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Drought Resilience through Livelihood Diversification among Somali Pastoralists: A Case Study of Yocale Woreda

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About Article

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ABSTRACT

Pastoralist communities in the Somali region, especially in the Yocale district, face significant challenges because to frequent droughts and changing environmental conditions. The strategies these communities use to diversify their sources of income are examined in this study. Data was collected using a mixed research approach and a cross-sectional survey design from 204 randomly selected families in four kebeles in the Yocale area. According to the findings, pastoralists employ a variety of coping strategies before, during, and after droughts, including moving, diversifying their herds, selling cattle, putting down weak animals, consuming wild fruit, selling charcoal, depending on social support, and changing up their revenue streams. One important strategy was herd diversification, with an emphasis on drought-tolerant species like goats and camels. In the early phases of a drought, selling livestock helps raise money for necessities. However, the report points out that adopting livelihood diversification presents some difficulties, including limited credit availability, insufficient capital, poor infrastructure, and a lack of skills. The results highlight the necessity of programs and policies that assist pastoralists' customary adaptive strategies while removing obstacles to diversification.

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1. INTRODUCTION

Communities that live in arid and semi-arid areas of the world and are primarily dependent on animal husbandry are said to practice pastoralism. Livestock farming is essential to the daily lives, economies, and financial security of hundreds of millions of Africans and people around the world in both pastoral and agro-pastoral contexts (Abduletif, 2019; FAO, 2021).

Over time, pastoralists' livelihood choices have evolved into a range of survival tactics in these arid and semi-arid regions due to periodic droughts and ongoing changes in the climate, social structures, and economic situations. Some pastoralists continue to expand their herds using traditional ways, but others are increasingly engaging in value-adding activities like cattle trading. Additionally, some pastoralists decide to abandon the pastoral way of life (Kirui *et al*., 2022).

Nearly half of sub-Saharan Africa's livestock, which sustains the livelihoods of more than 30 million people, is found in East Africa (Organization, 2021). Around 12 to 15 million pastoralists live in Ethiopia, primarily in lowland regions that make up roughly 62% of the country's total area. They do, however, constitute a minority in relation to the rapidly growing national population, which now stands at over 90 million (World Bank, 2019).

Pastoral groups in Ethiopia have historically been shut out of the political, social, economic, and environmental realms of the nation. This exclusion is a result of ongoing social, political, and economic marginalization, which has made the complicated and challenging situation that pastoral cultures face in the country even more severe. Livestock is essential in pastoral areas because it provides food (such milk and meat), revenue, and job opportunities—benefits that also reach neighboring urban dwellers. The livestock industry is crucial for supporting national economies, as Gebreyesus *et al.* (2021) The fact that livestock makes up 40% of Ethiopia's agricultural sector and more than 20% of its GDP emphasizes how important it is to the country's economy. For thousands of years, pastoral communities have been perfecting their resource management and survival strategies to endure challenging environmental conditions and socioeconomic conditions (Mortimore, 2010). For resilience and livelihood, these communities have largely developed long-term, ecologically sound methods. However, pastoralists have encountered growing challenges in preserving traditional subsistence and adaptation methods in recent years due to the complex interactions of ecological, demographic, economic, social, political, and climate-related factors (FAO, 2011).

Increasing the resilience of pastoralist communities that are susceptible to drought and other climate-related issues requires the implementation of methods to diversify livelihoods. These communities are susceptible to climatic disturbances since they have historically depended mostly on cattle for both income and sustenance (Opiyo *et al*., 2015). Pastoralist households have used a number of diversification techniques in response to the growing climate variability and catastrophic weather occurrences. Keeping a variety of livestock is a popular strategy. Because it increases resistance against changes in rangeland ecosystems and the climate, multispecies herding has become an important local adaptation technique. More drought-tolerant animals, like camels, which have shown remarkable adaptability in some areas, are being included by pastoralists more frequently (Megersa *et al*., 2014).

There are many pastoral and agro-pastoral settlements in the Somali region of Ethiopia. Frequent droughts that have devastated the entire region have had a significant influence on the Nogob zone. These frequent dry spells, which are made worse by unfavorable environmental conditions, have disproportionately affected pastoralists in Nogob. When another drought hit in 2015–16, the devastation caused by the 2011 drought had not completely healed. Yocale Woreda was one of the most severely affected regions in the region during the 2010–11 drought (FAO, 2021).

Along with other human-caused problems, prolonged droughts have weakened ecosystems and diminished the resources available to pastoral people, endangering their traditional way of life. These communities have continuously shown perseverance in the face of these difficulties. The main reason for this resilience is that, in comparison to alternative land uses and livelihoods that do not need mobility, pastoralism provides a more effective adaptation approach (Kennedy *et al*., 2015).

The government's current response to drought crises mostly consists of food aid, the relocation of impoverished pastoral communities, and the rare cattle rescue mission. Usually reactive in nature, these acts are carried out without a long-term plan. Current policies are predicated on the idea that environmental degradation and the persistent danger of drought prevent poor nomads from returning to their traditional way of life. Therefore, it is anticipated that pastoralists would find new ways to adapt (Mekuyie & Mulu, 2021).

Commentators and policymakers should recognize the methods pastoralists use to cope with and adapt to the historical difficulties of their livelihood systems, rather than viewing pastoral ways of life as unsustainable and endorsing policies that undermine pastoralism, turning contentious presumptions into outcomes that appear inevitable. Accordingly, development projects in pastoral areas must to be based on a comprehensive knowledge of the place, its people, and the customary adaption strategies employed to deal with changing circumstances (Maxwell & Hailey, 2021). In this regard, nothing has been done to understand the complexities of the Somali pastoral system, particularly as it relates to the Yocale woreda pastoralists. Therefor, the rationale of the study is assessing the drought resilience through livelihood diversifications among pastoralists communities

2. LITERATURE REVIEW

2.1. Pastoralism in ethiopian

More than 12 million Ethiopians depend on the raising of livestock for their livelihoods, with agropastoralists combining farming with livestock husbandry (FDRE CSA, 2013). The Southern Nations, Nationalities, and Peoples' Region (SNNPR), as well as the Afar, Ethio-Somali, Oromia, and Gambella Regions, are the main pastoral areas. The Benishangul-Gumuz (BGMZ) Region and Dire Dawa Administration are also home to a small number of pastoralists. The Ministry of Agriculture and Livestock Resources (MoALR)'s Livestock Sector Analysis (LSA) estimates that 100% of camels and 44.3% of the country's

livestock population (cattle, sheep, goats, and camels) are raised in pastoral lowland grazing areas (Shapiro *et al.*, 2017).

Livestock meat and milk from the pastoral sector are used in both domestic and international markets. According to Shapiro *et al.* (2017), pastoral in lowland grazing systems generate 34% of the nation's red meat, 38% of all milk, and 21% of cow milk. With a total area of over 280,000 km2, the Ethio-Somali Regional State (ESRS), which is situated in the southeast of the country, is the second largest region in Ethiopia. The region is home to one of the biggest pastoral communities in the HoA and the largest in Ethiopia, with a population of 5,748,998 (FDRE CSA, 2013). Cattle, camels, and small ruminants are kept by pastoralists, who make up almost 70% of the population. The region has the longest national frontier with borders to Kenya, Djibouti, and Somalia. Additionally, it shares a lengthy border with the Afar Regions and Oromia. For Ethiopian Somali herders, access to grazing areas and markets across borders and regions is essential. The area is well-known for its thriving cross-border livestock trade and its blackhead sheep. The region has two rainy seasons: gu, from March to May; and deyer, from October to December. Although there is little to no rainfall in the arid region, flooding is a possibility. Savanna-type grassland and browses make up the majority of the vegetative cover. Large gullies and bush encroachment, especially Prosopis, in some places are becoming major issues for PAPs. The transhumant strategy used by Ethiopian-Somali herders entails seasonal relocation from their home base. The region's three major rivers—the Wabeshebele, Genale, and Weybe—are utilized for animal watering, grazing, and irrigation. Compared to other pastoral areas in Ethiopia, Ethio-Somali PAPs have a more market-integrated economy and are better diversified (Gebremeskel *et al.*, 2029).

2.2. Impact of drought on pastoral communities

Drought is becoming a frequent and destructive occurrence that has a significant effect on pastoral populations in many different areas. Because they depend so largely on cattle for their livelihoods, these communities are facing more and more difficulties because of the shifting climatic patterns. Pastoralists claim a four-year drought cycle in Ethiopia's Borana Zone and Bale lowlands, which causes crop failures, food insecurity, disease outbreaks, and a rise in school dropout rates (Abdela, 2024). Like this, severe droughts in sub-Saharan Africa are leading to famines, water shortages, migration, and livestock farmer deaths (Piemontese *et al.*, 2024). Drought has an influence that goes beyond its immediate effects on the environment; it weakens pastoral communities' ability to bounce back in some ways (Ambelu *et al.*, 2017). Pastoral communities have created a variety of coping techniques and adaptation tactics in response to these difficulties. These include diversifying livestock breeds, establishing communal grazing areas, using already-existing water supplies, and taking part in other revenue-generating ventures (Abdela, 2024). The efficiency of these tactics in guaranteeing long-term resilience, however, continues to be a crucial topic of concern, requiring a better comprehension of the intricate interactions among drought, pastoral livelihoods, and adaptation measures (Dejene & others, 2025).

2.3. Concept and typologies of livelihood diversification

Rural households in developing nations frequently adopt livelihood diversification as a coping mechanism to lessen poverty, enhance well-being, and deal with environmental and economic shocks (Gautam & Andersen, 2016; Habib *et al.*, 2023). Survive and raising living standards, entails building a varied portfolio of activities and social support capacities (Ellis, 1998). According to Ellis (2000), there are two primary categories of livelihood diversification: diversification by need and diversification by choice. Factors including seasonality, risk, labor and credit markets, asset strategies, and coping mechanisms are frequently the driving forces behind the diversification of need. Conversely, comparatively better-off smallholders with enough assets who can take advantage of opportunities and synergies between farm and non-farm businesses tend to pursue diversification by choice (Alobo Loison, 2015).

It's interesting to note that different household types and geographical areas have varying degrees of variety. In the Tibetan Plateau, for example, livelihood diversification levels decline from high mountain gorge regions to plateau regions, and this is accompanied by a decline in extended livelihoods and livelihood activities (Yan *et al.*, 2010). Similarly, 40% of households in sub-Saharan Africa participate in all three primary livelihood activities: non-farm, livestock, and crops, indicating variation in diversification levels (Musumba *et al.*, 2022). Although it is often acknowledged that livelihood diversification is a good way to reduce risks and enhance sustainability, its application and results can differ greatly depending on the household context, asset endowments, and geographic location (Ayana *et al.*, 2021; Dai *et al.*, 2019). The difficulty of livelihood diversification techniques in developing nations' rural areas is highlighted by the dynamic character of livelihoods and the significance of elements like shocks and resource endowments (Dedehouanou & Mcpeak, 2019; Musumba *et al.*, 2022).

2.4. Drought resilience through livelihood diversification strategies among pastoral community

Diversifying one's source of income has become a vital drought resistance tactic for Ethiopian pastoralist groups. In order to disperse risk and augment their conventional livestock-based livelihoods in the face of frequent droughts, pastoral households are increasingly turning to a variety of revenue-generating activities (Little *et al.*, 2001; Megersa *et al.*, 2014).

Petty trade, transportation services, trade, and conservation/ tourism are all examples of this diversification (Abdela, 2024; Bedelian & Ogutu, 2017). It's interesting to note that diversification can lead to trade-offs even though it often increases resilience. Participating in wildlife conservancies, for example, offers access to grazing resources during dry seasons and consistent year-round revenue. The ability of pastoralists to adjust to seasonal fluctuations may be jeopardized, though, as it may also limit animal mobility and access to customary grazing sites (Bedelian & Ogutu, 2017).

Furthermore, not everyone gains equally from diversification; access to alternative livelihood possibilities is influenced by a number of factors, including wealth, education, land ownership, and gender (Bedelian & Ogutu, 2017; Little *et al.*, 2001). In conclusion, diversifying one's sources of income

is essential to helping Ethiopian pastoralists become more drought resilient. It increases household resilience to changes in rangeland ecosystems and climate, expands the repertoire of current techniques, and offers vital assistance during difficult times (Abdela, 2024; Megersa *et al.*, 2014). However, in order to optimize its efficacy, politicians and non-governmental organizations ought to concentrate on bolstering social safety nets, advocating for drought-resistant farming methods, and resolving disparities in access to possibilities for diversification (Abdela, 2024; Gebru *et al.*, 2018).

3. METHODOLOGY

The Somali Regional State (SRS) ranks as the second largest region in Ethiopia, following the Oromia Regional State. It spans an area of 350,000 km2 and shares its northern border with Djibouti, its eastern and northeastern borders with Somalia, and its southern border with Kenya. It shares borders with the Oromia region to the west and the Afar area to the northwest. Fafan, Jarar, Sitti, Nogob, Erer, Doollo, Shabelle, Korahea, Afder, Dawa, and Liban are the eleven administrative zones that make up the SRS.

After an administrative change in 2011, Yocale—which had previously been a Kebele in the Jarar Zone's Awaare district—was created as a separate district. Harshin to the north, Daror to the northeast, Aware to the southeast, Dagahbour to the southwest, and the Fafan Zone to the northwest encircle the district, which has a total size of 2330.29 square kilometers. There are 14,224 women and 31,095 men in Yocaale's estimated 45,319 residents (CSA, 2014).

3.1. Research design

A cross-sectional survey approach was used in this study, which made it possible to compare multiple factors at once. A mixed research strategy was used in terms of methodology. According to Creswell and Clark (2007), mixed research approaches seek to explore a range of social phenomena inside participants' subjective perspectives. Through the use of statistical methods and a partial reliance on numerical data, the study included quantitative elements. In order to gather data in non-numerical formats, it also incorporated a qualitative component.

3.2. Method of data collection

This study primarily relied on both quantitative and qualitative data obtained from participants in four specific kebeles within the Yocale woreda (Jarar zone). Socioeconomic information including gender, age, education level, household size, sources of income, livestock ownership, and productivity were all included in the quantitative data. In order to adapt to climate change, data on livelihood diversification was also gathered. For qualitative data, focus group discussions and interviews with key informants from the selected woredas were conducted. Secondary sources comprised a variety of books, articles, online resources, journals, and publications from both governmental and non-governmental organizations pertinent to the study. Furthermore, regional and zonal documents available for this research were utilized as secondary sources. To meet the research objectives, a series of sampling steps were carried out to choose the study locations, kebeles, and the necessary number of participants within the study area. Initially, the Yocale woreda was deliberately selected from the 11 woredas of the Jarar zone due to its accessibility. Subsequently, four out of the 18 kebeles in the woreda were chosen based on their livelihood practices. The kebeles of Higlosahley, Warta-handun, Maslaha, and Dudbedale were selected because they practice pure pastoralism. Finally, to determine the required sample size a total of 204 households was select randomly using probability proportional to sample size by using a simplified formula provided by (Yamane, 1967). At 93% confidence level, degree of variability = 0.7.

$n = N/(1 + Ne^2) = 9415/(1 + 9415(0.07)^2)) = 204$

Where:

n = Sample Size

N = Total number of targeted populations obtained from the SRS Bureau of Planning and Economic Development (BPED).

e= level of precision (sampling error) at 5 % significance level was taken.

Table 1. Sample size of Kebeles

Kebeles	Population	Sample size
Higlosahley	2856	62
warta handun	1450	32
Maslaha	3542	76
Dudbedale	1567	34
Total	**9415**	**204**

3.3. Method of data analysis

During the analysis phase, descriptive methods were utilized. Data gathered via questionnaires was coded and processed using Microsoft Excel. Indigenous adaptation methods and coping strategies, along with the constraints they encounter, were summarized in tables, charts, and graphs showing frequencies and percentages to aid in describing and explaining the study. Information obtained from key informant interviews and focus group discussions was analyzed narratively to complement the quantitative data.

4. RESULTS AND DISCUSSION

The demographic breakdown of participants indicated that males constituted the majority at 58.8% (n=120), while females accounted for 41.17% (n=84). In terms of age distribution, 22% of participants were 20 years of age or younger, while over half (49%) were between the ages of 21 and 30. Of the sample, 19% were between the ages of 31 and 40, and 10% were beyond the age of 50. Regarding marital status, the vast majority were married (85.7%, n=175), followed by singles (6.8%) and widowed or divorced (7.4%). The majority of participants had poor levels of education; only 14.71% (n=30) were literate, while 85.29% (n=174) were illiterate.The majority of households, 53.9%, had four or five people, followed by one to three people (26.76%) and six or more people (19.12%), according to a family size analysis. According to occupational activities, 32.35% (n=66) practiced agro-pastoralism, whereas the majority (58.8%; n=120) practiced pastoralism. 8.8% (n=18), a lesser percentage, said they engaged in other forms of livelihood.

Table 2. Demographics of the respondents

Variables	Category	Freq. 204	Percent
Sex	Male	120	58.8
	Female	84	41.17
Age	≤20	45	22
	21-30	100	49
	31-40	40	19
	≥50	21	10
Marital Status	Single	14	6.8
	Married	175	85.7
	Widowed/Divorced	15	7.4
Educational status	Literate	30	14.71
	Illiterate	174	85.29
	Total	204	100
Family size	1-3	55	26.96
	4-5	110	53.9
	≥6	39	19.12
Occupation	Pastoralist	120	58.8
	Argo-pastoralist	66	32.35
	Other	18	8.8

Source: (Survey 2025)

4.1. Drought coping as livelihood strategies in study area

In the research region, pastoralists utilized a range of methods to handle drought conditions and ensure the sustainability of their livelihoods (Table 3).

Table 3. Copping strategies used by pastoralists

Variables	Before drought (%)	During drought (%)	After drought (%)
Migrating	70.39	22.24	7.37
Herd Diversification	5.43	15.69	78.88
Livestock selling	51.45	44.63	3.92
Slaughtering weak Animals	8.35	84.8	7.84
Wild fruit consumption	9.8	83.82	6.37
Charcoal Selling	2.45	66.65	30.9
Social Support	1.96	50.51	47.53
Livelihood Diversification	22.08	5.88	72.04

Source: (Survey 2025)

Somali pastoralists have always depended on migration to provide pasture and water for their animals in the Horn of Africa. Proactively seeking pasture and water prior to an anticipated drought is a long-term strategy to reduce hazards in Yocale Woreda, according to about 70.39 percent of individuals surveyed. The study also found that diversifying livestock herds is another strategy for dealing with the region's drought, a method that has long been common and is still essential for reducing its effects. Pastoralists have used this tactic as one way to lessen the adverse effects of drought. Following droughts, more than 78.88% of the families polled in the research areas maintained a variety of livestock species, including sheep, goats, cattle, donkeys, and camels, in order to diversify their herds. The focus group discussion's insights showed that pastoralists choose browsers over grazers because woody plants with leafy feed are more reliable than grasses during droughts.

Yocale pastoralists now prefer shoats and camels to cattle, according to a key informant interview. This preference stems from the idea that camels and shoats are more drought-tolerant than cattle, more adapted to dry climates, and more resistive to drought. Water scarcity and changes in vegetation composition also have an impact on the shift towards browsers. According to Opiyo *et al.* (2016), there is currently a preference for goats and camels over cattle since they are thought to be more drought-resistant. Changes in vegetation and water availability also contribute to the shift away from grazers (sheep and cattle) and toward browsers (goats and camels).

Selling animals is therefore seen as an essential adaptive strategy, especially when a drought is starting. 52.45% of livestock were sold during the drought, which suggests a rather large volume of sales. This finding is in line with current research that indicates early livestock sales are an essential coping mechanism. This strategy offers quick cash resources that may be utilized to buy food, water, and other necessities for the pastoralist families as well as the remaining animals. These preventative actions lessen the financial losses brought on by cattle deaths during extreme weather occurrences (Yator, 2024).

On the other hand, 84.8% of respondents said they had to kill weak animals during periods of severe and protracted drought. Unable to survive because of a lack of food and water, these animals are used for their meat to feed families. Additionally, selling meat helps households make enough money to cover their essential expenses during dry spells, hence reducing food and financial shortages.

According to 66.65% of respondents, selling fuelwood and charcoal became a crucial survival strategy for Yocale pastoralists during dry spells. Pastoralists turned to selling fuelwood and charcoal to help support their households after either losing their animals due to drought or not having enough livestock to feed their families. However, this approach has hastened widespread deforestation and drastically reduced plant species in the area. Previous studies have shown that some pastoralist responses to drought are reactive, primarily involving the intensive use of limited pasture and tree resources. One of the main causes of rangeland degradation is the overexploitation of

these resources through the production of charcoal and wood fuel (Watson & Binsbergen, 2006; Opiyo *et al.*, 2016).

To control and lessen the hazards brought on by droughts, the pastoral Yocale community depends on a system of mutual aid centered on clans. 50.51% of society used this approach during droughts, while 48.53% did so following severe droughts. They have historically used a system of resource sharing called "Tolnimo," which means "kingship assistance." In the Somali reaction to the drought, kingship is essential (Carruth, 2018). Extending their revenue streams outside of the conventional pastoral system is ultimately a practical and successful tactic for pastoralists. After droughts, almost 72.04 percent of Yocale pastoralists increased the variety of their sources of income. Due to the steadily declining animal productivity and the quick depletion of rangeland resources, pastoral households in Yocale are forced to look for alternate means of income to provide for their families. To support their family and make up for the declining supply of animal goods, many pastoralists in the Horn of Africa are looking for alternative sources of income after losing their traditional means of life (UN-OCHA, 2011).

4.2. Challenges and constraints of livelihood diversification

In Ethiopia, implementing strategies for diversifying livelihoods involves a variety of intricate challenges. A major hurdle is the insufficient capital available to rural households, which restricts their ability to invest in and pursue different livelihood opportunities (Getahun *et al.*, 2023). Despite these challenges, there is growing evidence that rural households in Ethiopia are participating in a range of livelihood activities. This trend underscores the potential of diversified livelihood strategies to counteract the seasonal fluctuations of agricultural production and improve overall well-being (Dinku, 2018). Table 4 below presents the responses gathered from the sample respondents.

Table 4. Challenges and constraints of livelihood

Challenges and Constraints of Livelihood	Frequency	Percent
Lack of skills/Knowledge	101	49.5
Lack of infrastructure	37	18.1
Lack of capital/resources	54	26.47
Lack of man power	12	5.9
Total	**204**	**100**

Source: (Survey 2025)

According to research, 49.5% of participants said that the biggest barrier to diversifying their sources of income was a lack of skills. This finding is in line with Ifa Dadi's (2006) study, which highlights that households are deterred from seeking diversification by a lack of information about non-agricultural enterprises and restricted market access. Furthermore, 26.47% of respondents cited a lack of funds or resources as an obstacle, and 18.1% noted poor infrastructure. Additionally, 5.9% of respondents said that a lack of workers was a significant barrier to looking into alternate sources of income in Yocale Woreda, which is located in the Jarar Zone. The study also found that by limiting access to markets and resources, subpar infrastructure—such as inadequate transportation and limited electrical access—can impede diversification attempts. Furthermore, rural households have a major obstacle in obtaining the financial resources required to support diversification projects due to limited access to credit services (Getahun *et al.*, 2023; Yilebes *et al.*, 2022).

Key interviewees claim that a lack of funding is the main obstacle to putting different drought adaption measures into practice. The initial investment needed for strategies like diversifying livestock, raising drought-resistant animals, building strategic feed stores, making savings plans, improving livestock breeds, and growing herd sizes is frequently too high for the majority of households.The survey participants' worries over capital and resource constraints are supported by interviews. Communities also seem to have restricted access to savings banks. According to Yussuf and Abduselam (2022), pastoralist groups frequently do not have access to formal savings services and must instead rely on alternative, unofficial saving strategies in order to develop financial resilience. This remark is consistent with their findings. As a result, many respondents stated that a lack of funds or adverse economic circumstances were major obstacles to putting many of their preferred adaptation and coping mechanisms into practice in the study area. Key informants and focus group participants also noted that it was difficult to participate in improved livestock breeding and access quality veterinary care due to the low social and economic standing of the majority of households and their undeveloped market tactics.

5. CONCLUSION

To increase their resilience against drought, pastoralist communities in the Yocale district in the Somali region employed a variety of livelihood diversification measures, which were examined in this study. According to the study, pastoralists use a variety of coping mechanisms, including relocation, herd diversification, livestock sales, killing weaker animals, eating wild fruits, selling charcoal, looking for social support, and changing sources of income.

Diversifying herds, with a particular emphasis on drought-tolerant species like goats and camels, has emerged as a key strategy. Early livestock sales during dry spells give households much-needed cash. "Tolnimo," a historic clan-based system of mutual support, is crucial for risk management connected to drought. However, while attempting to apply livelihood diversification techniques, pastoralists face numerous challenges, such as limited access to credit services, inadequate infrastructure, a lack of capital or resources, and a lack of expertise. The study also highlights how some coping mechanisms, such as making charcoal, have a detrimental effect on the ecosystem and cause deforestation. The results highlight the necessity of development programs and policies that assist pastoralists in using their traditional adaptive strategies while removing obstacles to diversifying their sources of income. This entails expanding educational opportunities, building infrastructure, giving financial assistance, and providing instruction in skills for alternative livelihoods.

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