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RESEARCH ARTICLE

FARMER'S LIVESTOCK DROUGHT RESPONSE AND COPING STRATEGIES AT HOUSEHOLD LEVEL IN GALMUDUG STATE, SOMALIA

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Abstract

The frequency of drought presents huge challenges to the most rural communities in Africa. This article highlights drought characteristics and the many responses to drought stresses employed by Galmudug State, Somalia. Multiple data sources, including socioeconomic questionnaires with 123 households, focus group discussions, and key informant interviews with farmer's livestock were used to capture various aspects of drought occurrence. Results revealed that extreme drought events were increasingly frequent, and have negatively impacted pastoral livestock. In addition to the survey result showed that 100% of the respondents indicated that drought incidence increased for last three decades. In order to adapt to or cope with climatic anomalies, households are using a variety of strategies. In addition to the traditional short-term coping mechanisms, the long-term adaptation strategies used include livestock diversification species, livestock mobility to track forage and water resources; diversification of herd composition to benefit from the varied drought tolerance. However, the adaptation strategies are not practiced in full capacity, specifically Lack of meteorological information and lack of intuitional capacity about the livestock rearing are the constraints in this regard. Finally, the study suggested as a point of departure in developing drought adaption strategy and other pressures.

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Introduction:-

Drought is often one of the most upsetting weather phenomena and has negative effect on human population annually (Gidey et al., 2018, Velpuri et al., 2016, Wilhite et al., 2014). Given 70% of the African population depends on agriculture that are largely derived from rain-fed agriculture; drought has significantly affected the agricultural sector for the past several years (McGahey et al. 2008; Notenbaert et al. 2012). Most sub-Saharan region in Africa has been considered the most drought-prone areas. This part of the region is relatively drier, receiving much lower rainfall compared with the rest of the region (Ahmed et al., 2001), and the area has been further confounded by conflicts and poor institutional capacities that attributed significantly to reduce the country's resilience to drought conditions. In Horn of Africa, drought and its consequences (degradation of environmental and natural resources), continues persistent largely due to climate changes, increased human population, inadequate institutional capacities, civil unrest and high poverty levels in the region (Opiyo et al. 2014).

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Many drought incidents have occurred in HOA that become a challenge for rural communities to cope and recover from them over decades. However, in recent years, the occurrence has become more frequent and more severe leaving the affected communities with little ability to develop coping mechanisms. For example, the drought-induced famine that occurred in 2011 in most part of HoA was considered as one of the worst humanitarian crises ever seen in the world, which left over 12 million people in Djibouti, Ethiopia, Somalia for urgent food assistance and more than 320,000 children were suffering from severe malnutrition at the peak of the crisis (Oxfam, 2011). In Somalia, which lies in an arid and semi-arid environment, is frequently experienced recurrent episodes of drought which has become serious natural hazards. The recurrent droughts in Somalia resulted in significant repercussion on environmental, economic and human livelihood. It affects large proportion of the population in a number of ways such as causing loss of life, food shortages which might lead to malnutrition and mass migration. Pastoral communities in arid and semi-arid lands of Somalia have invariably been affected by various disasters, mainly droughts and floods, and they are the most vulnerable members of the society over the years, and is continuing to affect them presently (Lemma and Ahmed 2011). As a result, households' livelihoods and traditional way of coping mechanisms have been reduced or destroyed. The causes and vulnerability among pastoral communities are mainly due to rangeland degradation and climate variability that breeds recurrent droughts, erratic rainfall, a decline in vegetation cover, diminishing livestock productivity. Two consecutive seasons (Gu and Deyr) which are significantly below average rainfall in Somalia have resulted in depletion of grazing resources and significant livestock mortality. Pastoralists who occupy the vast majority in Somalia are hardly meet basic water requirements during the current drought and the problem will most likely get worse due to the incidence of droughts (Abdulkadir, 2017). In this article, the main purpose is to investigate drought adaptation strategies and the major causes of drought in Somalia. The outcome of the study is expected to add up to the understanding of pastoralists of the Somalia about the recurrent droughts and facilitate the adaptation of future droughts.

Research Methodology:-

Description of the study area: this study was carried out in the Galmudug, officially Galmudug State of Somalia, is a Federal Member State in central Somalia, with its capital at Dhusamareb. Geographically, it is located at between 6.0404° N, latitude and 47.7638° E. The area generally it is situated about 750 km from Mogadishu. It is bordered to the north by the Puntland state of Somalia, to the west by the Somali Region in Ethiopia, to the east by Indian Ocean and to the south by the Hirshabelle state of Somalia. Most of the inhabitants in the region are pastoralists. The study area covers about 115,370 km² of land.

Climate:

The semi-arid environment of Somalia is generally characterized by four alternative wet and dry seasons during the year. There are two rainy seasons, known locally as the *Gu* (late March to May) and the *Deyr* (late July to October). The rainy seasons are alternated by two dry seasons locally known as *Jilal* (late October to early March) and *Hagaa* (from late May to early July). Rainfall is erratic and highly variable in space and time. Its occurrence, intensity and distribution are highly unpredictable at any given season.

Socio-Economic Conditions in Somalia, land is mainly used for livestock production and rearing or mix farming (crop and livestock production). Most of the regions in Somalia are dry and cannot support rain fed agriculture. However, the main economic activity in the area of Galmudug is pastoralism. However, the area can hardly support cattle rearing but can be used by camels and small stock because *Qurac* shrubs are abundant. The grazing seasons are extremely short, lasting for a few months after the rains. Again the soils are for most parts are red sandy with semi desert look (Mohamed *et al*, 2022). However, recently, due to frequency of droughts, they have tended to settle around the trading centers and water points to allow the livestock to move as quickly and as frequent as possible to take advantage of the lightest showers even when it is far away. Therefore, settlements are scattered around water points and trading centers of late. When livestock move around, often the children and the elderly are left behind at these centers like Adado, Samareeb and Abudwak.

Research Design

The study was an exploratory one that employed both quantitative and qualitative methods. It used the cross-sectional survey approach. The major focus was to identify the drought adaptation and coping strategies used by the pastoral community and the study further examined the sustainability of the coping strategies of Galmudug State. Field interviews were conducted with household respondents using survey questionnaires. To generate the qualitative data, the study employed key informant interviews and focus group discussions.

Sample Size and Sampling Techniques

The state had estimated a total population roughly is about 128, 7297. In this study, a multistage sampling technique was applied to determine an appropriate sample size. In the first stage Galmudug state was selected purposely among the other States, because, it is largely a pastoral area and is thought to give a good insight about the impact of drought on pastoral livestock production system. In the second stage, three pastoral Districts (Abudwak, Adado, Samareeb,) were selected from the tendistricts of Galmudug state purposively in recurrent climate crises or events, abundant of the domestic animals (especially camel and Goat) and rainfall shortage induced livelihood related effects and research gap. Third stage households were drawn from the three districts based on probability proportional to size. This study was held in Galmudug state. To determine the sample size this study was used with Mugenda and Mugenda (2003)

Data Collection Methods

In this study, the socio-economic data were collected from 123 households; the major issues which were addressed in the household survey include household demographic characteristics, socio-economic characteristics and information about people's perception on drought variability, its impact on their livelihood and adaptation strategies. Each household took an average of one hour to respond to the semi-structured questions or the face-to-face interview. Besides, focus group discussion at each district, one separate focus group discussion was carried with elders, women, and youth groups. Each group was comprised 10-14 participants, per group were conducted to comprehend how the farmers were responding to drought and understand the perception of the people about droughts and variability, its impacts, and their responses to the droughts and variability induced hazards as well as the rainfall fluctuation.

Methods of Data Analysis

The analyses were used to draw descriptive. Descriptive statistics to analyses quantitative and qualitative data collected via household survey, key informant interviews, focus group discussions. To this end, data were first coded, arranged and edited using Excel spread sheets and then analyzed by using SPSS. Descriptive statistics such as frequency, percentage, graphs, charts, tables, mean and range were used to summarize and present the result on demographic and socio-economic characteristics of the pastoralists in the study area.

Results and Discussion:-

This section presents some of the demographic aspects of the respondents. Accordingly, the main demographic features of the respondents featured in this section include:

Distribution of Respondents by Level of Education

As one of the basic indicators of one's socioeconomic status, the researcher sought to establish the level of education of the individual respondents. The pattern of this distribution is as presented in Figure 1.

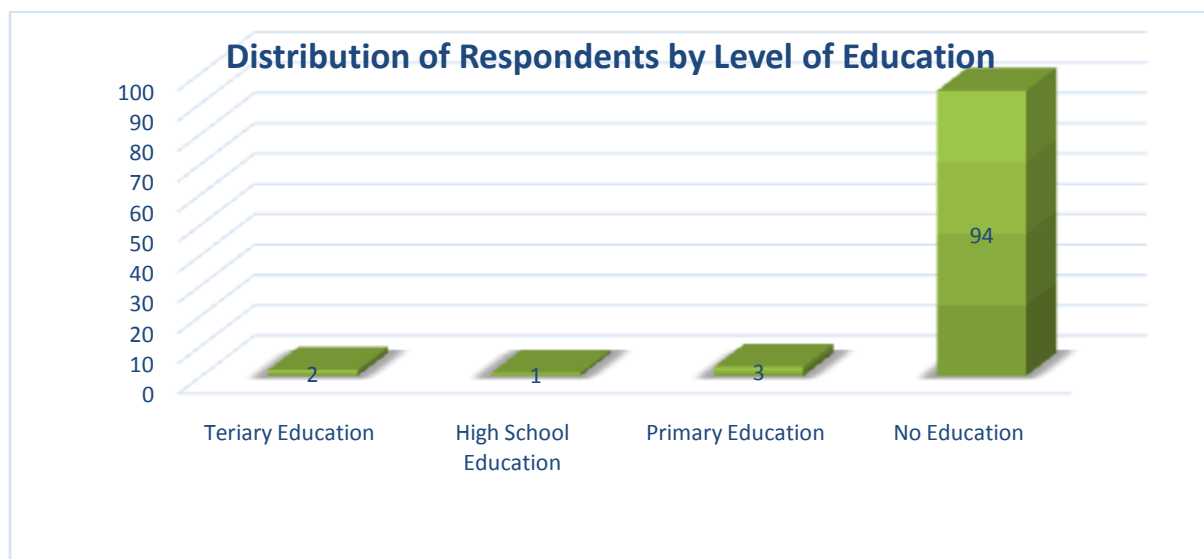


Figure 1:- Distributions of respondents by level of education.

Literacy is the most important factor or instrument for understanding facts (e.g., about drought) and changing our lifestyle and/or strengthening our resilience, coping and mitigation to various climate hazards. So, the educational status of respondents in all districts were very low, only 6% of sampled respondents were literate and attended formal education, the remaining percent comprising majority of the respondents in the districts (94%) were illiterate. This may be due to lack of access to educational facilities such as class rooms, insufficient teachers, and prohibitive expenses. This finding concurs with Caleb (2006) who found that 77% of total populations in Turkana Central district of Kenya were illiterate. This low level of literacy has significant negative implication in coping with climate change in their locality.

Table 1:- Demographic characteristics of respondents.

Variable	Description	Frequency	Percentage	Mean	Range	Min	Max
Age(years)				37	47	22	69
	1.20-30	38	30.9				
	2.31-40	29	23.6				
	3.41-50	24	19.5				
	4. 51-60	21	17.1				
	5. Above 60	11	8.9				
	Total	123	100.00				
Family Size				7.02	15	1	16
	1. 1-5	33	26.8				
	2. 6-10	71	57.7				
	3. 11-15	19	15.5				
	Total	123	100.00				

Source: Field Survey (2021)

The age of household head is one of the most essential variables that can influence selection of drought coping strategy. In the study shows that the respondent's age ranges 30.9% fall under the age category of 20-30, 23.6% fall under the age category of 31-40, whereas the remaining 8.9% were above the age of 60. The mean age of the pastoralists were found to be 37 years with a minimum of 22 and maximum of 69. This outcome shows that there is age gap among the respondents and the majority of the respondents fall within the productive age group.

Family size is associated with the availability of labor force that may enable the household to accomplish labor intensive adaptation strategies. With regard to family size of sampled respondents; over one-fourth (26.8%) have family size between 1 and 5 while over one-half (57.7%) of them have a family size of 6 to 10, and the remaining 15.5% of the households have a family size that ranges between 10 and 15. Furthermore, the mean family size is 7.02. These families ranged from 1 to 15 individuals.

Distribution of respondents by Occupation

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Distribution of Respondents by Occupation

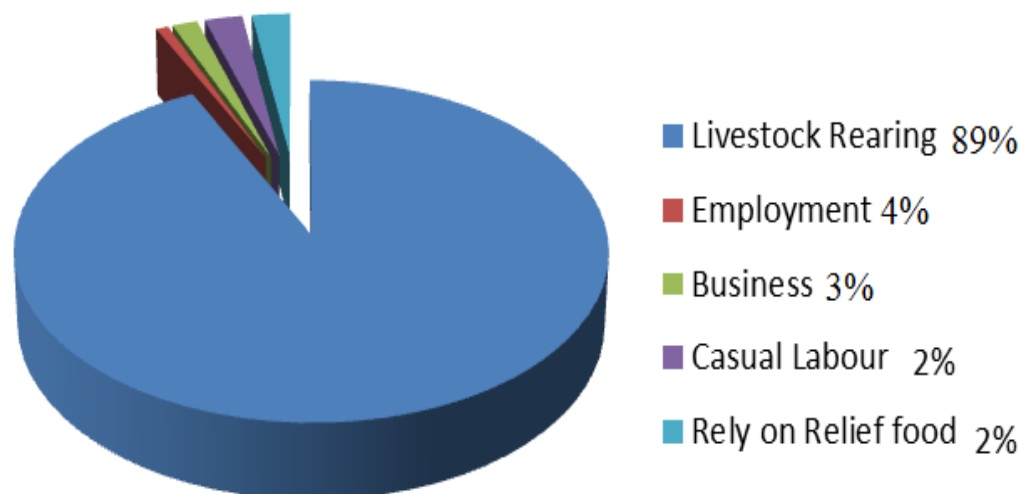


Figure 2:- Distributions of respondents by level of Occupation.

Another basic indicator of socioeconomic status sought using the questionnaire by the researcher was the occupation of the individual respondents. The pattern of this distribution is as presented in Figure 2 above. Livestock rearing was reported to be the main occupation with 89% (n=123) of the respondents relying on it.

Table 2:- Respondent perception about the causes of drought.

Variable	Adado		Abudwak		Samareeb		Total	
	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>
Causes of Droughts								
Scarcity of water	15	12.2%	12	9.7%	59	48%	86	69.9%
Altered weather patterns & Scarcity of water	1	0.81%	0	0%	2	1.62%	3	2.4%
Altered weather patterns	5	4.1%	5	4.1%	24	19.5%	34	27.7%
Total	21	17.1%	17	13.8%	85	69.1%	123	100%

Source: Field Survey 2021

The survey result in Table 2 shows, 69.9% of the respondents believed that droughts were caused by Scarcity of water factor where as 27.7% believed that altered weather patterns factor was prime cause of droughts, where only 2.4% of the respondents believed both Altered weather patterns & Scarcity of water factors as the major cause of droughts in the study area. This indicates that the occurrence of droughts in pastoral community of the study area were caused by natural factors, the result is consistent with Tallaksen *et al.* (2004) findings which indicates that droughts are perceived as a natural occurring. The impact of droughts has been triggering movements of livestock owners to longer distances in search of better grazing areas. During the data collection it was observed that many pastoral households were moving with their livestock towards the study areas in search of water and pasture.

Table 3:- Constraints of drought on local Community in the study area.

Variable	Adado		Abudwak		Samareeb		Total	
	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>	<i>Freq</i>	<i>%</i>
Drought constraints								
Yes	21	17%	17	14%	85	69%	123	100%

No	0	0%	0	0%	0	0%	0	0%
<i>Kind of constraints</i>								
Lack of water	18	14.63%	17	13.82%	73	59.35%	108	87.8%
Lack of market	0	0%	0	0%	1	0.81%	1	0.8%
Lack of pasture	1	0.813%	0	0%	3	2.43%	4	3.2%
Conflicts when there is not enough water	2	1.62%	0	0%	8	6.5%	10	8.1%
Total	21	17.08%	17	13.82%	85	69.1%	123	100%

Source: Field Survey 2021

Households were asked the constraints of drought over the last years. As illustrated in Table 3, 100% of the respondents agreed droughts were the major constraints to the local community. Pastoral communities in the study area were also asked the kind of drought constraints. The survey result shows that 87.8% of the respondents complained lack of water. So as the output shows the impact of droughts is multi-faceted. The most direct impact of droughts on households' livelihoods is a lack of water and declining forage resources for livestock. Water and forage are the two most important resources for pastoral livelihoods. Changes in their availability greatly influence livestock conditions and crop production. During FGDs, it has been identified that livestock death in the area is caused by many factors such as, shortage of water, scarcity of feed, outbreak of diseases, predators and also due to toxic plants. For the period of drought, high animal mortality is primarily caused by shortage of feed, diseases, shortage of water and predators attack, while for the duration of abundance year the causes are disease, predators and toxic plants are also key factors caused by livestock loss. The other important constraints of droughts was the reduction in the number of livestock and their weights as mentioned by the sampled households during the FGD and KII.

Livestock based adaptation strategies

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Table 4:- Adaptation strategies to the drought.

Adaptations Strategies	Respondents				
	N	Yes		No	
		Freq	%	Freq	%
Destocking	123	110	89.43	13	10.57
Diversification livestock species	123	112	91.06	11	8.94
Herd Mobility	123	110	89.43	13	10.57
Drought Tolerance Animals (Camel)	123	103	83.74	20	16.26

Source: Field Survey 2021

Generally, the local communities are already undertaking various livestock adaptation strategies in response to the adverse effects of drought. According to the respondents the major common adaptation strategies practiced were drought tolerance species such as camel, destocking, herd mobility and diversifying livestock. The use of Herd mobility and Diversification livestock species are the most commonly used methods of livestock-based adaptation strategies among the major adaptation options identified in Galmudug State.

Herd Mobility:

It is structures by the rural communities move with their livestock from place to place in search of grassland & water. Although herd mobility in pastoralists is restricted and is not like pure pastoralist due to political conflict among the people in the study area, it still remains crucial and one of the most commonly practiced livestock-based adaptation strategies in the study area.

Herd diversification:

This is an old-style management system of rearing different livestock species in order to minimize drought induced problems and their effects. As a result of recurrent droughts and shortage of livestock feed, especially grasses, pastoral households in the study area have shifted the composition of their livestock species from camel dominated

to goats. This was also confirmed by other authors such as Abdulahi (2013), Abduqadir (2017), Camels and goats, as browsers, are resistant to droughts compared to cattle; their milk is also greatly preferred in local markets (due to their lower fat content); before, cattle numbers per household has been falling. This shows that the climate variability has impacted the livestock composition in the study area.

Destocking:

it is another system in which the number of livestock holding per household is reduced. According to the respondents, in the previous, diversity of available fodder has permitted pastoral households raise different types of livestock in different combinations - sheep and goats or camels, goats and sheep or all. But currently due to drought recurrent livestock problems especially shortage of feed and water, pastoralist in the study area started to sell some of their livestock in order to reduce its quantity and increase the quality of their livestock. This was also confirmed by other study (NERAD, 2015); one of the major effects of climate change is a significant decline in forage resources for livestock. A prolonged delay, late onset and early cessation of rainfall resulted in a shortage of animal feed that in turn contributed to lower productivity. Reports indicate that an increase in frequency and severity of droughts has exhausted the capacity of the land to produce or regenerate pasture as before.

Major Challenges to Adaptation Strategies

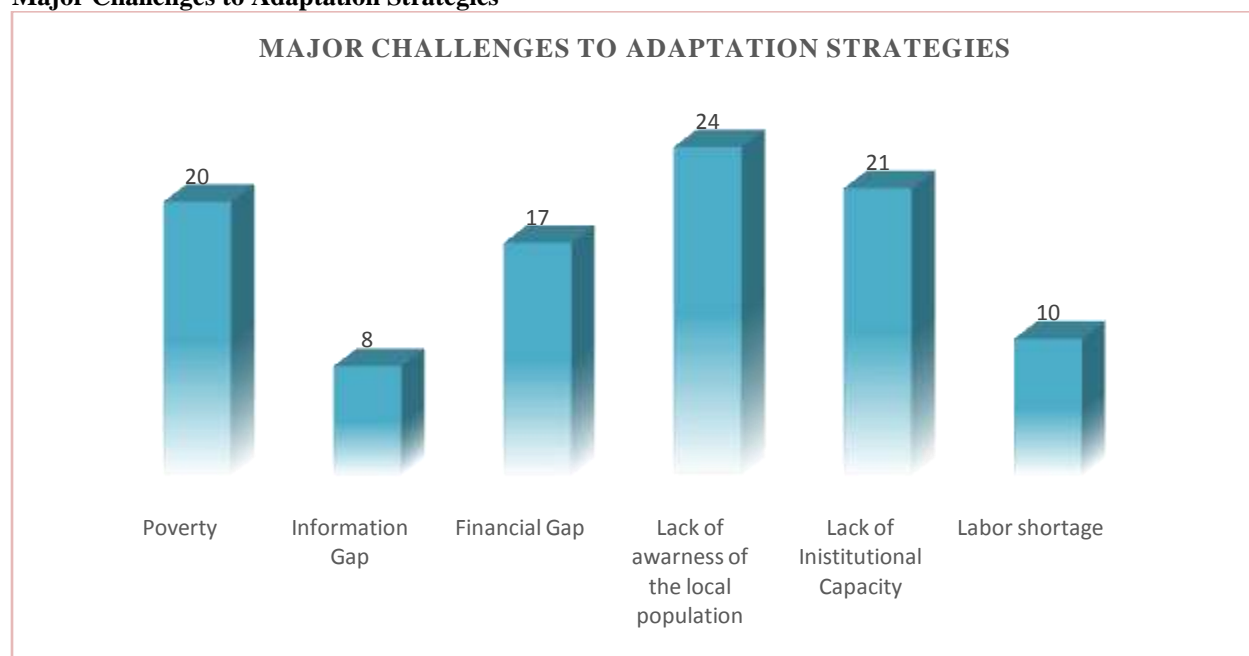


Figure 3:- Major challenges of the adaptation strategies.

According to the survey displaced figure 3, the household respondents were asked if there are challenges through the adaptation strategies, 24% of the respondents indicated there is a Lack of awareness of the local population about drought and its impacts, 20% Poverty, 8% Information Gap, 17% financial gap, 21% lack of institutional capacity and 10% labor shortage where mentioned the existence of labor shortage and information gap the remaining percentage argued there is a knowledge gap of the communities living in the study area.

Poverty:-

Adaptation depends on by cost. Hence, poor households have low adaptive capacity. The people in the area indicated poverty as a major constraint for not taking up the following adaptation options: rainwater harvesting and adopting non-farm activities. For instance, to engage with petty- trading availability of money, to start with, is a primary precondition. According to Key informant interview, community representatives and experts indicated that the study area is exposed to poverty and some people are working with taxi among the districts in Galmudug districts.

Labor shortage:

According to the respondent's herd mobility is a labor intensive and shortage of labor can hinder herd mobility. To move livestock when there is shortage of feed requires labor and if the family don't have enough labor it becomes a challenge. Thus, those households who have high family members can have better chance to move their livestock easily during shortage of pasture and escape the problems induced by droughts.

Lack of meteorological information:-

Lack of information is one of the most important barriers to adapt in the study area. Weather forecasts related with onset and/ offset of rains have never been communicated. They also said that the weather information that rarely delivered to them for pre-harvest is very general and lack specificity. This adversely affects the accuracy, trustworthiness and acceptability of meteorological reports.

Financial barrier:

Is another challenge to adapt climate change conditions according to the respondents.

Information gap:

According to the respondents access to reliable information about the market, upcoming seasons and adaptation options is what they are lacking.

Conclusion:-

The study showed that the influence of drought among pastoral communities normally manifests itself in the form of livestock losses which adversely affects the provision of subsistence income, and other socio-cultural goods and services to pastoral households. Most of the adaptive and coping strategies to drought are rather reactive and mainly intensify exploitation of existing resources, which may in turn undermine the very livelihoods that they are meant to accomplish. Existing opportunities for long-term adaptation strategies to drought appear constrained by a number of socioeconomic problems, political changes, and deteriorating ecological conditions.

Pastoral communities in the study area have been living with the expectation of drought for a long time. They have been suffering, and arguably and increasingly suffer substantial losses in capital and household savings. The impact of drought is particularly acute for poorer households with smaller livestock and farmland holdings as well as lesser socio-economic support systems. Most of the household respondents reported that they have experienced drought impacts with varying degree over years.

Similarly focus group discussions and key informants were asked about the situation of drought occurrence for the last three decades in the study area and most of them indicated that high frequency of drought were experienced in recent years which were not familiar before and it has negative effect on the livelihood of agro-pastoralists in the study area.

Adaptation to drought is a means of responding to the impacts of climatic changes, using indigenous knowledge systems or technological driven practices, whereas coping strategies are short-term response to an immediate and in habitual decline in access to food, and means acting to survive. Therefore In response to the impact of droughts, agro-pastoralists in the study area have already adopted various adaptation techniques such as crop diversification, adoption of early maturing crops, changing planting date, soil and water conservation, rainwater harvesting, livestock diversification, herd mobility and reducing livestock holding.

References:-

1. Abdulkadir, G.2017. Assessment of drought recurrence of Somaliland: Causes, impacts, and mitigations.*International Journal of Climatology*,doi: 10.4172/2332-
2. Abdullah MY, Mohamed SA.Perception of Climate Variability and Its Impact by Smallholders in Pastoral Systems of Abudwak District, Galmudug State, Somalia.*Research Square*; 2022. DOI: 10.21203/rs.3.rs-1243519/v1.
3. Devereux, Stephen, 2006. Vulnerable Livelihoods in Somali Region, Ethiopia.Institute of Development Studies.April 2006 UK .196pp.

4. Dondeyne, S. Emanuel, L.B. and Deckers, J.A. 2003. MrNapite's botanical knowledge: bridging farmers' and scientists' insights during participatory research. *African Journal of Indigenous Knowledge Systems*.2(2): 45–57.
5. Elsa, E. Moreira, C.A.C. and Ana, A.P. 2008. SPI-based drought category predication using log linear models. *Journal of Hydrology*.354: 116–130.
6. Gautam, M. 2006. Managing Drought in Sub-Saharan Africa: Policy Perspectives. Drought: Economic Consequences and Policies for Mitigation Washington, D. C. World Bank.
7. Gidey, E., Dikinya, O., Sebegu, R., Segosebe, E., & Zenebe, A. (2018a). Modeling the spatio-temporal meteorological drought characteristics using the standardized precipitation index (SPI) in raya and its environs, northern Ethiopia. *Earth Systems and Environment*, 2(2), 281–292.
8. ILRI (International Livestock Research Institute). 2006. Assessment of the impacts of the drought response program in the provision of emergency livestock and water interventions in preserving pastoral livelihoods in northern Kenya. Report of an ILRI Multidisciplinary Scientific Team of Consultants Assessing the Emergency Drought Response Project in Northern Kenya.
9. Lemma, B. and Ahmed, J. 2011. The impact of climate change and adaptation strategies of coping mechanisms by agro-pastoral communities in Gabiley, Somaliland.
10. Nassir M and Keder J. 2017. Mitigating Natural Disasters in Somaliland Policy Options and Strategies. Hargeisa, Somaliland
11. NERAD, 2015. Study on Traditional Coping Mechanisms in Disaster Management, Hargeisa, Somaliland.
12. Opiyo, F.E.O., O.V. Wasonga, and M.M. Nyangito. 2014. Measuring household vulnerability to climate-induced stresses in pastoral rangelands of Kenya: Implications for resilience programming. *Pastoralism: Research, Policy and Practice*. 4(10): 1–15.
13. Wilhite, D. A., Sivakumar, M. V., & Pulwarty, R. 2014. Managing drought risk in a changing climate: The role of national drought policy. *Weather and Climate Extremes*, 3, 4–13.