



Research Paper

## Impact of drought on live stock production, performance and livelihood of pastoral community in Wanlaweyn district, Somalia

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### ABSTRACT

Drought is a complex event which may impair community livelihoods, livestock, and social economic, agricultural and other activities of the society. It is a prolonged abnormally dry period when there is shortage of water for normal needs. It is temporary, recurring natural disaster, which originates from the lack of precipitation and brings significant economic losses. It is a slow poison, no one knows when it creeps in, it can last any number of days and its severity cannot be predicted. The non-structural characteristics of drought impact has certainly hindered the development of accurate, reliable and timely estimate of severity and ultimately, the formulation of drought preparedness plans by most government. The impact of drought like those of other hazards, can be reduced through mitigation and preparedness.

This study determined the impact of drought on postural performance in Wanlaweyn district Somalia. Somalia after collapsed in the central government in 1991 destructed all infrastructures including drought mitigation activity, assessment institution. The main objective of this study was to identify the impact of drought on postural performance in Wanlaweyn district Somalia and to explain the root causes of the drought. The study was conducted through survey design, data was collected through questionnaire technique by the researchers and analysis was done by using SPSS. Results of analysis are presented through tables and figures, 80 respondents were used for the study each respondent was issued with one questionnaire.

The conclusion is that drought has significant impact on postural performance in Wanlaweyn district Somalia. So the researcher recommends drought management plans to take full advantage of the drought preparedness measures. All-drought-relevant sectors including agriculture, food security, the environment, meteorology, water and energy have to be included in the drought policy development process and preparedness plans, integrated proactive drought policies should encompass.

**KEYWORDS:** Drought, Livestock and Postural society.

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### I. INTRODUCTION

Drought is a serious socio-economic challenge to many countries in the world, drought is the result of the deficiency in water supply, whether atmospheric, surface or groundwater. A drought can occur when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm to the economy. Prolonged drought has caused mass migrations and humanitarian crises. Agriculture is affected adversely because of drought. (J. S. Juana et al., 2014).

Drought has serious consequences on the economy of a country as a whole and particularly the socio-economic life of agricultural communities. In addition to the economy and people, drought results show that periodic drought leads to a significant decline in sector output, factor remuneration and deterioration in households' welfare. Drought causes low water supplies that are inadequate to support economic activities. (J. S. Juana et al., 2014).

The effects of drought could be categorized into two; direct or primary, and indirect or secondary and tertiary effects. The direct effect is evidenced by crop failure, livestock death or weight reduction in agriculture and its related sectors, while the secondary effect is evidenced by the inter-sectoral linkages, value added at factor cost, and households' income and general welfare. Drought, leads to livestock death, reduced crop yield and livestock weight, low pasture production and increased distances to water livestock. (J.S. Juana et al., 2014)

## **II. RESEARCH METHODOLOGY**

### **General Objective**

The general objective of this study is to identify the impact of drought on livestock production performance and livelihood of pastoral community in Wanlaweyn district.

### **Specific objectives**

- To determine the socio-economic impact of drought on livestock performance in Wanlaweyn district Somalia.
- To identify the relationship between climate change and drought in Wanlaweyn district Somalia.
- To assess the effect of drought mitigation on livestock recovery in Wanlaweyn district Somalia.
- To find out the relationship between deforestation and drought in Wanlaweyn district Somalia.

### **Significance of the study**

The findings of the study will serve as guidance for the civil society, local authorities, local community, and community based organization, business unions, NGOs both national and international who are operating in the field of livestock and rural society in Somalia. The findings of the study will provide research based and up to date information to future researchers and academicians about on postural performance in Wanlaweyn district Somalia, thus contributing to the body of knowledge about the subject under investigation.

### **Scope of the study**

This study will concentrate on the impact of drought on livestock production performance and livelihood of pastoral community in Wanlaweyn district. The study will be conducted in Wanlaweyn district – Somalia.

### **Research design**

This study was cross-sectional and descriptive in design. It will be descriptive because it is going to describe the impact of drought on postural performance in Wanlaweyn district Somalia and also the researcher was collect the data from study subject's one point in time.

### **Target population**

The nomadic peoples that lives on pastoral areas in Wanlaweyn district, experienced elders for rearing livestock, ministry of livestock, ministry of planning and national development, veterinarians, those involves animal production field and international NGOs will be the target for this type of study. The target population will consist of old people who are willing to participate to the study. Therefore this data was collected from this target population in Wanlaweyn district – Somalia.

**Study Area** This study is carrying out in lower Shebelle, specifically in Wanlaweyn district Somalia.

### **Sample size**

Slovene's formula will be used in this study to calculate the appropriate sample size.

The Slovene's formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where ( $n$ ) is the required sample size, ( $N$ ) is the target population size and ( $e$ ) is the standard error or level of significance which is popularly known to be =0.05 or 5%. For this study,  $N = 100$  and so the sample size was calculated as follows:

The Slovene's formula:

$$\text{The Slovene's formula : } \left[ n = \frac{100}{1 + 100(0.05)^2} = 80 \right]$$

The sample was consists of 80 respondents. The researchers are distributing the sample size for the target population in Wanlaweyn district, Somalia.

### **Sampling Procedure**

Non-probability sampling is a way of sampling where the researchers use a judgment to select population members who are good prospects for precise information, the sampling procedure will be non-probability purposive sampling used to select the sample. The reason for choosing this approach is that respondents who are eligible to participate in this study are purposively chosen as target respondents of the study.

### **Data Collection Procedure**

Semi structured questionnaires will be used to collect quantitative data. Selected research assistants who are familiar with English and the local languages spoken in Wanlaweyn and also had some prior research experience in data collection will translate the content of the questionnaire.

## **III. RESULTS, DISCUSSION AND RECOMMENDATION**

*Table 1: Number of livestock*

Number of Livestock	Frequency	Percent	Valid Percent
30-60	19	23.8	23.8
60-100	29	36.3	36.3
100-150	11	13.8	13.8
150-200	21	26.3	26.3
Total	80	100.0	100.0

According to table 1, the majority respondent 29(36.3%) the number of livestock held or keeping actually that in between 60-100 livestock , 21(26.3%) have also keeping livestock that in between 150-200, 19(23.8%) have number of livestock in between 30-60, while 11(13.8%) also keeping livestock that in between 100-150.

*Table 2: land*

Area	Frequency	Percent	Valid Percent
1-3ha	45	56.3	56.3
3-5ha	30	37.5	37.5
6-8	5	6.3	6.3
Total	80	100.0	100.0

According to the table 2, the majority of respondent 45(56.3%) have above 1-3 hecters of land possessing at that moment, 30(37.5%) have 3-5 hecters while 5(6.3%) have 6-8 hecters possessing at this moment.

*Table 3: Loss of Livestock*

	Frequency	Percent	Valid Percent
15-50%	35	43.8	43.8
51-70%	35	43.8	43.8
71-90%	10	12.5	12.5
Total	80	100.0	100.0

According to the table 3, the respondent people that we met 35(43.8%) have lost or died their livestock due to effect of last drought in the number in between 15-50 animals, 35(43.8%) were also lost that in between 51-70 livestock while 10(12.5%) also lost or died their animal that in between 71-90.

**Table 4: Loss of Wealth**

	Frequency	Percent	Valid Percent
10-40%	11	13.8	13.8
41-60%	17	21.3	21.3
61-80%	25	31.3	31.3
81% above	27	33.8	33.8
Total	80	100.0	100.0

According to the table 4, the majority of respondent 27(33.8%) were above 81% were lost their wealth due to the drought direct or indirect 25(31.3%) that in between 61-80% were lost their wealth in that time while 17(21.3%) were in between 41-60% lost their wealth while 11(13.8%) that in between 10-40% were also lost their wealth due to drought.

**Table 5: Drought interval**

	Frequency	Percent	Valid Percent
1-3	29	36.3	36.3
4-6	19	23.8	23.8
7-10	23	28.8	28.8
10 above	9	11.3	11.3
Total	80	100.0	100.0

According to the table 5, the majority of the respondent 29(36.3%) were met to drought 1-3 times entire their life, 23(28.8%) were met 7-10 times, 19(23.8%) were met 4-6 times while 9(11.3%) were met above 10 times.

**Table 6: Average price of Livestock**

	Frequency	Percent	Valid Percent
10-29	3	3.8	3.8
40-49	3	3.8	3.8
50-59	9	11.3	11.3
60 above	65	81.3	81.3
Total	80	100.0	100.0

According to the table 6, the majority of the respondent 65(81.3%) believe that the average declined in different types of livestock during drought period above 60%, 9(11.3%) that in between 50-59% ,also 3(3.8%) of respondents supported that point while 3(3.8%) also believe that.

#### IV. DISCUSSIONS

The result from this study showed that the most people have lost a number of livestock including camel, cattle, goat and sheep. The Wanlaweyn district is one of the largest numbers of nomads, severe drought leading to a water shortage, food insecurity and pasture scarcity have resulted in an increase in livestock mortality.

The data also showed the overall average price decline in different types of livestock, the price of both small and large stocks continue to fall, while cattle as lowest price during drought periods. Therefore while the price of livestock have declined, the price of basic food commodities has increased resulting in worsening livelihood of the people and the households have depleted their saving income to pay for water, food and other essential needs. The change in livestock price, decline the herd size and reduction of animal weight has effect the contribution of livestock income to the household needs, thus most of households lack supplementary incomes to sustain their basic life.

## V. CONCLUSIONS

Drought is a deficiency of precipitation over and extended time period which results in water shortage for various activities and environmental sectors.

Based on various characteristics such as severity, duration, spatial extent, loss of life, economic loss, social effect, and long-term impacts. Several studies have found that drought is the most far-reaching among all natural disasters in the context of poverty and food insecurity as well as political instability, drought and its associated impacts is responsible for more deaths and displacement of people than any other natural disaster.

The adverse impacts of drought are particularly devastating for the poorest and most vulnerable groups in the dry lands of developing countries, where economy relies on rain-fed agriculture and pastoralism. Developed countries are also affected, but in different ways: while drought-related famine is no longer an issue, there is increasing threat to energy security, water use for industry and services, forest fires and natural habitats.

From the previous data we can conclude the extreme importance of drought on pastoral society in these countries for many purposes but for better survival in these complex conditions associated with the drought difficulties. So, the impact of drought on pastoral performance is to be investigated in more detail for better application measures to avoid or minimize for next future the detrimental effect of drought on pastoralist.

## VI. RECOMMENDATION

- Although the study was carried out in Wanlaweyn district, there is a need for further research across the whole country.
- Other researchers are encouraged to test the generalizability of this study by conducting the same study in other districts within Wanlaweyn or other regions of Somalia.
- Local authorities are encouraged to develop mitigating measures for drought and better drought forecasting would provide farmers with more time to prepare for drought and would lessen, or even eliminate.
- Improved drought monitoring techniques, such as the increase in the quality and quantity of automated weather stations, would ultimately enhance accurate short- and long-term drought forecasting. Establishing food price monitoring systems, crop and livestock (weather), insurance, savings, cash transfer facilities.
- The implementation of more advanced pastoral and agriculture production systems and practices would provide better protection of livelihood from drought, thereby reducing community's vulnerability to drought.
- All sectors should be investigated for drought vulnerability because they are all affected by drought in one way or another.
- Additionally, it is important that the general public's awareness of drought and its impacts is raised because they can take measures to conserve water during times when water is becoming scarce.
- In non-drought period pastorals has to create income diversification, proper and planning migration within income diversification measure, infrastructure (transport, storage, telecommunication, etc.).
- Establishing fodder conservation system like hay and silage, drought resilience breeding, fostering livestock markets, stocks, managing pastorals and crop/livestock integration, risk and vulnerability assessment.

## REFERENCES

- [1]. Gautam, R. C., & Bana, R. S. (2014). Drought in India: Its impact and mitigation strategies—A review. *Indian Journal of Agronomy*, 59(2), 179-190.
- [2]. Monacelli, G., Galluccio, M. C., & Abbafati, M. (2005). Drought assessment and forecasting. Drought within the context of the region VI.
- [3]. Singh, B. B., Ajeigbe, H. A., Tarawali, S. A., Fernandez-Rivera, S., & Abubakar, M. (2003). Improving the production and utilization of cowpeas as food and fodder. *Field Crops Research*, 84(1-2), 169-177.
- [4]. Tadesse, D. (2010). The impact of climate change in Africa. *Institute for Security Studies Papers*, 2010(220), 20-20.
- [5]. Masih, I., Maskey, S., Mussá, F. E. F., & Trambauer, P. (2014). A review of droughts on the African continent: a geospatial and long-term perspective. *Hydrology and Earth System Sciences*, 18(9), 3635-3649.
- [6]. Carena, M. J., Bergman, G., Riveland, N., Eriksmoen, E., & Halvorson, M. (2009). Breeding maize for high yield and quality under drought stress. *Maydica*, 54(2), 287.
- [7]. Liu, K., Wang, L., Xu, Y., Chen, N., Ma, Q., Li, F., & Chong, K. (2007). Overexpression of OsCOIN, a putative cold inducible zinc finger protein, increased tolerance to chilling, salt and drought, and enhanced proline level in rice. *Planta*, 226(4), 1007-1016.
- [8]. Elbadawi, I. A., Ghura, D., & Uwujaren, G. (1992). World Bank adjustment lending and economic performance in sub-Saharan Africa in the 1980s. *Country Economics Department WPS*, 1000.
- [9]. Comas, J., Connor, D., Isselmou, M. E. M., Mateos, L., & Gómez-Macpherson, H. (2012). Why has small-

- [10]. scale irrigation not responded to expectations with traditional subsistence farmers along the Senegal River in Mauritania? *Agricultural Systems*, 110, 152-161.
- [11]. Eriyagama, N., Smakhtin, V. Y., & Gamage, N. (2009). Mapping drought patterns and impacts: a global perspective (Vol. 133). Iwmi.
- [12]. Mussá, F. E. F., et al. (2014) "Groundwater as an emergency source for drought mitigation in the Crocodile River catchment, South Africa." *Hydrology and earth system sciences discussions* 11.3(2014):2719-2757.
- [13]. Zhou, J., Wang, X., Jiao, Y., Qin, Y., Liu, X., He, K., ... & Zhang, Q. (2007). Global genome expression analysis of rice in response to drought and high-salinity stresses in shoot, flag leaf, and panicle. *Plant molecular biology*, 63(5), 591-608.
- [14]. Shiferaw, B., Tesfaye, K., Kassie, M., Abate, T., Prasanna, B. M., & Menkir, A. (2014). Managing vulnerability to drought and enhancing livelihood resilience in sub-Saharan Africa: Technological, institutional and policy options. *Weather and Climate Extremes*, 3, 67-79.
- [15]. Eriyagama, N., Smakhtin, V. Y., & Gamage, N. (2009). Mapping drought patterns and impacts: a global perspective (Vol. 133). Iwmi.
- [16]. Simelton, E., Fraser, E. D., Termansen, M., Benton, T. G., Gosling, S. N., South, A., & Forster, P. M. (2012). The socioeconomics of food crop production and climate change vulnerability: a global scale quantitative analysis of how grain crops are sensitive to drought. *Food Security*, 4(2), 163-179.
- [17]. Fisher, M., Abate, T., Lunduka, R. W., Asnake, W., Alemayehu, Y., & Madulu, R. B. (2015). Drought tolerant maize for farmer adaptation to drought in sub-Saharan Africa: Determinants of adoption in eastern and southern Africa. *Climatic Change*, 133(2), 283-299.
- [18]. Juana, J. S., Makepe, P. M., Mangadi, K. T., & Narayana, N. (2014). The socio-economic impact of drought in Botswana. *International Journal of Environment and Sustainable Development*, 11(1), 43-60.
- [19]. Ghanbari, S., Bayad, H., & Rezayi, S. Socio-Economical Impact Assessment of Drought on the Rural Agriculture: a Case Study of Rural District in Southern Iran. *International Journal of Environmental Protection and Policy*, 3, 53-56.
- [20]. Ziolkowska, J. (2016). Socio-economic implications of drought in the agricultural sector and the state economy. *Economics*, 4(3), 19.
- [21]. Jiang, R., Xie, J., He, H., Luo, J., & Zhu, J. (2015). Use of four drought indices for evaluating drought characteristics under climate change in Shaanxi, China: 1951–2012. *Natural Hazards*, 75(3), 2885-2903.
- [22]. Masike, S., & Ulrich, P. (2008). Vulnerability of traditional beef sector to drought and the challenges of climate change: The case of Kgatleng District, Botswana.
- [23]. Wang, W., Zhu, Y., Xu, R., & Liu, J. (2015). Drought severity change in China during 1961–2012 indicated by SPI and SPEI. *Natural Hazards*, 75(3), 2437-2451.
- [24]. Leister, A. M., Paarlberg, P. L., & Lee, J. G. (2015). Dynamic effects of drought on US Crop and livestock sectors. *Journal of Agricultural and Applied Economics*, 47(2), 261-284.
- [25]. Leister, A. M., Lee, J. G., & Paarlberg, P. L. (2013). Dynamic Effects of Drought on the US Livestock Sector.
- [26]. Muyambo, F., Jordaan, A. J., & Bahta, Y. T. (2017). Assessing social vulnerability to drought in South Africa: Policy implication for drought risk reduction. *Jamba: Journal of Disaster Risk Studies*, 9(1), 1-7.
- [27]. Gutiérrez, A. P. A., Engle, N. L., De Nys, E., Molejón, C., & Martins, E. S. (2014). Drought preparedness in Brazil. *Weather and Climate Extremes*, 3, 95-106.
- [28]. Loukas, A., Vasiliades, L., & Tzabiras, J. (2008). Climate change effects on drought severity. *Advances in Geosciences*, 17, 23-29.
- [29]. Yusa, A., Berry, P., J Cheng, J., Ogden, N., Bonsal, B., Stewart, R., & Waldick, R. (2015). Climate change, drought and human health in Canada. *International journal of environmental research and public health*, 12(7), 8359-8412.
- [30]. Van Loon, A. F. (2015). Hydrological drought explained. *Wiley Interdisciplinary Reviews: Water*, 2(4), 359-392.
- [31]. Escarcha, J., Lassa, J., & Zander, K. (2018). Livestock under climate change: a systematic review of impacts and adaptation. *Climate*, 6(3), 54.
- [32]. Nkondze, M. S., Masuku, M. B., & Manyatsi, A. M. (2014). The impact of climate change on livestock production in Swaziland: The case of Mpolonjeni area development Programme. *Journal of Agricultural Studies*, 2(1), 1-15.
- [33]. Oguntuase, O. (2018). Climate change and the Nigerian banking sector: An Agenda of Action. Available at SSRN 3263018.
- [34]. Dzavo, T., Zindove, T. J., Dhliwayo, M., & Chimonyo, M. (2018). Effects of drought on cattle production in sub-tropical environments. *Tropical Animal Health and Production*, 1-7.
- [35]. Kgosikoma, O. E. (2006). Effects of climate variability on livestock population dynamics and community drought management in Kgalagadi, Botswana (Doctoral dissertation, MSc thesis. Norwegian University of Life Sciences, Norway).
- [36]. Tindan, P. D. (2013). The causes of and impact from deforestation on local levels sustainable forest management in Ghana: a survey of Dwease and Praaso communities in the Ashanti region (Master's thesis, Universiteti Agder; University of Agder).
- [37]. Chakravarty, S., Ghosh, S. K., Suresh, C. P., Dey, A. N., & Shukla, G. (2012). Deforestation: causes, effects and control strategies. In *Global perspectives on sustainable forest management*. IntechOpen.