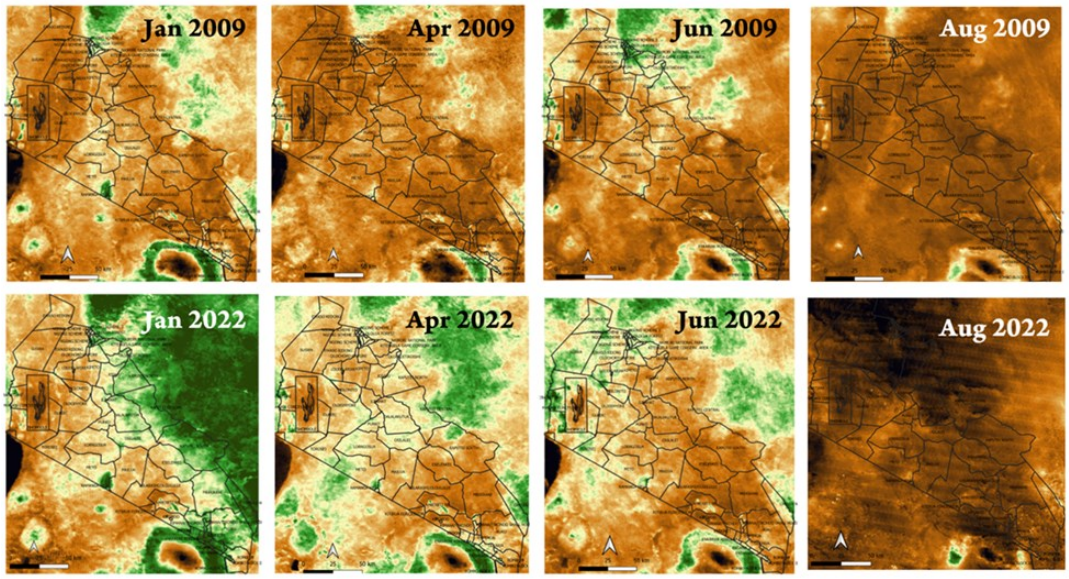

Figure 5: Enhanced Vegetation Index (EVI) satellite images of the southern Kenya and northern Tanzania borderland show the rapid progress of the 2022 drought from fair pasture conditions (green) in January to far worse conditions (brown) than 2009 by August.

The impact of drought on wildlife

Despite the severity of the current drought, wildlife losses are far lower than 2009 when over 60 percent of zebras, 95 percent of wildebeest and a quarter of the elephant population died.

Species	2009 Drought		2022 Drought	
Zebra	Amboseli Ecosystem numbers at the start of the drought **(Dec 2008 aerial survey)**	22,449	Amboseli Ecosystem numbers at the start of the drought **(February 2022 aerial survey)**	20,466
	Amboseli Ecosystem numbers at the end of the drought **(Feb 2010 aerial survey)**	3,056	Amboseli Ecosystem numbers at the end of the drought **(Projected)**	17,397
	Percentage decrease ↓	(85%)	Percentage decrease **(Projected)** ↓	(15%)
Wildebeest	Amboseli Ecosystem numbers at the start of the drought **(Dec 2008 aerial survey)**	10,772	Amboseli Ecosystem numbers at the start of the drought **(February 2022 aerial survey)**	8,700
	Amboseli Ecosystem numbers at the end of the drought **(Feb 2010 aerial survey)**	683	Amboseli Ecosystem numbers at the end of the drought **(Projected)**	7,047
	Percentage decrease ↓	(94%)	Percentage decrease **(Projected)** ↓	(19%)

Table 1: The numbers of zebra and wildebeest at the onset of the 2022 drought is close to the numbers at the onset of the 2009 but the mortality ACP has recorded in Amboseli is far lower. An estimated 15 percent of zebra have died in the 2022 drought compared to 86 percent in 2009, and 19 percent of wildebeest in 2022 compared to 94 percent in 2009. The difference is largely due to the expansion of the swamps. The 2022 mortality figures for most other species in Amboseli are less than 5 percent.

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Figure 6: Wildebeest and zebra carcasses have piled up in Amboseli since August but the death rate is far lower than in 2009. The populations surviving through to the first rains in late October are also far larger than in 2009, promising a fare more rapid recovery.

Figure 7: The swamps which act as the pasture of last resort in droughts have been heavily grazed down by elephants over the years. In 2009 large numbers of animals died as the swamps shrank. In the 1970s the sedge was tall enough to hide elephants. This picture shows the grazed down swamps in October 2022.

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Figure 8: Despite the depleted swamp grazing, the expansion of the swamps due to floods and subterranean flow from Kilimanjaro has created a large lake and opened up new swamp grazing which has sustained far larger wildlife populations than in 2009.

Figure 9: Wildebeest, zebra and buffalo have been able to graze deep into the swamps opened up by elephants grazing down the tall sedge and creating grazing lawns.

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The impact of drought on livestock and herders

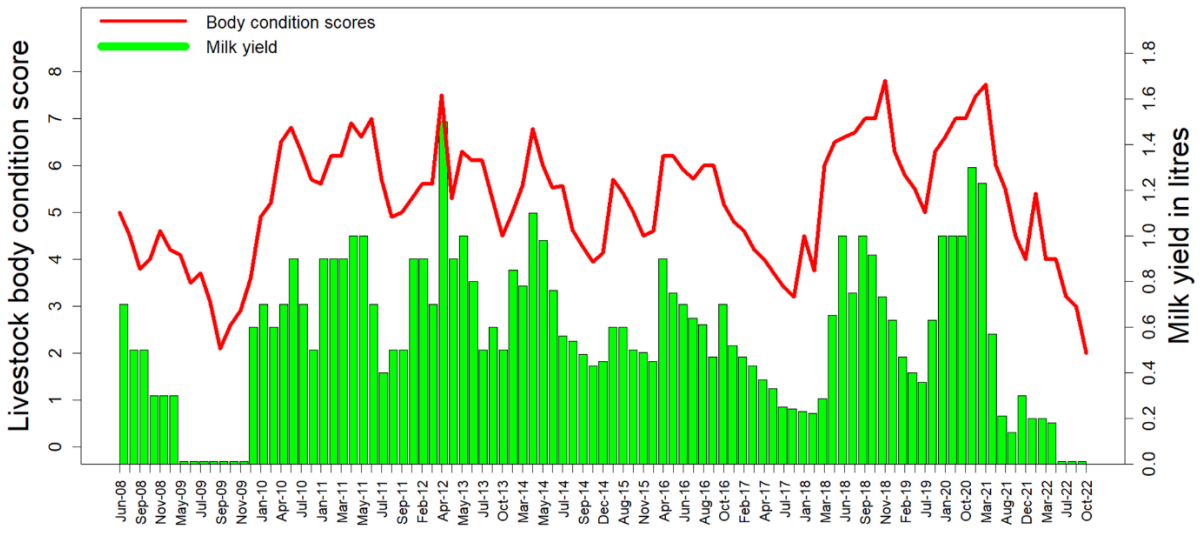

Figure 10: The impact of the 2022 drought on cattle condition and milk yields is as severe as the 2009 drought which saw 70 percent of the population succumb.

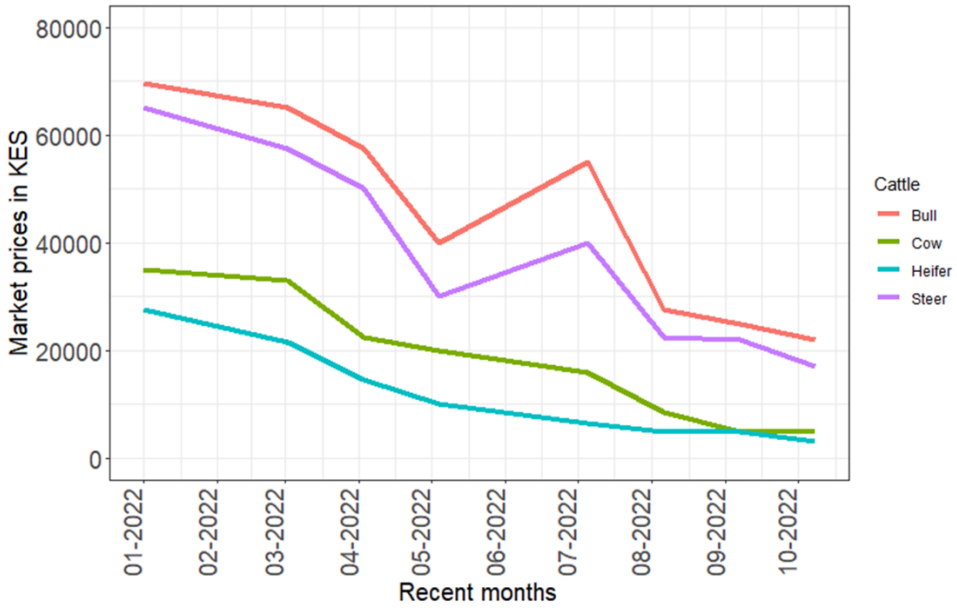

Figure 11: Livestock prices have plummeted since the beginning of the drought due to the glut of animals up for sale and their emaciated condition.

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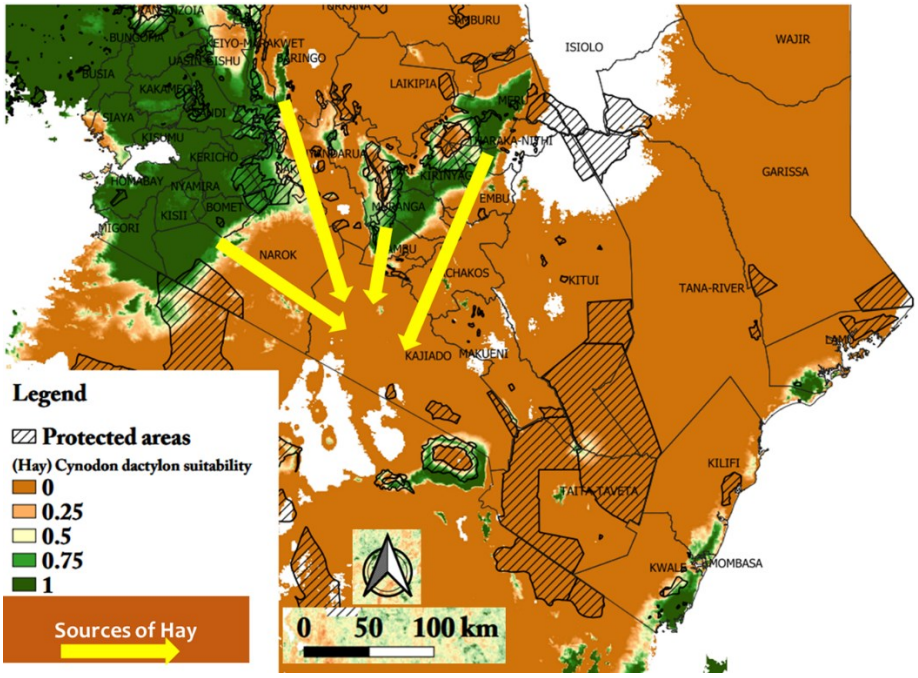

Figure 12: In a departure from the heavy livestock losses in the 2009 drought, herders have kept animals alive by feeding them hay, maize stalks and maize meal. Provisional estimates put the cattle losses at a quarter or so, mostly calves born during the drought. Herders have been buying hay from the upland farms at a steeply rising cost. A growing shortage of hay and a rising demand has increased prices by over a third per bale.

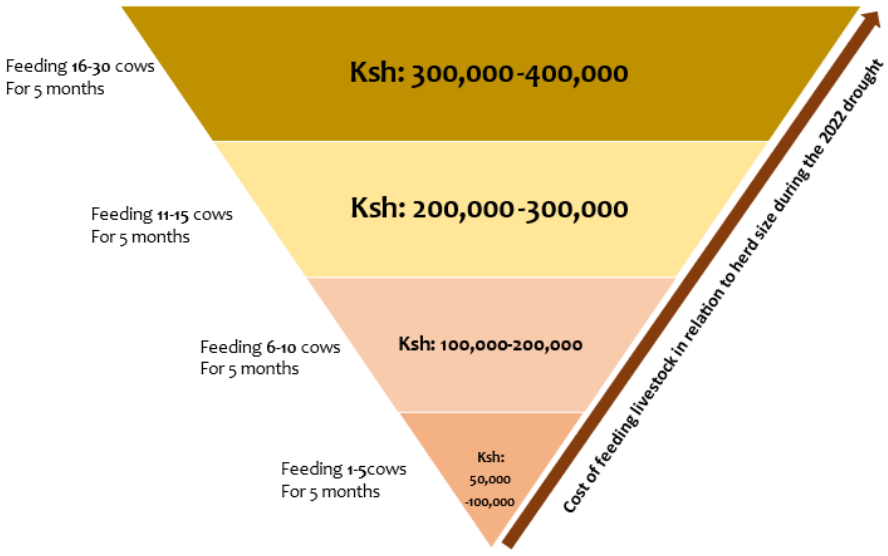

Figure 13: The cost of supplementary feeding to keep cattle alive during the past five months of drought has been costly and will be unsustainable in the event the drought continues to the long rains in March or April. Food prices and hay shortages are likely to inflate the cost of supplementary feeding.

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Perceptions of the cause of drought and the changing responses

Sakimber Kamiti who is doing his PhD research on erematere--the linkage between family, livestock, rangeland and social wellbeing--has conducted extensive drought surveys as a research associate of ACP. Sakimba has worked with the resource assessors Samson Leikanaya, Paul Kasaine and Sunte Kimiti to collect the questionnaire data from herders across eastern Kajiado. The follow section is a brief summary of their findings which will be expanded into a fuller report once the returns are in.

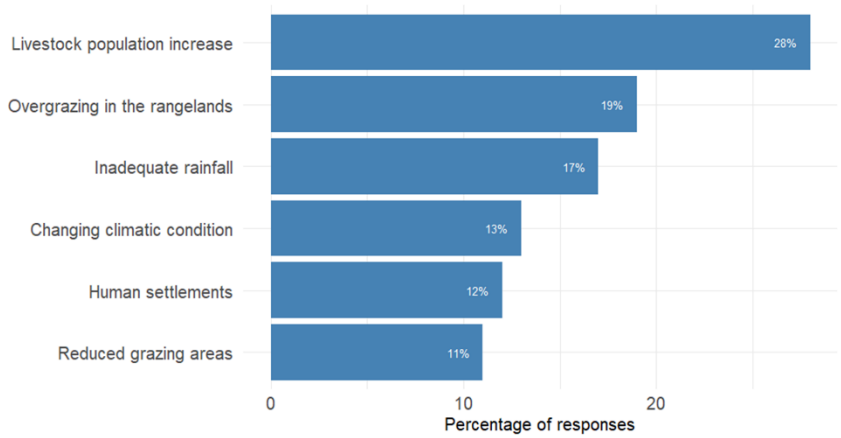

Figure 14: Perceptions of drought have changed since the 1970s when most herders saw lack of rainfall as the cause. Livestock increases, shrinking rangelands, overgrazing and settlement are now seen as the main causes, accounting for 70% of the explanation. Lack of rainfall and climate change account for 17 and 13 percent. Herders now see scope for mitigating the severity using a mix of management strategies.

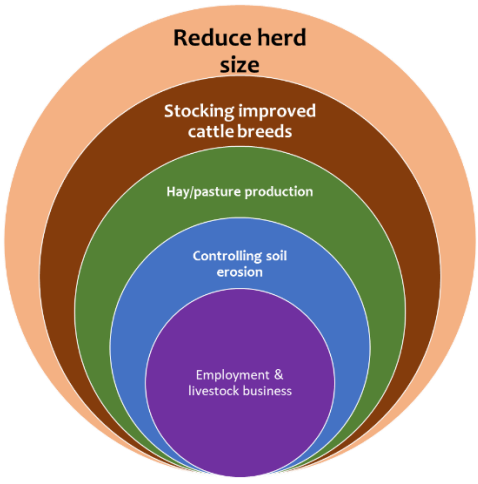

Figure 15: Herders see reduced herds, improved breeds, supplementary feeding, controlling pasture degradation, employment and livestock enterprises as the way to combat future droughts and increase family income and security.

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Figure 16: Despite rapidly advancing land subdivision and the breakdown of group ranches, herders see knowledge sharing, migration and financial resources as a way to reduce drought losses and build resilience. One herder has spent over a million shillings over the past five months to feed his cattle and avoid herd losses. Most herders have spent heavily on animal feeds. Feed supplements have kept cattle mortality in the 2022 drought low but the expenditures have severely cut the economic return on large herds and are unlikely to prove sustainable if the drought continues into 2023 and food prices rise steeply.

Figure 17: A number of herders with access to irrigation have planted fast-growing fodder grasses to feed their livestock. David Maitumo is pioneering grass banks in the Amboseli area as a way of counter pasture shortfalls and combat drought.

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The outlook until the long rains

The lower wildlife and livestock losses in the 2022 than the 2009 drought are due to the expanded swamp grazing in Amboseli and supplementary feeding of livestock. Hopes have run high that the short rains will break the drought and see pasture and herd recovery. Good short rains now seem most unlikely though. The forecasts by Kenya Meteorological Department project poor and scattered rains. Without a large flush of green pastures, livestock and wildlife will be unable to recover body condition before the January to March/April dry season.

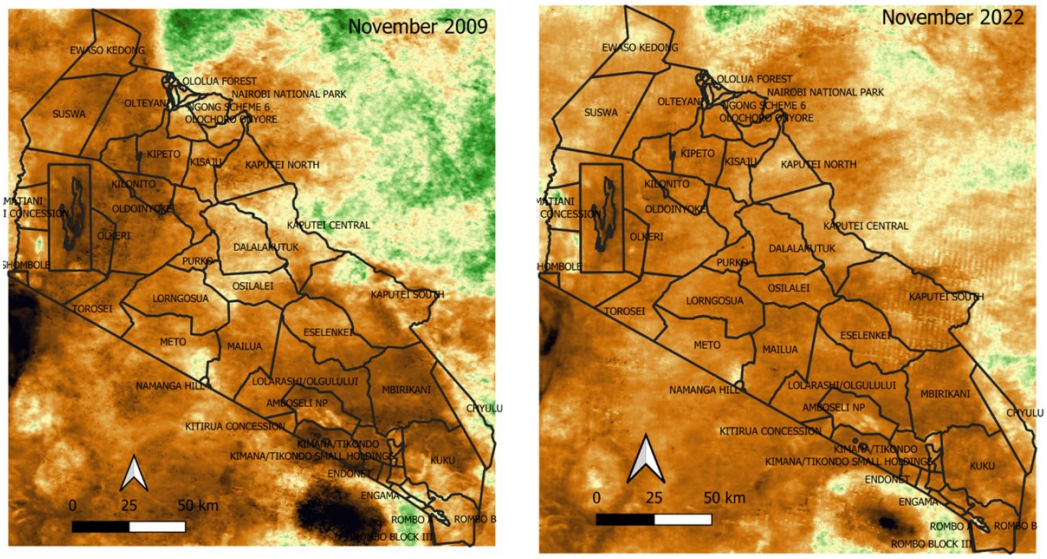

Figure 18: Greening pastures in November 2022 are far sparser than in the short rains of 2009, and the grazing pressure remains far higher because of the far larger surviving livestock and wildlife populations. The failure of the short rains in November and December will see the drought worsen until at least the start of the long rains in late March or April.

Conclusions and a call to action

The impact of the 2022 drought on wildlife, livestock and herders has been far greater than any drought in the last fifty years other than 2009. The severity of the drought is due in large part to heavy continuous grazing over the last decade, a shrinking open range for wildlife and pastoralists, permanent settlement and pasture degradation, exacerbated by poor long rains. Wildlife numbers in the Amboseli basin in early 2022 were far higher than at the start of the 2009 drought, and the surviving animals several-fold greater due to a 40 percent expansion of late season swamp grazing.

The impact of the current drought on livestock and herders has been far lower than in 2009 due to new adaptive responses, including extensive migrations and supplementary feeding. The responses point to ways of managing herds in the face of severe pasture shortfalls. Herders see collaboration as the best way to share knowledge, track rangeland conditions and learn from best practices. These are the

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services ACP has provided over the years and, in conjunction with landowner associations such as AET and SRC, is expanding across pastoral rangelands.

The changing perceptions of drought and husbandry practices couple with tracking rangeland conditions and learning exchanges need to be fast-tracked and scaled up with the support of county and national agencies and NGOs to spare the livestock and wildlife industry from the present discouraging outlook for the open rangelands. Pastures will shrink with projected range loss and degrade with continued heavy grazing. This will cause more large-scale livestock migrations in search of pasture, more competition for forage, greater economic losses, and more competition with wildlife.

Declining rangeland health coupled with accelerating land subdivision and settlement is causing unsustainable economic supplementation to save starving animals. The losses call for collective action at a national, county and landowner association level. This should build on the responses many herders are using in the way of grass banking, supplementary feeding, pasture restoration, managing herds closer to home, improving livestock breeds, selling earlier when prices are high and improving market access. As in the rangelands of the U.S. and Australia, county and government livestock purchase schemes are needed to avoid a collapse of livestock herds during severe drought. The collapse incurs huge knock-on economic losses to families and the national economy, severe rangelands degradation, erosion, and flooding and, in turn, a loss of carbon sinks and ecosystem services. The degradation is also causing large losses of wildlife and biodiversity and will diminish the value of the tourism industry nationally and for communities setting up wildlife conservancies.

Selected references on ACP methods and findings

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