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Overcoming Namibia's worst drought in the last 40 years: Ethnographic insights from Okakarara constituency

Diego A. Menestrey Schwieger*

Abstract

In 2019, Namibia experienced one of the worst droughts in recent decades, significantly affecting its agricultural economy, especially the livestock production sector. In this context, there is limited literature about how pastoral farmers in the country's communal agricultural areas navigated this severe dryness. This paper addresses this knowledge gap by introducing a case study involving Ovaherero pastoralists in the Okakarara constituency. Following a mixed-method approach, it describes the practices implemented by local households to keep their cattle herds alive, the challenges they experienced thereby, and the strategies used for recovering their livestock losses. The study reveals that essential drought-coping practices, such as livestock mobility along with various long-term risk reduction mechanisms, such as reservation of emergency pastures, and social institutions of exchange, are limited in the communities described in this research. The paper discusses the main reasons for these conditions and their implications for local farmers, considering that more frequent droughts of similar severity are projected for the coming years in the region.

Introduction

Severe periods of drought have been a multi-century phenomenon across Africa, including Namibia.¹ The country is regarded as one of the driest in the sub-Saharan part of the continent and is particularly prone to these meteorological events.² In 2019, Namibia experienced one of the toughest droughts in the last four decades,³ with cumulative

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¹ Sharon E. Nicholson, "A Multi-Century History of Drought and Wetter Conditions in Africa," in *The Palgrave Handbook of Climate History*, ed. Sam White, Christian Pfister, and Franz Mauelshagen (London: Palgrave Macmillan UK, 2018).

² Fenny N. Ndapewa, Rosemary Shikangalah, and Absai Vatuva, "Drought as a Disaster in the Namibian Context," *International Journal of Science and Research* 1, no. 3 (2020).

³ SASSCAL (Southern African Science Service Centre for Climate Change and Adaptive Land Management) Fact Sheet 2018/2019 Drought in Southern Africa, <https://www.sasscal.org/fact-sheets/2020> [last accessed 17 October, 2022].

precipitation of 100 mm for the entire country.⁴ The drought affected Namibia's agricultural economy immensely, particularly the livestock production sector where output declined to 18%,⁵ and eventually, ca. 100.000 farm animals (cattle, goats, sheep, donkeys, and horses) died country-wide – a number corresponding to 50% of Namibia's livestock.⁶ In May 2019, the Namibian government declared the drought a national disaster and introduced a state of emergency that lasted until March 2020, that is, shortly after heavy rains had eventually arrived.⁷ Subsequently, forage provision slowly began to improve in most cattle production districts.⁸

In this context, conservative estimates stated that at least 30.000 head of cattle alone perished between October 2018 and March 2019 in the communal farming areas of the country,⁹ where subsistence livestock farming constitutes the main livelihood strategy of thousands of people.¹⁰ Despite that, no attempts have been made to assess how the farmers living in these territories navigated this extreme climatic event of dryness. There is no information regarding their practices for limiting livestock losses, or their efforts to secure their livelihoods, or the challenges they experienced.

Considering that these kinds of droughts are expected to reoccur in the broader region at similar or increased severity,¹¹ it is essential to investigate how people in these commonages are managing these exceptional conditions. Recent accounts show that pastoral groups in these parts of Namibia are becoming more vulnerable to drought and

⁴ Xuan Liu and Jie Zhou, "Assessment of the Continuous Extreme Drought Events in Namibia During the Last Decade," *Water* 13, no. 20 (2021). Some regions reported having experienced the worst drought in 90 years, as published in the national news: "Khomas faces worst drought in 90 years", *The Namibian* 23 May 2019. <https://www.namibian.com.na/188806/archive-read/Khomas-faces-worst-drought-in-90-years-THE> [last accessed 17 October 2022].

⁵ Rosemary Shikangalah, "The 2019 Drought in Namibia: An Overview," *Journal of Namibian Studies* 27 (2020).

⁶ "Drought continues livestock carnage", *The Namibian*, 8 January 2020. <https://www.namibian.com.na/196742/archive-read/Drought-continues-livestock-carnage-THE> [last accessed 17 October 2022]

⁷ "State of drought emergency extended", *The Namibian*, 3 October 2019. <https://www.namibian.com.na/193796/archive-read/State-of-drought-emergency-extended-THE-state-of> [last accessed 17 October 2022].

⁸ Liu and Zhou, "Assessment of the Continuous Extreme Drought Events in Namibia During the Last Decade."; "Namibia anticipates a difficult post-drought recovery", *The Namibian Farmer*, 5 June 2020. <https://namibianfarming.com/namibia-anticipates-a-difficult-post-drought-recovery/> [last accessed 17 October 2022].

⁹ NEWFIU (Namibia Early Warning and Food Information Unit) *Crop Prospects, Food Security and Drought Situation Report, March 2019* (Windhoek: Directorate of Planning and Business Development, Ministry of Agriculture, Water and Forestry, 2019).

¹⁰ John Mendelsohn et al., *Farming Systems in Namibia* (Windhoek: RAISON, 2006).

¹¹ ASSAR, *Global Warming of 1.5°C and Higher Brings Profound Challenges to Semi-Arid Regions: An Assar Cross-Regional Insight* (Cape Town: University of Cape Town, 2019).

having serious difficulties in adapting to climate change.¹² Therefore, a deep investigation of their drought-coping capabilities and the factors limiting them is crucial.

On this premise, peoples' drought experiences in the eastern communal areas of the country have received little attention despite the region's socio-economic and cultural significance of livestock farming there.¹³ Previous studies have focused on OvaHimba pastoralists' risk reduction strategies in Kunene,¹⁴ the impact of the 1992/3 drought on rural communities in Erongo and Zambezi,¹⁵ and the farmers' vulnerability to drought in the southern communal areas (Namaland, Bondelswarts and Warmbad).¹⁶ Hence, there is a need to undertake up-to-date pastoralism research on drought in Namibia regarding the last severe dryness and its socio-geographical impacts.

To address this gap, this paper presents a case study involving OvaHerero pastoral farmers in the Okakarara constituency in the context of the 2019 drought. The study draws on data gathered during and after this extraordinary rainless period using sampling and combined interview procedures conducted across three settlements. The analyses focus on the farmers' practices and efforts to keep their cattle alive, their animal casualties, the reasons why some lost either exceptionally high or exceptionally low cattle numbers, their strategies to rebuild their herds, and preparations for the next similar drought. The presentation of the data adopts a descriptive approach combining statistics and ethnography. On this basis, the article's overall aim is two-fold: i) contribute to a better understanding of the needs and realities of these historically marginalized communities in the context of these extreme droughts;¹⁷ and ii) generate knowledge to

¹² Emilia N. Inman, Richard J. Hobbs, and Zivanai Tsvuura, "No Safety Net in the Face of Climate Change: The Case of Pastoralists in Kunene Region, Namibia," *PLoS ONE* 15, no. 9 (2020); Ashley Hazel et al., "Opportunities and Constraints in Women's Resource Security Amid Climate Change: A Case Study of Arid-Living Namibian Agro-Pastoralists," *American Journal of Human Biology* 33, no. 4 (2021).

¹³ cf. Ute Stahl, "'At the End of the Day We Will Fight': Communal Land Rights and 'Illegal Fencing' in the Otjozondjupa Region," in *People, Cattle and Land: Transformations of a Pastoral Society in Southwestern Africa*, ed. Michael Bollig and Jan-Bart Gewald (Köln Rüdiger Köppe Verlag, 2009); Stijn Verschueren et al., "Assessing Human Conflicts with Carnivores in Namibia's Eastern Communal Conservancies," *Human Dimensions of Wildlife* 25, no. 5 (2020); Diego A. Menestrey Schwieger and Meed Mbidzo, "Socio-Historical and Structural Factors Linked to Land Degradation and Desertification in Namibia's Former Herero 'Homelands'," *Journal of Arid Environments* 178 (2020); Gabriel N. Hangara, Mogos Y. Teweldemedhin, and Izak B. Groenewald, "Major Constraints for Cattle Productivity and Managerial Efficiency in Communal Areas of Omaheke Region, Namibia," *International Journal of Agricultural Sustainability* 9, no. 4 (2011).

¹⁴ Michael Bollig, "Risk and Risk Minimisation among Himba Pastoralists in Northwestern Namibia," *Nomadic Peoples* 1, no. 1 (1997).

¹⁵ Stephen Devereux and Trine Næraa, "Drought and Survival in Rural Namibia," *Journal of Southern African Studies* 22, no. 3 (1996).

¹⁶ Katuscia Fara, "How Natural Are 'Natural Disasters'? Vulnerability to Drought of Communal Farmers in Southern Namibia," *Risk Management* 3, no. 3 (2001).

¹⁷ Omu Kakujaha-Matundu, *Common Pool Resource Management: The Case of the Eastern Communal Rangelands in Semi-Arid Namibia* (Maastricht: Shaker Pub., 2003); Wolfgang Werner, *No One Will Become Rich: Economy and Society in the Herero Reserves in Namibia, 1915–1946* (Basel, Switzerland: P. Schlettwein, 1998).

guide effective support measures and inform ongoing climate change adaptation plans for the areas that such communities live and farm in.¹⁸

With this said, the rest of the paper will be structured as follows: a more detailed description of the study area, fieldwork, and data collection procedures is provided. Followed by a brief description of the basic attributes of the sample in this study. The next section is an elaboration on the article's main analytical foci and viewpoints as outlined above. The last section discusses the implications of case study's findings for future droughts and concludes with final summarizing remarks.

Characteristics of the Okakarara constituency

During the South African colonial period and its Apartheid policies, the study area was part of the so-called 'Herero homeland' – a territory established to re-settle and socio-economically control the OvaHerero population.¹⁹ After independence (1990), the homeland was abolished and declared part of the eastern communal areas of the country. These are now composed of four administrative units: The Okakarara, Otjinene, Otjombinde, and Tsumke constituencies. Considering these four, Okakarara is currently the second poorest (after Tsumkwe), it has the largest population (ca. 23.000 inhabitants), and it is the most densely populated (1.6 persons per square kilometer).²⁰ Livestock farming – especially cattle, goats, and sheep – is the region's most important economic activity and source of income. The climate in this sandy savannah landscape is semi-arid, with an erratic annual rainfall of 325–350 mm, most of which falls between January and April.²¹

Excepting the same-name town of Okakara and the ca. 60 small-scale farming units in Okamatapati,²² most people in the constituency live in communities of fifteen to sixty homesteads located around communal boreholes.²³ Each community considers a certain

¹⁸ E.g., Republic of Namibia, *National Policy on Climate Change* (Windhoek: Ministry of Environment and Tourism, 2011); *National Climate Change Strategy & Action Plan 2013-2020* (Windhoek: Ministry of Environment & Tourism, 2013).

¹⁹ Kakujaha-Matundu, *Common Pool Resource Management: The Case of the Eastern Communal Rangelands in Semi-Arid Namibia*.

²⁰ Republic of Namibia, *2011 Population and Housing Census* (Windhoek: Central Bureau of Statistics, 2014); Namibia Poverty Mapping (Windhoek: Macroeconomic Planning Department, 2015).

²¹ John Mendelsohn and Selma el Obeid, *The Communal Lands in Eastern Namibia* (Windhoek: RAISON, 2002).

²² These farm units consist of 7 km × 7 km fenced-off pieces of land inhabited by ca. 60 households each. They were introduced during the South African colonial administration from the 1960s onwards in the half-hearted attempt to 'develop' the subsistence-oriented economy in the region Kakujaha-Matundu, Common Pool Resource Management: The Case of the Eastern Communal Rangelands in Semi-Arid Namibia.

²³ Ibid.

low grazing value dominate the grass layer.²⁸ In this context, colonial policies of territorial encapsulation, poor infrastructural development, uncontrolled fencing, and local power relations have together contributed to current land degradation conditions.²⁹

Fieldwork and methods

Data for this study was collected within the framework of an ethnographic research in the region, focusing on three adjacent settlements: Ovitatu, Ombooronde, and Ozongaragombe (39, 36, and 62 households each). All of these are located in the southern part of the constituency next to the border to the freehold areas (see Fig. 1.). At the beginning of fieldwork in October 2019, the drought was at its peak after two virtually rainless years. Most people on-site had not experienced such a severe drought. It caught many by surprise, and no one thought it would be that harsh. Only the elderly residents assured that the dryness was comparable to that of 1981, which had a disastrous impact country-wide back then.³⁰ The veld was described as thoroughly 'clean' (no grasses, no browse) and/or entirely depleted (otj. *okuti kwakururuka*). Nearly all the cattle that was seen walking around had reached a skeletal body outline. Every informal conversation with local residents revolved around how many animals were dying and the challenging economic situation that people in the area were facing.

In this context, a mixed-method approach³¹ was implemented to better understand how people were navigating this severe drought in the three selected communities. It consisted of interviews, including blocks of closed and open-ended questions, conducted at the *onganda* level. A typical *onganda* (pl. *ozonganda*, usually translated as 'homestead' or 'household') comprises a kraal (otj. *otjunda*) and several huts in a fenced courtyard. Behind these structures, many *ozonganda* have a camp (otj. *okamba*, pl. *ozokamba*), that is, a fenced-off piece of land of 50-70 hectares to keep the household's bull and/or old, sick, weak, and pregnant cattle more easily under guard.³²

²⁸ Ben J. Strohbach, "Vegetation of the Eastern Communal Conservancies in Namibia: I. Phytosociological Descriptions," *Koedoe* 56, no. 1 (2014).

²⁹ Menestrey Schwieger and Mbidzo, "Socio-Historical and Structural Factors Linked to Land Degradation and Desertification in Namibia's Former Herero 'Homelands'." (2020).

³⁰ cf. Michael Bollig, *Risk Management in a Hazardous Environment. A Comparative Study of Two Pastoral Societies* (New York: Springer, 2006); Keith Leggett, Julian Fennessy, and Stephanie Schneider, "Does Land Use Matter in an Arid Environment? A Case Study from the Hoanib River Catchment, North-Western Namibia," *Journal of Arid Environments* 53, no. 4 (2003); Wolfe W. Schmokel, "The Myth of the White Farmer: Commercial Agriculture in Namibia, 1900-1983," *The International Journal of African Historical Studies* 18, no. 1 (1985).

³¹ cf. John W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Thousand Oaks: Sage, 2003); H. Russel Bernard, *Research Methods in Anthropology: Qualitative and Quantitative Approaches* (Lanham: Rowman & Littlefield, 2017).

³² cf. Stahl, "'At the End of the Day We Will Fight': Communal Land Rights and 'Illegal Fencing' in the Otjozondjupa Region.," Kakujaha-Matundu, *Common Pool Resource Management: The Case of the Eastern Communal Rangelands in Semi-Arid Namibia*.

Fig.2: Decimated cow close to a homestead in Ozongarangombe, 31st October 2019



Using closed-ended questions, basic information was recorded regarding household composition, sources of cash income, and day-to-day farming activities, drawing on the ethnographic census method.³³ With open-ended questions, more explicit drought-related data was gathered. Subjects of inquiry included: i) farming practices to keep animals alive (mainly cattle, due to their high economic value and susceptibility to drought); ii) total livestock losses suffered; iii) impacts of these losses on the household's economy; iv) tactics to cope with money shortages; v) strategies to recover herd numbers, and vi) plans to cope with any future dryness of comparable intensity. Respondents were the heads of the respective households and/or other knowledgeable community members.

Due to logistic and time constraints, a complete survey of all three settlements was impossible. For this reason, a sample comprising almost half the total number of *ozonganda* was selected in each village: 16 in Ovitatu, 17 in Ombooronde, and 28 in Ozongarangombe (n=60). The sample was selected randomly using lists containing all homesteads in each settlement provided by each place's traditional councillor (otj. *orata*). The closed-ended questions block was conducted between November 2019 and February 2020. The open-ended interviews took place from April 2020 onwards, that is, after the

³³ Julia Pauli, "Ethnographischer Zensus," in *Methoden Der Ethnologischer Feldforschung* ed. B. Beer (Berlin: Reimer, 2008).

first heavy rains, in order to capture people's experiences during the entire drought. In so doing, a local translator assisted in overcoming the Otjiherero language barrier, and only a few informants were proficient in English. Afterward, the gathered data was organized and analyzed using Microsoft Excel and qualitative data analysis software (MAXQDA) for thematic coding.

Basic socio-economic attributes of the sample

Household composition

Of the 60 homesteads assessed, 39 were headed by men and 21 by women. The mean age of all heads of household was 63 years old. Six people (five men, one woman) were 'weekend farmers', employing herders or tasking family members to take care of the animals while attending jobs elsewhere. The average number of persons habitually living in the homesteads was 4.61 per household (p/hh). This figure excluded three types of persons considered household members: i) school children staying in hostels (avg. 4.5 p/hh), ii) students pursuing further education in towns (vocational trainings, university degrees) (avg. 0.63 p/hh), and iii) unmarried adult children living and working in urban centers at the time of the assessment (avg. 3.6 p/hh). Most of the latter made a living as factory workers, housekeepers, truck drivers, teachers, government employees, and small business owners in Windhoek, Tsumeb, and Walvis Bay. They maintained close ties to the village through regular visits. Consequently, most people living in the homesteads *de-facto* were mainly in the age groups of 0-5 and 50-70, that is, children of pre-school age and elderly adults. These household demographics and 'translocal' networks to towns correspond to those of pastoral farmers in other parts of Namibia.³⁴

Livelihoods

78.33% of the households stated that the primary concern of livestock farming was to secure their livelihoods (otj. *okuhupa*, lit. 'to live/survive'). This implied: providing the household with food of animal origin (especially milk) and obtaining cash through sales for essential household expenses, such as buying foodstuffs, sending children to school, paying the water point contributions, and purchasing medicine and supplements for the animals. Other reasons for keeping livestock ranked in second and/or third place included: continuing the ancestors' way of life; producing and selling quality meat; celebrating funerals and weddings;³⁵ and/or because farming was regarded as an important means for the respondents to achieve full personhood and make them feel part of the community.

³⁴ cf. Clemens Greiner, "Patterns of Translocality: Migration, Livelihoods and Identities in Northwest Namibia," *Sociologus* 60, no. 2 (2010); "Migration, Translocal Networks and Socio-Economic Stratification in Namibia," *Africa* 81, no. 4 (2011).

³⁵ For the role and importance of slaughtering livestock in these occasions, see Selaelo T. Kgatla and Jinho Park, "Healing in Herero Culture and Namibian African Independent Churches: Original Research," *Theological Studies* 71, no. 3 (2015).

The remaining 21.67% of homesteads ranked at least one of the latter purposes for livestock farming as equally important to sustaining their livelihoods.

In this context, it is crucial to point out that selling animals was not the only way of obtaining cash among the assessed households, even though other sources of income in the area apart from livestock farming were/are quite limited. For instance, all households reported having at least one member, either earning a wage or a salary elsewhere and/or sending remittances, receiving a state grant (i.e., child and disability benefits, including old-age pensions) or being involved in small-scale income-generating activities on-site (e.g., baking and selling bread, cutting and selling poles, offering transport).

However, the percentual contribution of these supplementary sources to the total bulk of income at the household level was difficult to determine. For example, most households sell different numbers of animals depending on the nature and urgency of the need, and remittances are not sent in equal amounts every month. Still, it is safe to state that most livelihoods were, to some degree, diversified and that for some households, these sources constituted a larger part of their budget (in proportion to the revenues from livestock sales) than others.

Furthermore, 71.33% of the sampled homesteads indicated that they owned a rain garden, usually located inside the camps (otj. *ozokamba*). The garden sizes ranged between 0.5 and 0.9 hectares, with maize, beans, and pumpkins being the most planted crops intended exclusively for household consumption. In years of good rains, households could benefit from the harvest for two to four months, but no one was able to grow anything during the drought – except three households. These had smaller gardens (0.01 hectares) that could be irrigated through pipes connected to nearby wells sunk by individual farmers in their compounds. At the time of the fieldwork, two households owned this kind of water source in Ovitatu, with six more in Ombooronde, and four in Ozongaragombe – all these families were regarded as wealthy. The rest of the homesteads in all three places used the local communal water points to serve animal and human consumption. Irrigating the more extensive rain gardens with water from this borehole would be technically challenging and conflictive because the practice would deplete the water necessary for maintaining the villages' livestock.

Livestock numbers

Most households in the broader region typically own between 10 to 50 head of cattle and have average flocks of eight sheep and 25 goats.³⁶ Those holding 100 head of cattle are considered rich and constitute the minority in each settlement. Regarding the study's sample, each household's livestock numbers were assessed shortly after the drought (in April 2020), that is, after all homesteads had experienced varying amounts of livestock losses (see next sections below). Taking this into consideration then, each household had, at this point, on average, 25.55 head of cattle, 10.13 goats, 7.61 sheep, 2.71 donkeys, and 0.51 horses. The last two species are usually held in low numbers, as these

³⁶ Mendelsohn and Obeid, *The Communal Lands in Eastern Namibia*.

are not kept for commercial gain but for utilitarian work – pulling donkey carts, carrying water cans, and/or looking for lost cattle. Chickens are usually kept for their eggs and meat and to sell and obtain a little cash now and then. On average, each household had 6.7 of them.

In this context, differences in livestock ownership were significant: the minimum amount of cattle recorded among the sampled homesteads, for instance, was 2, while the maximum – even after the drought – was above 100. It is noteworthy to mention that 25% of the homesteads did not previously keep small stock (especially goats, which are more drought-resistant) but only cattle. They all gave up keeping small ruminants long ago because the animals were constantly lost, stolen, and/or killed by jackals and cheetahs. In fact, livestock theft in the constituency constitutes a serious problem,³⁷ and farmers complained that they rarely got compensation from the conservancy when predators attacked their animals.³⁸ Additionally, 38.33% farmed with cattle and goats and 11.66% with cattle and sheep. The remaining 23.33% kept all three kinds of these ruminants.

Herding practices

In all three settlements, the grazing organization was/is undertaken collectively, with each household driving its cattle to areas behind its own homestead to graze. Adult bovines used to find fodder closer to the settlements during good rainy periods. As these sources are consumed throughout the dry season, the animals move gradually into the orbits of the villages. In so doing, they must still walk back to the settlements' boreholes to access water, an activity that considerably increases their energy expenditure. This is a typical rangeland utilization pattern among many other communities in the region.³⁹ In this context, animals are rarely herded due to the lack of available caretakers.^{40,41} Small stock

³⁷ Stahl, "'At the End of the Day We Will Fight': Communal Land Rights and 'Illegal Fencing' in the Otjozondjupa Region."

³⁸ For the dimensions of these human-wildlife conflicts in the region, see Verschuere et al., "Assessing Human Conflicts with Carnivores in Namibia's Eastern Communal Conservancies."

³⁹ Kakujaha-Matundu, *Common Pool Resource Management: The Case of the Eastern Communal Rangelands in Semi-Arid Namibia*.

⁴⁰ Stahl, "'At the End of the Day We Will Fight': Communal Land Rights and 'Illegal Fencing' in the Otjozondjupa Region."

⁴¹ Therefore, animals are often conditioned to return to homesteads on their own. This conditioning usually implies a period (ca. three to four weeks) of intensive herding aimed at habituating the animals to getting hay and supplements in the homestead's kraal. Encouraging them to return is also achieved by separating cows from their calves, which are driven in the opposite direction. This practice also aids in obtaining more milk, as the young beasts have limited access to their mothers' udder.

grazes and browses closer to the homesteads, while young goats and sheep are kept at home.⁴²

Residents regard their settlements as 'full' (otj. *yeura*) and heavily grazed. For this reason, no new settlers have been allowed in these three places since the beginning of the 2000s. Only the heads of households' children are allowed to start farming in these areas. In case of deficient rains, the residents of Ombooronde and Ozongarangombe can take their animals to their nearest cattle posts, each located ca. 7 km away. The government constructed these cattle posts after the 1981 drought to enable people to access pastures in times of extended dryness.

The decision to 'open' (ojt. *okupaturuka*) the cattle posts is taken collectively amongst all heads of household in the village depending on the grazing conditions around the homesteads. External users are allowed access depending on the local grazing conditions. When rains arrive, residents remove the boreholes' water pumps to ensure that no livestock owner uses or stays in these reserved areas. In the case of Ovitatu, people depend on the surrounding communities for authorization to access grazing lands, as this place does not have its own cattle post. During the 2019 drought, however, no homestead in the studied settlements could take their cattle to these seasonal grazing areas because their pastures became depleted and did not recover after 2018. Other nearby emergency grazing areas were unavailable due to the region's dense settlement and intensive land use. Ozongarangombe and Ombooronde are currently two of the eight settlements in the Okakarara constituency which have a cattle post (see above).

Overcoming drought

Keeping livestock alive

Given these drought circumstances, farmers implemented (one or a combination of) the following three methods to keep their animals alive: purchasing hay and supplements in shops, collecting leaves and seeds in the veld, and/or moving a portion of the herds to distant places. Considering the three practices, the first option was the most common.

In average years, all interviewed households feed their cattle hay and season-specific supplements to maintain their bodyweight: these supplements help them assimilate nutrients from tree leaves when grazing is scarce, and compensate for the lack of phosphate in the area's sandy soils. This is also a common practice in other parts of the region.⁴³ In this context, the kind and amount of supplementary feed an individual household purchases will depend on the respective herd sizes, the seasonal state of the

⁴² Some households let their dogs bond with their goats and/or sheep from a young age, so they develop a guarding instinct towards them; this tactic helps to protect their small stock from thieves and predators in the veld.

⁴³ cf. Hangara, Teweldemedhin, and Groenewald, "Major Constraints for Cattle Productivity and Managerial Efficiency in Communal Areas of Omaheke Region, Namibia."

rangeland, the animals' conditions, and the availability of money. The closest place to buy these products is in Okakarara town (see Fig. 1).

During the 2019 drought, however, all households intensified these practices beyond the aim of keeping their animals in good shape. All of them reported having bought hay and supplements specifically to prevent their animals from starving. Except for a few cases, cash was a constant limiting factor for most households. Respondents emphasized that the money, and thus, the amount of purchased feed, was seldom adequate. In this vein, 67-year-old Antonious Mbaha stated, for instance: "we do not know how much [supplementary feed] we bought in the end, but we bought a lot! And despite this, we found dead animals constantly, behind our camp, at the water point, and on the road. They got food but died anyway [...] we had to wait for our pension to buy feed, but many died before we got this money".

Because of this, 17 households additionally resorted to collecting *otukarakaka* (*Acacia giraffae*'s seeds) as well as the leaves from *omusjasetu* (*Terminalia sericea*) and *omupanda* (*Lonchocarpus nelsii*) by hand to feed their livestock at home, as the animals were too weak to go far into the veld on their own. This is a recurrent practice when grazing and cash funds are insufficient.

Against this background, almost a third (=17) of all assessed households decided to take a portion of their cattle herds to distant places allegedly less affected by the lack of rain for three to six months. Thirteen homesteads took 5 to 50 animals to other settlements in the communal areas where relatives or friends were living, most of which were located east of Okondjatu village, at least 50 km away (see Fig 1.). Two other homesteads took 31 and 28 cattle each to resettlement farms located around Okondjatu and Otjinene, and two more (very wealthy households) took 32 and 80 animals, respectively, to a private farm in the adjacent freehold areas.

Those who moved their animals within the communal areas (including resettlement farms) were usually requested to give a monetary contribution for on-site water usage, for example, 5N\$ per animal per month, that is, the same amount that had to be paid for using the communal boreholes in their communities. In contrast, those who decided to take their animals to the freehold farms paid a monthly grazing and caretaking fee per animal of 100N\$. Those who could afford transport paid to take their animals out of the villages on a trailer; others managed to drive the cattle accompanied by horse. The rest of the households decided not to take their animals anywhere due either to lack of funds or because they did not have personal farming contacts in other areas, and/or because they were unable to find other places less affected by the lack of rain.

Livestock losses

Despite the practices to keep their livestock alive, all homesteads reported livestock losses. Considering all drought-related casualties recorded through the interviews, it can be concluded that each household lost, on average, 16.01 head of cattle, 2.87 goats, 8.77 sheep, 0.08 horses, and 0.06 donkeys. To estimate how much these numbers meant

in terms of percentual herd reductions, the 'rule of three' was applied using these amounts and the numbers of livestock alive recorded shortly after the drought. The sum of these constituted the approximate number of each household's animals at the advent of the dryness, that is, the totals based on which percentual losses were calculated. Taking this into account, these amounts equate to reductions of ca. 39% in cattle, 6.5% in goats, 21% in sheep, 23% in horses, and 4.1% in donkeys, respectively (without considering drought-related animal sales to buy supplements). Since these assessments did not exclude cases of newborn calves during the first months of the rainy season in 2020, the totals could have been *de facto* lower and the percentage of losses correspondingly higher.

In contrast to ordinary conditions, cattle losses, in particular, were remarkably high. For instance, most households reported that they do not usually lose any of these animals – except for one or two very old ones – during the yearly rainless periods (May-October). And yet, during the 2019 drought, the total amount of bovines lost by all assessed households equated to the total amount of cattle alive recorded for all homesteads in Ombooronde in an average year (=961 animals).⁴⁴

In this context, however, it is essential to emphasise that no household reported having lost all its cattle due to the drought. This is remarkable considering the severity of the dryness. When asked which farming practices helped the most to keep these animals alive, all research participants/ interviewees (including those that took a portion of their herds to other places) responded that buying hay and supplements was crucial. For most households, however, keeping their livestock alive implied tightening their belts and relying on sources of income beyond farming.

Coping with scarcity

The most significant implication of losing livestock was that much of the income generated through selling animals was drastically reduced. 47-year-old Vehonga Kahuure from Ozongarangombe, for instance, was explicit in this regard: "At some point, I did not have any more steers to sell [...], and it was difficult to get money due to the low prices. Normally, you would sell one or two animals to get the money you need, but during the drought, you had to sell up to five [due to their state of decimation] to get the same amount. It was tough because animals were dying, and at the same time, it was necessary to sell more of them."

Like Vehonga, other respondents confirmed that they even stopped selling bovines at some point because the money they received was only just enough to cover the transport costs and the kraal space at the auction in Okakarara town before marketing them. Nevertheless, they continued to have to meet running expenses and maintain the effort of keeping the rest of their herds alive.

⁴⁴ Data from the local water-point committee records.

Going hungry

These circumstances were the rule across the assessed households, yet another substantial effect was linked to the drought and the livestock losses in general: all households stated that they did not have milk to use as human nourishment. Cattle milk is often processed into sour milk (otj. *omaere*) and butter (otj. *omaze*), and both are often eaten together with porridge (otj. *oruhere*) made from milled maize bought in shops. Cows can provide reasonable amounts of milk (up to two liters per day), especially in the weeks after they give birth. This usually occurs between November and January, the span coinciding with the growth period of grass, which positively influences their milk yields. However, mother animals had hardly any forage to eat during the drought and were very thin and weak. Therefore, farmers abstained from milking them so that the calves could get the little milk their mothers were producing and have better chances of survival.

Meat consumption, in contrast, was less affected. Bovines and sheep are usually reserved for important rituals anyway (i.e., funerals and weddings), and goats are mostly slaughtered on special occasions (e.g., family visits).⁴⁵ For instance, no affirmative answers were recorded when asked if household members attended a funeral in their settlements without meat. In these situations, a wealthy livestock owner from the area always provided livestock for sacrifice. Likewise, most households that kept goats stated that they had slaughtered one of these during the 2019 festive season “to have something special to eat”. In addition, it was observed that people culling starving animals in order to use what little meat remained on their carcasses –including their entrails. Chickens were also occasionally slaughtered for meat consumption.

Nevertheless, most households (except a few very wealthy ones) reported having reduced the number of meals from three to two, or even to one, per day during the drought. The most common reason was to save money for buying hay and supplementary food for the animals, especially cattle. For instance, 50-year-old Absalom Kuhanga stated: “we [in our household] went from eating three meals a day to just once. Normally we eat rice or pap and milk. But during the drought, we only had maize pap, sometimes without oil or sugar. We also did not have milk for a long time. All the money was for the animals”.

In this context, the government provided drought relief three times in the studied settlements during the whole drought period. However, according to residents, the frequency and amounts of food were insufficient. One time, for instance, the aid consisted of a 10kg bag of maize mill, a 1-liter bottle of cooking oil, and two cans of fish per household – an amount that in most homesteads lasted only two days. Additional governmental help for farmers consisted of subsidies for selling livestock and buying supplementary food. From all assessed households (n=60), only 11 applied for and received these benefits; another 11 did not obtain them despite making an application. The rest reported either not knowing or having heard too late about these aids.

⁴⁵ See also Mutjinde Katjiua and David Ward, "Pastoralists' Perceptions and Realities of Vegetation Change and Browse Consumption in the Northern Kalahari, Namibia," *Journal of Arid Environments* 69, no. 4 (2007); Ngungaa Hangara, Jekura U. Kavari, and Ephraim P.K. Tutjavi, *Ozongombe Mombazu Yakaoko/Cattle Culture of the Kaoko OvaHerero* (Windhoek: University of Namibia Press, 2020).

Conversely, the state's free primary education financially relieved many families in the area. Although householders still had to pay fees for uniforms, stationery, books, and hostels (where children received food), no family was eventually forced to take any children away from school due to money shortages during the drought.

Relying on state grants, remittances, and off-farming activities

To compensate for the lack of cash revenues from animal sales, all assessed households relied on different income sources, such as state benefits, remittances from those working in towns, and small income-generating activities on-site (see previous sections). Concerning state benefits, for instance, 37 of 48 households receiving an old-age pension and/or a child and disability grant stated that these income sources were crucial for coping with money shortages induced by the drought. Additionally, 32 of 52 households having members living and working in towns stated that they had benefited from their remittances in money and kind (the latter being food for animals and people). The rest of the households having these networks did not receive any transfers because their relatives could not send remittances during the drought. The main reason was that they were already struggling to make ends meet where they lived and had no extra cash or resources available.

Apart from these established rural-urban connections, 20% of households reported that one (in some cases two) family member(s) decided to search for temporary work in towns precisely because of the 2019 dryness. Their primary motivation was to help their families back in the village cope with the situation. One of these cases included the household of 69-year-old Meriam Katusuva. She explained, for example, that: “Apisei and Desmond [two of her adult sons] decided to leave and look for a job because they did not like seeing the animals dying in the veld. Both found temporary work in a fish processing company in Walvis Bay [thanks to their elder sister, who was working there]. They have been sending me food for the animals since then.”

While these cases of outmigration were intended to be provisional, there were also cases of people who decided to give up farming permanently. In this respect, it was recorded that nine people (eight men; one woman) from different households. Their respective families stated that they decided to sell the last few animals belonging to them and seek a livelihood outside farming as they saw the drought situation as hopeless. However, there was not any recorded cases where *entire* households disintegrated or abandoned farming due to the economic pressures of the drought.

Ultimately, all 37 households with a member earning cash on-site stated that these activities helped cope with the scarcity situation in one way or another as well. These persons comprised, in total, ten women sewing or repairing Ovaherero dresses (*otj. sing. ohorokweva onde*); eight selling home-made bread or fat cookies; three selling small items, such as sweets, chips, and prepaid cell phone airtime; one selling own-grown tobacco, and two doing hairstyling. Other activities, such as cutting and selling poles (for erecting or repairing fences), building or repairing huts, and offering transport, were carried out exclusively by men (the numbers being four, four, and five, respectively).

Exceptional cases

Against this background, it is noteworthy that there were a few cases of exceptionally high and low cattle losses within the sample. Two households lost more cattle than twice the samples' average (>80%); one lost ca. 100 animals, while the other three only suffered herd reductions below 15%. These are important exceptions as they reveal why some individual homesteads managed to reduce many more livestock casualties than others did. In this section, a detailed description of these exceptional cases is provided, based on the informants' accounts to illustrate the reasons behind their high and low cattle deaths. Beginning with the cases involving low cattle losses.

Low cattle losses

Case 1: The lowest percentage of cattle losses recorded in the sample was encountered by 65-year-old Marcus. He only lost ten head of cattle due to the drought, and was left with 90, a loss of ca. 10%. Based on respondent's opinion, his low cattle losses were due to various reasons. On the one hand, he emphasised living simply without spending much money on food or school fees. Marcus lives alone (he does not have children) while taking care of the livestock belonging to him, his sister (a teacher in a nearby town), and her son (a truck driver living in Walvis Bay). Moreover, Marcus has received an old-age pension from the state since he was 60, which covers much of his expenses, so he said.

On the other hand, (and in contrast to most other farmers), Marcus used to sell his cattle when their prices reached the highest level (and not necessarily when the need arose) and then saved the proceeds in the bank. These savings and selling a part of his sheep herd (ca. 20 animals) helped him to finance the purchase of feed and to pay a young man to collect leaves and seeds in the veld for his cattle. Besides, he could pay for motor-transport to take 20 of these animals to Okamapingo village, 15 km southeast of Okondjatu, where a friend of his lived. He lost only two head of cattle there because the grazing was acceptable, and he "only took the strongest ones", he said. The rest of the animals (8) died in the village despite his efforts to feed them, yet he stated that these were old beasts anyway. That said, he assured that he did not need to ask his sister or nephew for financial help during the drought. Therefore, it seems that Marcus' cattle selling strategies, the availability of small stock, the lack of dependants, keeping expenses low, and cleverly separating his herd during the drought helped limit cattle losses.

Case 2: The second example of low casualties was the case of 53-year-old Epton. His household 'only' lost ca. 10% of its cattle herd, eight of nearly 70 animals. However, Epton's homestead was one of the largest in the sample, with nineteen permanent dwellers (excluding school children) and eight members living and working elsewhere. From these, four had permanent middle-level positions at government institutions (including Epton himself).⁴⁶ During the drought, he could actively support those taking

⁴⁶ Moreover, the household received child and disability benefits for six and one children respectively.

care of the animals in the village with extra money to buy supplementary feed. Those on-site, in turn, dedicated themselves to collecting leaves and seeds to nourish their cattle. Likewise, his family decided to take half of their cattle herd (33 animals) to a resettlement farm close to Okondjatu. However, there they were given a more depleted camp for their animals than had been arranged, which forced them to transport supplementary feed and bags of leaves from the village to prevent the cattle from starving. One month later, they were able to move their animals to a nearby farm in the freehold areas, thanks to someone's advice. There, they paid 200N\$ per animal for two months, even though this was a much higher amount than they had previously had to pay at the resettlement farm: 5N\$ per animal per month. But Epton considered this move worthwhile since it meant that they did not lose any stock due to forage shortage (only one animal died because it broke its leg, and the rest perished in the village). Still, without his household's financial and human capital, rapid action, and perhaps also luck, the low number of casualties in his case would not have been possible.

Case 3: Beduel, a 52-year-old farmer lives with his wife, who takes care of a toddler, while their other five children (two of them adopted) attend school. After this household lost four head of cattle due to the drought, 22 remained, a herd reduction of ca. 15.4%. In this connection, it is essential to highlight that Beduel and his wife stated that they sold around ten animals at the onset of the drought because these were old and could have died anyway. Otherwise, they also tried to sell animals when the prices were high (in June/July) and deposit the money in the bank. During the dryness, moreover, they were one of the few households that could continue growing some food (and thus save money) in their small garden (20m²), irrigated with water from a nearby well sunk by Beduel's extended family. Beduel was also one of the few people in the area earning money regularly by offering transport to Okakarara with his old bakkie truck. His wife contributed to the household income by baking and selling bread. They also received child benefits for their adopted children, which helped them financially.

In contrast to the two previous cases, Beduel and his wife did not take a portion of their cattle herd anywhere; they all remained in the village during the drought. Apart from their varied livelihood strategies, which enabled them to access cash and decrease expenditures (e.g., food), two farming practices significantly reduced cattle deaths. "We used many goats to buy food for the rest of the animals", and "we have a small machine to crush bush and make fodder", said Beduel. Thanks to his small stock, he had enough capital to buy feed (which he managed to get subsidized) and stretch it by mixing it with the processed bush fodder. No other households from the sample had the equipment to apply this technique. Hence, he said, "we saved lots of money buying supplements, and we always had enough fodder."

In summary, these three examples show that a combination of interrelated factors contributed to reducing cattle losses significantly: these included economic capacity, income diversification, savings, human and material capital, keeping and marketing small stock, and opportune decision-making during the drought. All these components largely overlap with the drought coping and adaptation strategies implemented by pastoralists

across Africa.⁴⁷ On this basis, one could infer that the cases with low cattle losses would look diametrically opposite regarding these traits. Yet, this is only partly the case, as explained in the next section.

High cattle losses

Case 1: the case with the highest percentage of livestock losses involved 48-year-old Joseph.⁴⁸ He was a 'weekend farmer' holding a middle-level position in a regional government office and the only breadwinner of a six-member household. Due to the 2019 drought, and after selling all his goats to buy supplementary feed for his cattle, he decided to take all his remaining 49 bovines to Ekwenje, a community 16 km from Okondjatu. In so doing, he hoped to reduce costs, yet this decision turned out to be disastrous: of the original 49, only six animals survived, implying a herd reduction of ca. 87.5%. According to him, the most important reason for these casualties was a combination of hunger and plant-related poisoning. When he moved his animals to Ekwenje, he did not know that *otjikurioma* (*Dichapetalum cymosum*), a well-known noxious plant in the eastern communal areas, was rife in that specific location. He explained: "my animals ate it without differentiating it from the grass [...] they were hungry, ate many of these weeds, and died very quickly." Moreover, Joseph was the only one from the entire sample who took all his animals elsewhere; others kept a portion of their herds in the village, feeding them hay in the kraal. Hence, dividing his herd and continuing to buy feed for them could have been less costly for him in the end.

Case 2: The other exceptional case of major cattle losses was encountered by 54-year-old Joanna.⁴⁹ She lost nine head of cattle due to the dryness and was left with only two – a drastic herd reduction of 81.8%. Compared to many other households, Joanna's situation was particularly challenging. She cared for her 21-year-old pregnant daughter and three toddlers while two of her adult sons were trying to make a living in Windhoek with temporary jobs. At the same time, her only income sources comprised of the revenues from selling fat cookies and the remittances of her eldest daughter (a low-rank police officer in a nearby town). She used to have a few goats in the past, but they ended up in the hands of thieves or were killed by jackals. During the 2019 drought, she was unaware of the state subsidies and abstained from selling any cattle because they were too thin to market. Despite these conditions, Joanna tried to buy hay, salt, and even milk for her calves, she explained. Still, these efforts were obviously in vain. With the little money

⁴⁷ E.g., John F. Morton, "The Impact of Climate Change on Smallholder and Subsistence Agriculture," *Proceedings of the National Academy of Sciences* 104, no. 50 (2007); Edna Wangui, "Adaptation to Current and Future Climate in Pastoral Communities across Africa," *Oxford Research Encyclopedia* <https://oxfordre.com/climatescience/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-604> [last accessed 17 October 2022]; Francis Opiyo et al., "Drought Adaptation and Coping Strategies among the Turkana Pastoralists of Northern Kenya," *International Journal of Disaster Risk Science* 6, no. 3 (2015).

⁴⁸ Informant wished to be anonymized.

⁴⁹ Informant wished to be anonymized.

available during the drought, she had to decide between buying food for her animals or her family. Hence, there was little she could do to keep her animals alive.

Case 3: Lastly, 54-year-old Tom.⁵⁰ He lost ca. 100 head of cattle (the highest number of animal losses from the studied sample), and had 60 remaining at the end of the drought. Tom lives alone, but he supports his daughter, who attends the university and lives with her mother in Windhoek. According to him, his high cattle losses were due to various reasons. Most importantly, he waited too long to buy hay and supplements, gambling on the hope that the rains would not wholly fail in 2019. In addition, he did not move a portion of his herd elsewhere for the same reason. In this context, he wanted to avoid extra costs, as sustaining his family in the capital was expensive. He additionally decided to vaccinate his animals against botulism (otj. *ombindu*), a disease which, in his experience, caused his cattle lose weight. Therefore, his animals got progressively thinner and weaker, and many died in the veld looking for forage before Tom realized that organizing supplements was essential. His losses could have been even higher if he had not changed his approach.

In conclusion, as exemplified by Joanna, exceptionally high cattle losses resulted from particularly tough socio-economic constraints, which reduced her capability to keep her animals alive. However, the other two cases showed that significant casualties resulted from taking all animals to an unknown, hazardous place (Joseph) and lack of prompt action (Tom). Therefore, considerable casualties did not necessarily result from the lack of economic capacity and resources alone, but also from deliberate yet unfortunate choices made during the drought. In this context, the lack of information about rangeland vegetation elsewhere and the uncertainty related to the duration of the drought were at play – two critical constraints in pastoralism quite apart from the lack of workforce and herd capital, as experienced by Joanna.⁵¹ Hence, the question here concerns how farmers, communities, and the state can put systems in place so that farmers can make informed decisions during the drought and be effectively assisted when facing economic hardship. Examples like those provided by Markus, Epsen, and Beduel might be instructive, as they show that farmers can successfully confront extreme droughts when certain conditions are met. Ideally, cases like these should not remain exceptions, but become the rule to manage similar severe droughts conditions.

Recovering from the drought

Immediate tactics

After the rains finally arrived, the most common strategy applied by the sampled households to recover their livestock losses was “breeding as usual”. This implied trying to sell or exchange male calves for females and keeping them long-term so that they reproduce and thus, increase the herd. Other action plans, such as buying in female

⁵⁰ Informant wished to be anonymized.

⁵¹ E.g., Michael Bollig and Barbara Göbel, “Risk, Uncertainty and Pastoralism: An Introduction,” *Nomadic Peoples* 1, no. 1 (1997); Ian Scoones, *Living with Uncertainty: New Directions in Pastoral Development in Africa* (London: Intermediate Technology Publications, 1994).

animals, were not an option because most households did not have enough money or livestock capital available for buying animals due to the drought-induced expenditures and losses they had suffered. Moreover, due to the socio-economic impacts of COVID-19 in the country shortly after the drought,⁵² 17 households reported at least 1 of their members working in towns lost their jobs, and 18 (eight overlaps with the previous ones) with members subjected to salary reductions.

In contrast to other regions,⁵³ people in the study area did not experience serious difficulties accessing food, as travel restrictions during the lockdowns did not prevent them from going to shops in Okakarara. However, all households stated that food expenses increased significantly in mid-March as school children (who usually eat at their hostels) were sent home to curb the spread of the disease. Conversely, no participant reported difficulties selling animals or experiencing any significant decreases in the marketing prices due to the lockdowns for livestock at the time of the interviews.

In this context, applying for a bank loan to recover from the drought was not viable because this requires borrowers to have assets as collateral, such as a house in town. A house in the village does not count, as individuals cannot obtain title deeds in the communal areas. A few households did have freehold property used by family members living and working in urban centers. Yet, these owners were still skeptical about applying for a loan, for example, respondent Fredrik⁵⁴ mentioned, "I would like to ask money at [bank's name], but I am afraid that if I cannot pay back, they will take the house, which my family is using". He pointed out that if the new animals got lost or stolen, he wouldn't be able to settle his debts and would consequently get into trouble with the bank.

Moreover, other strategies were inconceivable, such as borrowing cattle from relatives in order to increase their own herds. Reportedly, impoverished Himba herders in the northern Kunene received cattle loans from their relatives with larger herds to continue a pastoral livelihood after the harsh dryness of 1981.⁵⁵ Yet, these practices were not standard in the study area. Elders asserted that these transfers existed among Otjiherero-speaking communities in the region albeit that this had happened a long time ago. Furthermore, individuals prefer not to borrow livestock to avoid distress, as 61-year-old Manfred explained: "It is difficult to borrow anyways because of mistrust. If I lose an animal or it gets stolen, the owner will want me to pay it back. They won't believe you lost it; they will think you sold it. That is why people prefer to farm with their own things." However, it was recorded that two households were planning to request relatives for a few livestock

⁵² Evelina Julius, Samuel Nuugulu, and Lukas H. Julius, "Estimating the Economic Impact of Covid-19: A Case Study of Namibia," *Munich Personal RePEc Archive* (Paper No. 99641) (2020). <https://mpra.ub.uni-muenchen.de/99641/> [last accessed 17 October 2022]

⁵³ Martin Paul Jr. Tabe-Ojong et al., "Covid-19 in Rural Africa: Food Access Disruptions, Food Insecurity and Coping Strategies in Kenya, Namibia, and Tanzania," *Agricultural Economics* 53 no. 5 (2022).

⁵⁴ Informant wished to be anonymized.

⁵⁵ Bollig, "Risk and Risk Minimisation among Himba Pastoralists in Northwestern Namibia."

animals to rebuild their herds. However, it was not confirmed whether they actually received these animals.

If the next drought comes

When asked “How will you prepare for the next drought of this intensity?” 60% of the households mentioned at least one (or a combination of) the following strategies: save money; sell milking calves beforehand; find a place early on to take a portion of the herd; sell lots of animals, put money in the bank and then buy new animals after the drought; buy hay and supplements beforehand; cut grass, collect seeds and store them; plant maize for the cattle; sell old animals as soon as possible, and/or find additional income strategies (e.g., buy a welding machine, start offering transport). Hence, these farmers were optimistic about how to do things differently to better cope with such severe dryness next time. Another question is whether they do (or can) ultimately put these ideas into practice. By contrast, the other 40% of the households stated they could do little or nothing to prepare for the next drought of this magnitude. This does not necessarily reveal a lack of ideas; all these households managed to find ways to overcome the drought. Instead, this number indicates the widespread feeling of powerlessness and helplessness that prevails when such severe meteorological phenomena occur.

Moreover, especially for farmers with scarce resources, adopting long-term risk management strategies is particularly challenging. In this regard, for instance, 66-year-old Hepure Tijiposa stated: “With little money, it is difficult to plan, and we sell animals only one by one according to our needs. Sometimes we have a plan, but something happens, like a funeral. Then you must use the animals you were keeping for something else.” And 62-year-old David Kutamundu expressed similar sentiments: “We do not have long-term strategies. We only try to accumulate animals in case of drought and to pay the school. Otherwise, we can only pray to God.”

Taking everything into account, apart from “breeding as usual”, other herd recovery strategies after the 2019 drought were limited among the studied households. In other contexts, livelihood diversification among pastoralists has played an essential role in restocking after a drought.⁵⁶ Yet, many households in the study area could not rely on money remittances after the dryness due to the subsequent socio-economic impacts of the coronavirus pandemic in Namibia. Moreover, accessing cash loans is not only difficult but risky for many farmers: social institutions aimed at rebuilding herds, as employed by other pastoral groups, are not present within the study area. Therefore, if droughts of similar magnitude occur more frequently, it is possible that not all households will be able to recover quickly enough to face these severe meteorological events. At this juncture, measures to enable farmers in the region to increase their resilience toward these climatic hazards are urgently needed to avoid socio-economic tipping points at both the household and community levels.

⁵⁶ Caleb Ouma, Joy Obando, and Micheal Koeh, “Post Drought Recovery Strategies among the Turkana Pastoralists in Northern Kenya,” *Biotechnology* 1, no. 5 (2012).

Summary and conclusion

Despite the severity of the 2019 drought, the sampled households overcame this extraordinary meteorological event without losing all their livestock, particularly cattle. Farmers implemented one or more mitigatory farming practices, including organizing supplementary feed, collecting leaves and seeds, and/or moving a portion of their herds elsewhere. In this connection, the households' diversified income strategies, along with translocal networks, and even saved money for food all played an essential part in financing these ameliorative tactics. Moreover, an examination of exceptional cases showed that very low cattle losses were linked to economic, human, and material capital, including keeping and marketing small stock and making the right choices during the drought. Conversely, cases with significant cattle losses did not result exclusively from the lack of economic capacity and resources, but also from erroneous decisions influenced by insufficient knowledge and the inherent uncertainty of the drought situation. These findings coincide with the insights on drought-coping strategies and constraints to overcome these meteorological events in current pastoralism literature.⁵⁷

Based on these research findings, it is essential to emphasize that while pastoral households managed to overcome 2019's exceptional drought, critical drought-coping methods and practices are nevertheless limited in the studied area. These include livestock mobility and various long-term risk reduction mechanisms such as herd diversification, reservation of emergency pastures, social institutions of exchange, and access to capital to restock.⁵⁸ At the same time, the region's entire ecosystem is considered highly fragile and susceptible to crossing desertification tipping points due to climate change.⁵⁹ Hence, if droughts and desertification processes intensify, measures to enable farmers in the region to increase their resilience towards these climatic hazards and ecological conditions are urgently needed. Therefore, this research is an attempt to inform about the climate change adaptation plans currently being developed by the Namibian government⁶⁰ and non-governmental organizations (e.g., Namibian Chamber of Environment, UNDP) to fit local needs and realities in the future.

⁵⁷ Morton, "The Impact of Climate Change on Smallholder and Subsistence Agriculture."; Opiyo et al., "Drought Adaptation and Coping Strategies among the Turkana Pastoralists of Northern Kenya."; Bollig and Göbel, "Risk, Uncertainty and Pastoralism: An Introduction."; Wangui, "Adaptation to Current and Future Climate in Pastoral Communities across Africa."

⁵⁸ cf. Morton, "The Impact of Climate Change on Smallholder and Subsistence Agriculture."; Opiyo et al., "Drought Adaptation and Coping Strategies among the Turkana Pastoralists of Northern Kenya."; Wangui, "Adaptation to Current and Future Climate in Pastoral Communities across Africa."

⁵⁹ Abinash Bhattachan et al., "Resilience and Recovery Potential of Duneland Vegetation in the Southern Kalahari," *Ecosphere* 5, no. 1 (2014).

⁶⁰ Republic of Namibia, National Climate Change Strategy & Action Plan 2013-2020.

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