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INVESTIGATING THE LONG-TERM IMPACTS OF DROUGHT ON AGRICULTURE IN JOWHAR, SOMALIA

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Abstract: Drought is a recurring natural phenomenon with significant global impacts. Various regions around the world, including India, Israel, southern Africa, and parts of China, experience drought events at different intervals. In some cases, like the North China Plain, droughts have occurred frequently, with 35 reported instances over the past four decades. Both Australia and the United States have faced severe droughts in recent years, with California enduring prolonged periods of low precipitation from 1987 to 1992, and Australia experiencing only one drought-free year in a five-year span. Northeastern Brazil is particularly susceptible to droughts, occurring approximately every four years and often accompanied by flooding. Drought events have had severe consequences, resulting in loss of life and economic disruptions on densely populated continents. For instance, between 1985 and 1988, an estimated 28 million people were affected by drought in India, although Africa has been arguably the most severely impacted region.

Keywords: Drought, recurring phenomenon, global impact, India, Israel, southern Africa, North China Plain, Australia, United States, northeastern Brazil, consequences, Africa.

1. Introduction

Drought is an overall marvel. Dry grounds in

India experience dry spell once at regular intervals, and a comparative recurrence is seen in Israel, southern Africa, and parts of China, albeit in the North China Plain there have been 35 announced dry seasons over the most recent forty years. Australia and the United States have both experienced significant dry seasons this century: California endured back-to-back long stretches of low precipitation between 1987 and 1992 and Australia was totally liberated from a dry spell for just a single year in a similar five-year time frame. In northeastern Brazil, dry spells happen eight out of at regular intervals, frequently joined by floods. Drought has been reprimanded for the demise and financial disturbance on totally occupied mainland's; in 1985 – 1988, for instance, 28 million individuals are accepted to have been influenced by the dry season in India in the time frame, Although Africa seems to have been the most exceedingly awful influenced.

The dry spells of the mid-1980s made a large number of natural evacuees in Africa and colossal languishing over those abandoned. Three huge droughts occurred in the Sahel zone in the twenty-first century— during the 1910s, 1940s, and 1970s. The last is of most worry since it appears to have broadcasted the start of usually drier conditions that have impacted 80% of the number of occupants in the Sahel (Lin, Deng, 2013) Water deficit during dry season spells is maybe the primary pressing factor factors in reape creation around the globe (Nagar, 2017) It can provoke basic yield decline or even reape disillusionment. Near the negative effects of water weight on the yield sum, the quality can similarly be influenced (W. Paper and Issues, 2011). The Horn of Africa is experiencing the most genuine food crisis on earth today Over 12 million people are truly impacted in Djibouti, Ethiopia, Kenya, and Somalia which is the point of convergence of the crisis. The circumstance has extended when contrasted with

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what acquired a half year back, undoubtedly there is an expansion of about 38% in the dry season circumstance to the degree that starvation was authoritatively announced by the United Nations on the twentieth of July 2011 in the center of Southern Somalia (Wilhite, 2000). In 1974 was given the name of Abartidabadeer ("long-tailed") by people throughout the Ogden and Somalia, because it was triggered by a drought that lasted for two years. There is a widespread perception in Somali Region that droughts occur more frequently than in the past. 'I remember when I was a child, the droughts didn't happen so often.

Somali Region has truth be told endured a progression of dry seasons since 1999/2000 and a few zones have confronted three years or a greater amount of sub-optimal precipitation. Despite the way that droughts impact occupations in rural zones most direct and rapidly, since trained creatures and yield creation depend clearly upon precipitation, dealers and expert centers whose business depends upon country compensation are moreover unfavorably affected, as they face declining interest for their product and ventures. Retail stores in country settlements lost compensation, and a couple of stores needed to close down. ('Most associations are engaging to find enough customers'; 'The families who were our customers are buying only one quarter what they used to take (W. Paper and Issues, 2011). In hypothetically, Drought by implication affects rural exercises. The immediate effect incorporates diminished harvest yield, rangeland, and wood productivities. The outcome of these effects brings about a decrease in the pay of ranchers and agro-based businesses, it includes food deficiency and movement to metropolitan zones. This makes dry spell transients increment tension on the social foundation of the metropolitan territories and prompts expanded destitution (Cafer, 2011).

Agriculture usually plays a vital role in the economy of every nation that exists. Not only for the reason that it tends to feed the entire population of a country but also in the respect that agriculture correlates and interacts with all the related industries of that country. ("Agricultural Production and Productivity," 2014). A country is generally viewed as a social and politically stable country on the off chance that it has a truly steady agrarian premise. A stable horticultural industry guarantees a Country of food security. Food security is viewed as one of the necessities of any country. No country can viably develop with a stable farming base while holding a country of "hungry individuals", as these hunger individuals can do nothing what-so-ever towards building up their country. Food security forestalls starvation which has customarily been viewed as perhaps the biggest issue being capable by the little agricultural countries. Most nations rely on farming items and related enterprises for their significant kind of revenue.

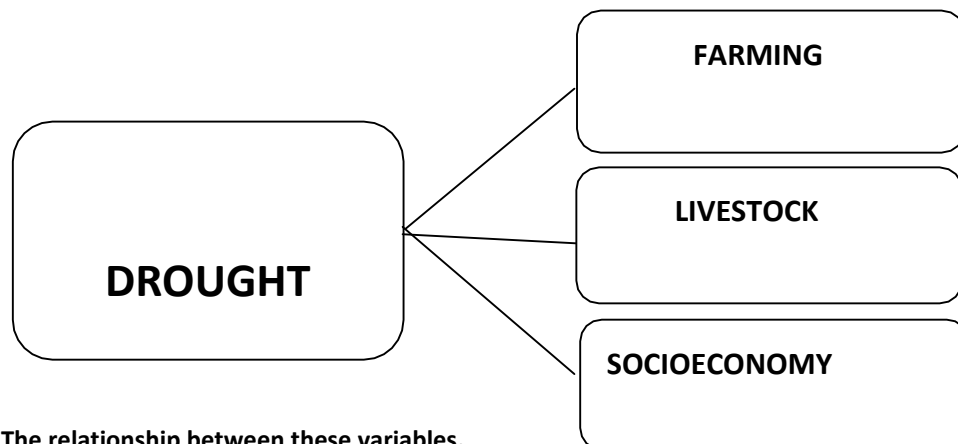
Indeed, even the recently non-industrial nations will find that they rely on and can profit enormously from their farming industry (Lin et al, 2013). Drought is a current problem that results from harmful agriculture production of Somalia that cause came from less rain or unearned expected water that generally has not rained in most Somali regions. However, reduction of agriculture production can create a decrease of income of the farmers, increase in poverty level, enhancing the rate of unemployment, less of gross domestic production, so the researcher requires to investigate this problem whether exist or not. (S. Paper, 2010).

After the Somali government imploded in 1991, the nation crushed by the common war, and tribe partition assumes a significant part in the troublesome circumstance that exists in our local country. Sadly, it is made uncountable relocation from rustic metropolitan for purpose of endurance because a large portion of the ranchers rely on essential of horticultural creation so they moved at the spot that appropriates for life yet the low pay of the rancher is a significant angle that has it is own difficult which makes inaccessibility of fundamental requirements of the ranchers if there is an absence of water there is no farming creation so the two elements are the establishment of each general public on the planet (Africana, 2011). This study has fulfilled the improvement of water that farmers get from the rivers and promote farmers to enhance their productivity of agriculture to reduce poverty and increase their standard of living. The primary target of this investigation is to look at the significant part of drought in agriculture in Somalia between the time frames 1970 and 2018, applying the with the help of

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SPSS software using frequency, percentage, and means to accomplish this wide level headed, this paper is explicitly planned. This is to identify the impact of farming in Jowhar Somalia, to focus the relationship between drought and on livestock in Jowhar Somalia to identify the effect of drought on socioeconomic

1.2: conceptual framework Figure 1: Conceptual Framework



The relationship between these variables.

Drought can reduce livestock and socioeconomic and necessary productive farm, resulting negative significance direct and indirect impact of livestock and socio-economic agriculture sector. Drought can also contribute insect outbreak increase in wildfire and altered rates of carbon, nutrient and water cycling. The direct impact of socioeconomic impact of drought is crop failure and pasture losses. These costs are often passed on to consumers through increased prices.

If plant growth is stopped by drought forage quality may decline rapidly because livestock selectively graze the highest quality forage first. The rate of decline in forage quality and during drought is much more pronounced than in an average growing season but the high risk of socioeconomic droughts remains as climate change prediction presage a warmer climate with possibility worsening reduction of socio economic, farming and livestock. economic impacts to the agricultural sector. Drought can also contribute to insect outbreaks, increases in wildfire and altered

2. Literature review

To explore the role of economic development on farming in Mogadishu, Somalia. To consider the relationship between livestock production and economic development in Mogadishu, Somalia. This study used Descriptive Design and explanatory data on the Agricultural production of livestock and Farming, and the Economic Development from March-28 to June 2017. The study analysis has these two independent variables such as farming and livestock production affects Economic development in Somalia. The study explored the role of farming and livestock in economic development in Mogadishu, Somalia. The researchers checked the regression hypothesis before taking place further analysis. The dependent variable economic development was normally allocated to all the actors' independent variables. Two hypotheses were developed after reviewing the literature (Ahmed et al, 2017).

This study struggles to solve the perplexity in the evaluation of the effects of drought on the price fluctuation of agricultural products by building a partial equilibrium model that describes the balancing process of supply and demand quantitatively. We formulated a database for the IAEEE model just like other computable equilibrium models such as The Enormous Regional Model (TERM), the Global Trade Analysis Project (GTAP) model, and the European car emissions (Hertel 1997; Denis and Koop man 1998; Horridge, Madden, and Wittwer 2005). Applying the IAEEE model for drought, we estimate the effects of drought in North China on national market prices of agricultural products under the three designated scenarios— mild drought, moderate drought, and severe

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drought. The results announced that the price fluctuations of agricultural products differ from scenario to scenario. (Lin et al., 2013).

Studies focus on property break and less so on higher-order, and intangible (non-market, environmental, and social) impacts. The available literature on macroeconomic effects of natural disasters studied mainly on the rapid onset, typically geophysical hazards. Slow onset hazards such as drought requires a different methodology. In Europe, the only existing large-scale study bases on a survey conducted by the Directorate General (DG) Environment in 2006-2007. The economic impacts of droughts for the past 30 years have been predicted to top 100 billion Eur. In the most recent years, the annual costs escalated to over 6.2 billion euros (Markandya & Mysiak, 2010).

This study, therefore, was arranged to reduce the information gap that exists on the impact of climate change on livestock production at the Mpolonjeni Area Development Program. The study was both qualitative and quantitative in that it used peoples' perceptions and empirical data to create the impact of climate change on livestock production. Shows the number of households that own livestock. As shown by the results, 12.1% of the households own only cattle, 22.0% own goats only, and 32.2% own both cattle and goats. Thirty-four percent (33.7%) of the households had no livestock (Nkondze et al., 2013).

3. Methodology

The main purpose of the study was to check the relationship between the impact of drought and agriculture production in Jowhar farmers in Somalia. This study was organized quantitative design and correlation design. The correlation is research in which the researcher determined to an extent an association exists between two or paired variables (Oso&Onen, 2008). The researcher selected this design because he investigated the relationship between two variables.

The target population of this study is Jowhar society, the accessible population is the society of agricultural production bases such as Jowhar where drought happened. After the end of the research, we believe that this study applied to all other areas in which drought was enacted homogeneously. To assure the impact of drought on agricultural production, the target population of this study was 100 of Jowhar society, (Ahmed, 2014).

This study had drought victims who consist of the 100 and error can be 0.1 So, we used the following formula known as Slovene's formula that has written as:

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

$$120000$$

$$\frac{1 + 120000(0.1)^2}{} \quad \text{therefore } n = 100$$

Data were collected from both primary and secondary sources. Primary data was obtained (100) farmers. Secondary data was acquired through reviewing related literature such as published books, magazines, journals, and internet sources

3.1: Data Source and Analysis

To get data from the respondents through the above instruments, the researcher visited the personally and administered the questionnaires to the sample larger farmers and small farmers. They were thoroughly briefed about the procedure of filling the questionnaire. The numbers of the sample large farmers were noted and the results of the small farmers were taken from the controller the owners of farmers. This study was applying quantitative methods for analyzing the data. Tables and percentages charts were used to present and analyze the data in an appropriate way. The data was made using Microsoft Excel and Statistical Package for Social Science (SPSS) as a tool for analyzing the data.

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For determining the validity of questionnaires item analysis to total Person Product–Moment Coefficient of Correlation (r) was computed. The validity coefficients of the questionnaire the same package was used to analyze by computing relative frequencies, means, standard deviations, and other relevant statistics at the unit variety Level, and among others.

Table 1: Data Interpretation

Mean Range	Respondents Mode	Interpretation
1.00 up to 1.80	Strongly Agree	Excellence
1.80 up to 2.60	Agree	Very good
2.60 up to 3.40	Neutral	Normal
3.40 up to 4.20	Disagree	Poor
4.20 up to 5.00	Strongly disagree	Very poor

4. Findings

The first objective of this study was to identify the impact of Drought on farming in Jowhar farmers in Somalia. The respondents were required to indicate the extent of agreement with each of the items by writing the number that best describes their perceptions. To achieve that objective, the respondents were asked several statements related to drought on farming to know their views or opinion. The results are summarized in the following

Table 2: Impact of drought on farming in Jowhar Somalia

Farming	Mean	Std. Deviation
Farming in Somalia is a major employment activity and is the largest economic sector in the country.	1.94	1.221
There is a strong negative relation between farming Production and drought.	2.11	1.043
The result of farming production and livestock production shows an effect that they have a positive and significant effect on economic development in Somalia.	2.19	1.293
Farming is an important economic activity in Somalia not only in terms of meeting the food needs of the population but also in terms of generating income through crops.	2.16	1.245
The quantities of goods produced on farms have, in contrast, Risen dramatically.	2.95	1.344
Total mean & Std. deviation	2.27	1.22

Source Primary Data 2022

The above table presented that to identify the impact of drought on farming in Jowhar farmers in Somalia. Was scored Average Mean 2.27 overall, these results show to identify the impact of drought on farming in Jowhar farmers in Somalia.

Is mostly very good and this is indicated by the total average Mean. Respondents were asked whether they know Farming in Somalia is a major employment activity and is the largest economic sector in the country. The mean score of 1.94 and standard deviation of 1.221, indicates that most of the farmers agree that crop production is an important part of their internal environment of the farmers. also, were asked whether there is a strong negative relation between farming Production and drought. The mean scored of 2.11 and the standard deviation was 1.043

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this indicates that the respondents agree that drought affects farms. Respondents were also asked the result of farming production and livestock production shows an effect that they have a positive and significant effect on economic development in Somalia the mean score of 2.19 and standard deviation of. 1.293 So it tells us that respondents agree that economic development depends on farming. it asked Farming is an important economic activity in Somalia not only in terms of meeting the food needs of the population but also in terms of generating income through crops. The mean score of 2.16 and standard deviation of 1.245 indicates agree. if the quantities of goods produced on farms have, in contras Risen dramatically. The mean score is 2.95 and the standard deviation is 1.344. This indicates that Q5 is agreed.

Table 3: Impact of drought on livestock in Jowhar Somalia

Livestock	Mean	Std. Deviation
Livestock is a very important livelihood asset for the People in both rural and urban.	1.79	1.122
Literature is pointing to the fact that climate change Does Affect livestock production and livestock systems.	2.43	1.075
Livestock has also been affected by the critical shortage of water and pasture.	2.26	1.228
Estimation of livestock numbers and past growth rates, Somalia has about 3.69 million camels, 0.80 million head of Cattle, 13.4 million goats, and 11.75 million sheep.	2.75	1.274
Livestock is the backbone of the country's economy and supports the largest production community of the Somali People.	2.20	1.371
Total mean & Std. Deviation	2.28	1.21

Source Primary Data 2022

The above table presented that the impact of drought on livestock in Jowhar Somalia Was scored Average mean 2.28 overall, these results indicate that the employees of farmers in Jowhar so the result indicate to identify the impact of drought on livestock in Jowhar farmers in middle Shebelle Somalia.

Respondents were asked Livestock is a very important livelihood asset for the People in both rural and Urban this question has different information according to the data; the mean value indicates 1.75 and Std.

Deviation 1.122 they told us that respondents strongly agree that livestock is important. also, were asked that Literature is pointing to the fact that climate change does affect livestock Production and livestock systems. The mean score shows 2.43 and a standard deviation of 1.075 this indicates that they agree. Respondents were asked Livestock have also been affected by the critical shortage of Water and Pasture. The mean score of 2.26 and standard deviation of 1.228 indicate that respondents agree that livestock needs water. they were asked Estimation of livestock numbers and past growth rates, Somalia has about 3.69 million Camels, 0.80 million head of Cattle, 13.4 million goats, and 11.75 million sheep. mean indicates 2.75 and ST. Deviation 1.274 shows us that they agree Somalia has a lot of livestock. they were asked Livestock is the backbone of the country's economy and supports the largest Production community of the Somali People. The mean value is 2.20 and the Std deviation is 1.371 this identifies agree that Somali people depend on livestock.

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Table 4: Impact of drought on Socio-economic in Jowhar Somalia

Socio-economic	Mean	Std. Deviation
When the shortage of water exists and agricultural production Was declines, it creates an imbalance between demand and supply.	1.77	.930
The harm of agriculture production can increase the mortality rate of farmers because They depend upon their production.	2.45	1.175
If the agriculture production mitigates it may cause an increase in the unemployment rate of farmers.	2.55	1.242
Socioeconomic drought occurs when the demand for water exceeds the Supply	2.42	1.249
Small businessman (retailer) who take the outcomes of the farmers they Also suffer a decrease in their business.	2.62	1.324
Total mean & std. Deviation	2.3	1.184

Source Primary Data 2022

The above table examined the impact of socio-economic effects of drought in Jowhar Somalia was scored Average 2.3 overall. Respondents were asked when the shortage of water exists and agriculture production was a decline, it creates an imbalance between demand and supply. The mean score of 1.77 and the standard deviation of .930. This means the majority had strongly agreed with this idea. They were also asked that the Harm of agriculture production can increase the mortality rate of farmers because they depend upon their production. Mean score of 2.45 and standard deviation of 1.175. This indicates that they agree that agriculture production will cause high mortality of the farmers or their children. and were asked If agriculture production mitigate it may cause an increase in the unemployment rate of the farmers. they strongly agreed with a mean score of 2.55 and a standard deviation of 1.242 this shows agree because if agriculture production mitigates it may cause unemployment. Respondents were asked if whether a Socioeconomic drought occurs when the water demand exceeds the supply. The mean score of 2.42 and the standard deviation of 1.249. Q4 agrees that this occurs when there is a shortage of rain. Respondents were asked if that small businessman (retailers) who take the outcomes of the farmers they also suffer a decrease in their business. The mean score of 2.62 and the standard deviation of 1.324. The majority of respondents who Supported this idea are neutral.

Table 5: Impact of drought on Agricultural production in Jowhar Somalia.

Drought	Mean	Std. Deviation
Drought is Africa's principal type of natural disaster.	1.65	.626
Definition of drought Is an unrealistic expectation.	1.99	.718
The extent and intensity of Drought impacts are determined Prevailing economic conditions	2.14	.888
Drought can be classified under four broad categories Physical, social, economic, and Environmental.	2.07	.879
Drought affects agricultural production, livestock, and Socioeconomic.	1.72	.642
Total mean & std. deviation	1.9	3.753

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Source Primary Data 2022

The above table presented that to identify the impact of drought on agriculture production in Jowhar Somalia, was scored Average mean 1.9 overall, the result indicates to identify the impact of socio-economic drought on agriculture production in Jowhar farmers in Somalia. This is indicated by the total average of 1.9. Respondents were asked that Drought is Africa's principal type of natural disaster. Respondents strongly agree with a mean score of 1.65 and a standard deviation of .626. they indicated that natural disaster affects economic development. They were asked that the Definition of drought Is an unrealistic expectation. Respondents agreed with a mean score of 1.99 and a standard deviation of .718 most of them had supported those farmers feel disappointed for their production when during drought. They were asked that the extent and intensity of Drought impacts are determined by prevailing economic conditions. They agreed with a mean score of 2.14 and a standard deviation of .888. Because agriculture usually plays a vital role in the economy of every nation that exists. They were asked Drought can be classified under four broad categories Physical, social, economic, and Environmental. They agreed with a mean score of 2.07 and a standard deviation of .879.

Respondents were asked Drought affects agricultural production, livestock, and socio-economic. Respondents strongly agreed with a mean score of 1.72 and a standard deviation of .642

4.1: Correlation Analysis

The first objective of this study was to identify the relationship between drought and farming in Jowhar Somalia. The correlation between drought and farming as table 6 shows is 0.447 It tells us that a one-level increase of drought leads to 0.447 lower farming. The probability of this correlation coefficient occurring by chance is .000. This coefficient shows that there is a statistically weak relationship between drought on farming ($r = 0.447$, $p < .01$). Thus, hypothesis 1 is accepted. The second objective of this study was to know the impact of drought on livestock in Jowhar Somalia. The correlation between drought and livestock as table 6 shows is 0.697. It tells us that a one-level increase of drought leads to 0.358 lower livestock. The probability of this correlation coefficient occurring by chance is .000. This coefficient shows that there is a weak relationship between drought and livestock ($r = 0.358$, $p < .01$). Thus, hypothesis 2 is accepted. The third objective was to examine the relationship between drought and socio-economic in Jowhar, Somalia. The correlation between drought and socio-economic as table 6 shows is 0.352. The probability of this correlation coefficient occurring by chance is .000. This coefficient shows that there is a weak relationship between drought on socio-economic ($r = 0.352$, $p < .01$). Thus, hypothesis 3 is accepted.

Table 6: Correlations between Drought, Farming, and Socioeconomic

Correlations	Drought	Farming	Livestock	Socio-economy
Pearson Correlation	1	.447**	.358**	.352**
Sig. (2-tailed)		.000	.000	.000
N	100	100	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

4. Discussion and Conclusion

The purpose of this study was to investigate the impact of drought on agricultural production by using the simple correlation analytical technique analysis and collecting data through questionnaire, with a sample size of 100 Jowhar residence. The problem that researchers wanted to realize is the impact of drought on agricultural production in Jowhar farmers in Somalia, as well as to examine the drought is applicable in Somalia. After analyzing the data collected from Jowhar residence the researcher reached the following results:

the correlation between the relationship between drought on farming ($r = .447$, $P < .01$) indicated that there is a negative relationship between drought and farming however; also we found that there is a strong negative

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relationship between drought and livestock ($r=.358$, $P<0.01$); and finally there is a weak relationship between drought and agricultural production which was ($r=.352<0.01$) these findings supported by the previous study made by (Nagar, 2017) which was examined the relationship between drought and agricultural production. Finally, the study revealed a weak relationship between drought and agricultural production.

Drought is one problem that influences numerous parts like social, natural, and affordable, besides; horticulture creation can have an indispensable impact for each country particularly in the creating and under-creating region.

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