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Climate Variability Effect on Food Security and Coping Strategies among the Small Holder Farmers of Onesi Constituency, Namibia

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Abstract: *Climate variability continues to be a major global problem, affecting many sectors. Namibia Climate Change Policy (NCCP) documented that the Onesi region is characterized by rainfall variability, persistent droughts, floods, and extreme temperatures all of which have a significant effect on community despite various national intervention measures put in place. It is against this background that the study sought to assess climate variability and coping strategies of food security by the farmers of Onesi Constituency, Omusati Region, Namibia. The research was guided by the following objectives; the nature of climate trends, effects of climate variability on agriculture, and climate change adaptation strategies. The study employed a mixed-methods Research Design consisting of quantitative and qualitative data of surveys and interviews. The primary data was a raw data collected in the field by interviewing participants, while secondary data of Climate of Districts bordering Onesi was collected from the Namibian Ministry of Environment and Tourism Report of the year 2025. The target population was 23,364 according to Namibia Population and Housing Census report of the year 2023. Yamane's formula $n=N/(1+N(e)^2$ was used to select the sample size of 393 households, comprises of small holder farmers, local agricultural officers, community leaders, women and youth farming households, government stakeholders, and NGOs, FBOs and CBOs. The study applied stratified sampling to ensure representation from different categories of people affected by climate variability. The study further employed purposive sampling to select the above participants who possess in-depth knowledge related to climate variability and food security. Data was gathered using questionnaires, focus group discussions, and key informant interviews. Both the quantitative data and Qualitative data were collected using semi structured questionnaires and was analyzed using Statistical Packages for Social Sciences version 24. Furthermore, qualitative data was analyzed using systematic classification of coding and identifying themes. The data was compressed into themes, by editing, classifying, coding, and keying the data. The key findings showed that irregular rainfall patterns and unpredictable temperature trends are detrimental to crop and animal production, drought has extreme effects on agriculture, and there is a need to grow drought and insect resistant crops. The study concluded that irregular rainfall and variable temperatures are the major contributors of famine in Onesi. The study therefore recommended that the residents should adopt planting varieties of drought-resistant crops rearing more hardened breeds of livestock. The Government should also subsidize the cost of LPGs to reduce the high rate of deforestation. These measures are expected to mitigate climate variability in Onesi Constituency.*

Keywords: *Adaptation strategies, Climate Change, Climate Resilience, Climate Variability, Coping Strategies, Global Warming, Smart Agriculture*

1.1 Background of the Study

Climate variability refers to the variation of the mean state and other statistics of the climate on all spatial and temporal scales beyond that of individual weather events and may be due to natural processes within the climate system or to anthropogenic external forcing, (H. Lee, and J Romero, 2023).Climate Variability can be described by fluctuations of a fairly small number of climate patterns such as Elnino Southern Oscillation North Atlantic Oscillation, Arctic Oscillation, and Northern Annular Mode. It presents a significant challenge to sustainable development because of its harmful effects on the environment, human health, agriculture, food security, economic activities, natural resources, and infrastructure (Orimoloye *et al.,* 2019).

A study of Climate change environmental extremes, and human health in Australia: challenges, adaptation strategies, and policy gaps by Yanming Liu *et al.*(2023). A significant decline in agricultural productivity over the past 30 years is largely attributed by climate change. This has manifested through extreme weather events such as unpredictable and insufficient rainfall, droughts, floods, and cyclones (Dhliwayo *et al*., 2022). Article 95(1) of the Namibian Constitution mandates the protection of ecosystems, the maintenance of vital ecological functions, and the conservation of biological diversity. It also emphasizes the sustainable utilization of natural resources to ensure the well-being of Namibia's population (The-Government-of-Namibia, 2010). Awala *et al*. (2019) analyzed monthly rainfall data from four stations along a 1200 km climatic gradient in Northern Namibia, covering the period from 1987 to 2018. Their analysis of annual, seasonal, and monthly trends revealed an overall increase in annual rainfall, with a decreasing trend in the dry season by -0.14 millimeters per year and an increase in the rainy season by 7.74 millimeters per year. Consequently, the average monthly temperature during the rainy season showed a predominantly upward trend, while the dry season temperature exhibited minor decreasing trends. The study also identified a decreasing rainfall gradient from the northeast to the northwest, with a variation of 156.8 mm and increasing spatial-temporal variability. The rising rainfall trend suggests potential flooding during the rainy season, while the declining trend points to a possible intensification of drought conditions in the dry season.

A study of Climate Change adaptation strategies among smallholder livestock farmers in Namibia's Omaheke Region revealed that challenges of climate change are continuously increasing constituting a major threat to livestock production a socio-economic cornerstone in Namibia's rural communal farmers contributing approximately to two thirds of the country's agricultural GDP, (Avihe *et al.*,2025). Climate variability which may be inform of drought, very high temperatures, floods, frosts has a detrimental effects on feed and water availability, leading to reduced livestock weight, growth production, and reproductive performance, and high mortality. Data were gathered and purposively sampled farmers in *Epikuro* and *Otjombinde* constituencies based on livestock ownership. The study highlighted that 93.8% were aware of climate change attributed both to human and natural activities, although the implementation of adaptations strategies in livestock agriculture is very low. The study recommends employment of extension services, promotion of farmer to farmer extension, and utilization of climate knowledge.

1.2 Statement of the Problem

Climate variability is a major detriment to sustainable livelihoods of the farmers in Onesi Constituency because the area is already one of the driest in Omusati Region. The weather patterns naturally swing between very dry and relatively wet years. These swings are becoming more extreme and unpredictable

which make it harder for people, ecosystems and economy to cope. The area thus experiences unpredictable rainfall, frequent droughts, and water scarcity. The prolonged period of insufficient rainfall and extreme temperatures in Onesi has lasted for more than 15 years.

The livelihoods of farmers in Onesi largely rely on rain-fed agriculture and livestock, both of which are highly sensitive to climate fluctuations. Therefore, farmers cannot plan planting or grazing schedules reliably because for some years there is almost no rain and, in some years, heavy rains and flooding are experienced. Interestingly, even in normal years, the Constituency is dry. Rivers and groundwater are the main sources of water, but they depend heavily on seasonal rains hence low rainfall years strain supply of people, agriculture and wildlife. The event has negatively affected the livelihood of children in which a good number look malnourished due to insufficient food in their families. Livestock die during prolonged dry spells, and crops yield drop sharply leading to food shortages and higher prices. Therefore, the reduced crop and livestock diversity has led to the community relying on narrow range of food resources which has contributed to nutrition deficiencies particularly among the children making the community more vulnerable.

A number of stakeholders from National to community levels have engaged the locals in climate change risk management training and scenario planning. However, the process of adjustment to expected Climate Variability seems to be undertaken in an uncoordinated manner because the structures for addressing phenomena are still in preliminary stages of establishment. In fact, the National Climate change strategies seem not to be available in Onesi. Therefore, the actors involved in activities find themselves implementing Climate Variability Coping Strategies by default. The issue of climate variability needs to be addressed, and failure to which may lead to more frequent droughts, food insecurity, water scarcity, health risks, damage to biodiversity and forced migrations.

1.3 Research Question

What are climate variability effects on food security and coping strategies among the small holder farmers of Onesi Constituency, Namibia.

1.4 Hypothesis

There is no significant relationship between climate variability effects on food security and coping strategies adopted among the small holder farmers

1.5 Theoretical Framework

1.5.1 Climate Resilience Theory of Change

This research is underpinned by the climate resilience theory of change, originally formulated by Auguste Comte (1798–1857), who is a key figure in its development. The Climate Resilience Theory of Change is a strategic framework used to understand and guide efforts to build resilience to climate change impacts. It helps communities outline steps needed to achieve long term resilience goals by linking activities, outputs, outcomes, and impacts in a logical sequence. The theory asserts that climate change presents a significant challenge to society, necessitating urgent actions that focus on enhancing resilience and developing adaptive strategies (Aldunce et al. 2016). However, fostering resilience requires a clear understanding of how different stakeholders perceive and articulate the concept in various contexts. Resilience frameworks often highlight the importance of participatory processes, collaborative knowledge creation, and the involvement of stakeholders and decision-makers. Despite

this emphasis, there is limited practical validation of these frameworks. Addressing the complexity of climate change, resilience demands active engagement from governments, citizens, scientists, and the private sectors.

Nevertheless, there are critiques regarding the roles of these diverse actors, particularly scientists. Scientists have developed theoretical frameworks to explore the impacts of climate change and the responses of individuals and communities (Berrang-Ford et al. 2011; Djalante and Thomalla 2010). In Climate resilience, there is an interest in getting conversant with the impacts, the future generation of climate changes, and the adaptations we need to take to minimize the risks threshold. The risks are managed and opportunists are exploited by the stakeholders. The Climatic Resilience Theory of Change highlights the necessity of adaptation when conditions worsen, which has been observed in communities affected by extended drought periods. These communities have been compelled to diversify into non-pastoral activities due to climate variability, such as engaging in small-scale trade, farming, casual labor, and formal employment (Debela, McNeil, Bridle, & Mohammed, 2019). The response to such disasters is influenced by the severity of the impact and the available alternatives (Pollini & Galaty, 2021). This theory is relevant to the study as it supports the examination of adaptive strategies in response to climate variability. Resilience theorists also emphasize the process of reorganization, where resources are realigned into a new system to capitalize on emerging opportunities.

1.6 Literature Review

Global climate has undergone significant changes since the 1900s, presenting a critical challenge to food security. With the global population expected to reach 2.4 billion by 2050, agricultural output must rise by approximately 70 percent to meet future needs (FAO, 2019). “The Food and Agriculture Organization (FAO) reports that both gradual climate changes” and recent extreme weather events have hindered efforts to reduce poverty and food insecurity, impeding overall development progress (Panagiotis Karfakis et al., 2023).

Economic sectors like agriculture and fisheries, which depend significantly on weather patterns, are increasingly being impacted by climate change. The challenges posed by global climate change are particularly severe for agriculture. It is well-recognized that the growing occurrence and severity of extreme weather events—such as cyclones, droughts, floods, and desertification—adversely affect agricultural productivity and the viability of farming livelihoods. Climate change can alter multiple dimensions of agriculture, including crop yields, market conditions, food prices, and supply chain logistics. According to projections by Dawson et al. (2016), by 2050, around 31% of the global population might face risks of undernourishment due to expected changes in population and land use, assuming the current climate change trends continue.

Shifts in temperature and precipitation patterns have significant implications for water resources, impacting various socioeconomic aspects, physical environments, and hydrological processes (Shikangala, 2020). By 2030, it is anticipated that nearly half of the global population may face water scarcity. In 2019, climate-induced droughts caused severe disruptions in areas including North Eastern China, North Korea, North Ontario (Canada), Southern Australia, and several African countries such as Angola, Botswana, Zambia, South Africa, Zimbabwe, and Namibia. According to Denis Garcia, the susceptibility to climate change is shaped by factors such as geographic proximity to the Equator,

dependence on agriculture, and shortcomings in socioeconomic management, financing, poverty levels, and demographic growth (Shikangala, 2020).

Nelson et al. (2019) forecast that agricultural commodity prices will deviate from historical trends, with global maize prices expected to rise by 61% from 2010 to 2050. China faces multiple challenges, including resource constraints exacerbated by industrialization and urbanization. Addressing these challenges through the development of China's agricultural sector and a comprehensive climate risk management framework is crucial.

A study by Singh et al., (2020) in Jodhpur District in India reveals that only 0.46% of the district's land area is forested. Tube wells account for over 90% of the total irrigation in the region. The district's agriculture relies on crops such as millets, jowar, pulses, and groundnuts during the *kharif* season, and wheat, barley and mustard during the *Rabi* season. The agricultural sector in Jodhpur district is highly susceptible to climate change (Singh *et al*., 2020). A field survey aimed at identifying factors contributing to household vulnerability revealed that farmers with limited education and those with small landholdings are particularly vulnerable to climate-related shocks. These groups struggle more with adapting their agricultural practices and diversifying their livelihoods.

A study on climate variability and food security in Malawi has highlighted the country as being highly vulnerable to the adverse impacts of climate change, such as droughts, dry spells, and floods (World Bank, 2021). Agriculture serves as the main livelihood for the majority of rural Malawians, and the increased frequency of extreme weather events significantly threatens food security and efforts to reduce poverty. Irrigation practices are limited, with most farmers depending on rain-fed agriculture. Kenya's climate varies significantly across different regions, with high temperatures at sea level and lower temperatures in mountainous areas. Annual rainfall ranges from less than 250mm in arid and semi-arid regions to more than 2000mm in areas with high agricultural potential. According to the Government of Kenya (2016), of the country's total land area of approximately 582,646 square kilometers, only 12% is highly suitable for agriculture. Agriculture is a crucial part of Kenya's economy, with farmers relying heavily on rain-fed agriculture for their livelihoods. It contributes 26% to the Gross Domestic Product and 60% to foreign earnings, making it essential for both urban and rural populations. However, frequent climatic changes have caused severe droughts and flooding, leading to a decline in agricultural productivity.

Namibia is recognized as the most arid country in Southern Africa, with annual rainfall varying significantly across the country. In the North East Caprivi region, rainfall exceeds 600 millimeters, while the South West receives less than 50 millimeters annually, (FAO, 2021). The country experiences substantial water loss through evaporation, which ranges from under 2,400 millimeters per year along the North East Coast to over 3,800 millimeters per year in the South East. Groundwater reserves are crucial for Namibia, meeting more than half of the nation's water needs. The economy relies heavily on natural resources, with the primary sector contributing 24.4% to the GDP in 2008. Agriculture and forestry account for 5.5% of the GDP, with livestock farming representing 3.2% of this figure. Approximately 78% of the land is utilized for agriculture, and about 70% of the population engages in subsistence farming, employing 27% of the national workforce and 58% of the rural workforce. The livestock sector, including both commercial and small-scale farming, is vital for local livelihoods. Cattle

farming, which covers roughly 38% of Namibia's land in the Northern and Central regions, faces challenges due to low productivity linked to insufficient rainfall (FAO, 2021).

Around 70% of Namibia's 2.1 million populations resides in rural areas and depends directly on subsistence farming for their livelihoods. Their primary diet includes maize, porridge (*Oshifima*), and a variety of other foods such as meat, fish, pasta, potatoes, and vegetables (Oshikundu, 2021). The state-owned Meat Corporation of Namibia (Meatco) reported a significant decrease in cattle slaughter, with only 36,074 cattle processed in 2021 due to drought, compared to 116,304 in 2019 when many farmers sold off their herds following the peak of the drought. The climate in Namibia is anticipated to become increasingly hot and dry, with more unpredictable rainfall (FAO, 2021).

A study conducted by Shikangala, (2020) revealed that the rainfall during the 2019 drought was the lowest recorded in Windhoek since 1891, making it the most severe drought in the past 90 years for the country. The combination of irregular rainfall and low soil moisture resulted in decreased agricultural output and severe water shortages, impacting numerous communities in Namibia. Consequently, about a third of the country faced food insecurity, and thousands of livestock were lost due to the drought. The Ministry of Environment, Forestry, and Tourism of Namibia has identified the increasing frequency of wildfires as a growing issue, contributing to significant losses in livelihoods, environmental health, infrastructure, natural resources, and income sources (Lita, 2021). For example, a wildfire destroyed crops and irrigation infrastructure at the Sikondo irrigation project in the Kavango East Region. Despite the critical importance of climate variability and associated coping strategies, there is a noticeable absence of research specifically addressing these issues in Namibia.

In the Omusati region, the issue of climate change has emerged as a major concern. The area is predominantly rural, with many residents engaged in subsistence farming. Along the Olushandja dam and the Nam-water Canal, some horticultural farmers are involved in small-scale vegetable irrigation. For most subsistence farmers in Omusati, rainfall is seen as the crucial climatic factor for crop yields and livestock health. A survey conducted in the region showed that small-scale farmers rear a variety of livestock primarily for family consumption and traditional practices, with income generation being a secondary concern (Southern African Development Community, 2023). According to the Namibia Statistics Agency (2011), 57% of the rural population residing in communal areas is highly susceptible to the effects of climate change. These effects include land degradation, deforestation, overgrazing, water scarcity, and poor land tenure systems, all of which exacerbate problems like droughts and floods.

1.7 methodology

The study adopted mixed method approach consisting of quantitative and qualitative research designs. The quantitative design allowed for the objective measurement of the collected data and for coherent decision making. The qualitative design enables the researcher to explore complex, subjective in-depth phenomenon focusing on the understanding the why and how, thus helps in gaining understanding of human experiences, social interactions, and unique contexts. The researcher used the questionnaires of semi structured form for the flexibility of the responses. The units of analysis were the government stakeholders, the youth, the farmers, NGOs, CBOs, and FBOs. The researcher propped the various groups on the topics such as changes in rainfall patterns over years, temperature changes, frequency and severity of droughts, floods and storms, and the impacts farms, water access, health and livelihoods.

Focused Group Guides and Interview Guides were also employed for the community groups and the key informants. The researcher had a total of five focused groups. The local elders, farm groups, FBOs, and other CBOs were engaged to share their observations of long-term changes of climate and coping strategies. The researcher also spoke with the local leaders, agricultural officers, health workers and key environmental stakeholders on climate issues.

The researcher used a mixed method of data collection. The types of respondents determined the tools to be used in data collection thus headmen, Community Based Organization, and Faith-Based Organization was interviewed as a group using the Focused Group Guide. The government stakeholders and the NGOs among others were interviewed using key informant guides. The researcher used a semi-structured interview to carry out interviews with villagers (farmers, pastoralists, school teachers, local small enterprise representatives, and the council of elders among others). The semi-structured interview was necessary to allow the participants to speak openly and widely about climate variability and coping strategies of food security. The collected data entailed various variables such as precipitation, temperature; both climatic and non-climatic elements affect crops, animals and the entire environment, and the coping strategies. The data was analyzed using statistical packages for Social Sciences (SPSS version 24) for the generation of descriptive statistics. Finally, secondary data was derived from the existing literature in the library.

The Yamane (1967) simplified formula to determine the sample size as shown below.

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

Where:
n = sample size
N = population size
e = the level of precision (0.05)
1 = Constant

. n= 23,364/(1+23,364(0.05)2)
= 393 households.

Table 1: The Target Population, Sample Size and Sampling Procedure

Target Group(Categories)	Target Population	Sample Size	Sampling procedure
Oshanyala (Youths)	6011	101	Stratified sampling
Onyamangunda (stakeholders)	2379	40	Purpose sampling
Ostinka (Farmers)	3025	51	Stratified sampling
Nandiinotya (Farmers)	5269	89	Stratified sampling
Jerry Ekandjo (Farmers)	3934	66	Stratified sampling
		46	Purpose sampling
Total	**23364**	**393**	

Source*: Author, (2025)*

The study population was divided proportionally according to the sizes of the five primary community centers within Onesi Constituency. Given the constraints of time and the need to address a broad geographic area, these centers were chosen due to their significant climate variability. Participants were

selected through a stratified random sampling approach, where the population was segmented into smaller groups, or strata, based on shared characteristics. Samples were then drawn from each stratum to form the overall sample size. Additionally, purposive sampling was employed to identify and include 25 key informants from the total sample as shown in table 1.

1.6 Findings & Discussions

1.7.1 Climate Variability Experienced in Onesi Constituency

The researcher sought to ascertain the community's knowledge on climate variability challenges in Onesi Constituency. The results are illustrated in Table 2:

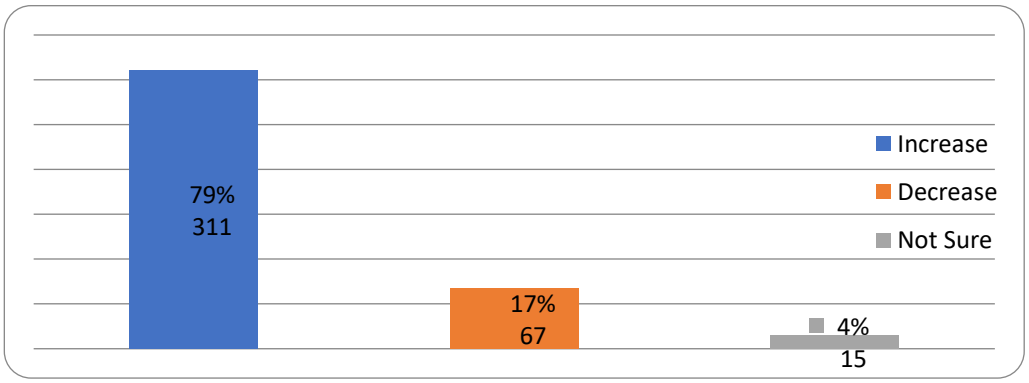
Table 2: Reponses indicating knowledge of Climate Variability in Onesi Constituency

Climatic Variability challenges	Response	Frequency	Percentage
Changes in Rainfall patterns and Temperature trend	Yes	371	95%
	No	17	4%
	Not sure	5	1%
Episodes of flooding in the last 20 years	Yes	323	82%
	No	57	15%
	Not sure	13	3%

Source: *researcher's field survey (2025)*

The majority of the respondents 95% posited that there have been changes in rainfall patterns and temperature trends in Onesi constituency. However, a few participants 4%, maintained that there was no change they had witnessed, while the remaining 1% were not sure of any changes in rainfall pattern and temperature trends in the Constituency. The table 2, 82% of the respondents admitted that Onesi Constituency experienced episodes of flooding, 15% had not experienced the flood, while 3% were not sure whether they had experienced flooding.

The study sought to establish whether the rainfall had increased or decreased in Onesi Constituency. The findings are presented in figure 1.



Source: *researcher's field survey (2025)*

Figure 1. Response on the Increase or Decrease in Rainfall in Onesi Constituency

The figure 2, shows that 79% of the respondents contended that there has been an increase in rainfall over time, while 17% reported an decrease in rainfall, and 4% were not sure whether there was an increase or a decrease in rainfall.

The study sought to establish the extent to which the residents were affected by Flood. The findings are presented in figure 2

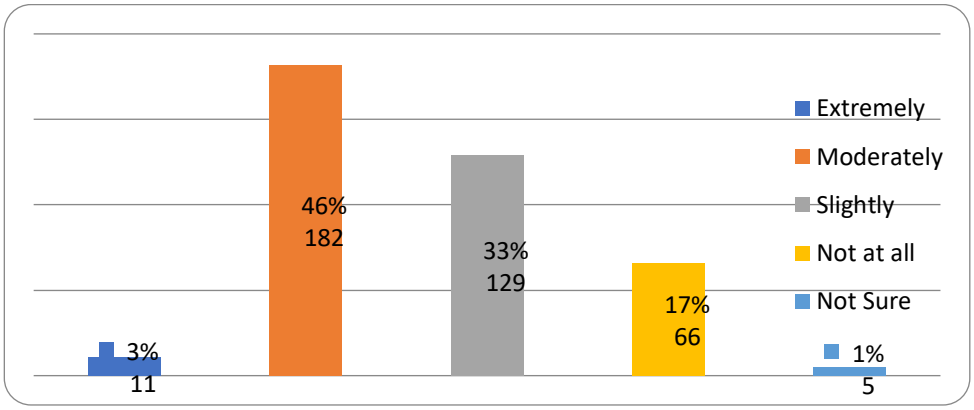


Figure 2: The Extent to which the Residents were affected by Flood

Source: *researcher's field survey (2025)*

According to the findings, 3% of the respondents testified that they were extremely affected by the emergence of flood in the study area, 46% said they were moderately affected, 33% were slightly affected, 17% were not affected at all, while the remaining 1% were not sure.

1.7.2: Climate Variability and its Effect on Small Holder Farmers in Onesi Constituency

The study sought to reveal weather elements causing crop failure in Onesi constituency. The finding are presented in table 3.

Table 3: Climatic Elements Causing Crop Failure

Climatic Elements	Frequency	Percentage
Lack of Rainfall	289	73%
Heavy Rainfall	25	6%
Hot Temperature	65	17%
Cold Temperature	11	3%
Not sure	3	1%
Total	**393**	**100%**

Source: *researcher's field survey (April 2025)*

The table 3 shows that the majority of the respondents 73% revealed that insufficient rainfall is an element that leads to climatic failure in Onesi, 17% reported hot temperature, 6% mentioned flood to be the element, 3% talked about cold temperature, and 1% was not sure. In 2019, droughts resulting from climate change severely affected various regions worldwide, including North Eastern China, North Korea, and North Ontario in Canada, Southern Australia, and several African countries such as Angola, Botswana, Zambia, South Africa, Zimbabwe, and Namibia. Denis Garcia highlights that a region's susceptibility to climate change is shaped by its geographical proximity to the Equator, dependence on agriculture, and challenges in addressing socio-economic issues, such as financial constraints, poverty levels, and population growth (Shikangala, 2020).

The participants were asked if they were aware of other factors that could cause crop and livestock failures. The results were listed in the figure 3;

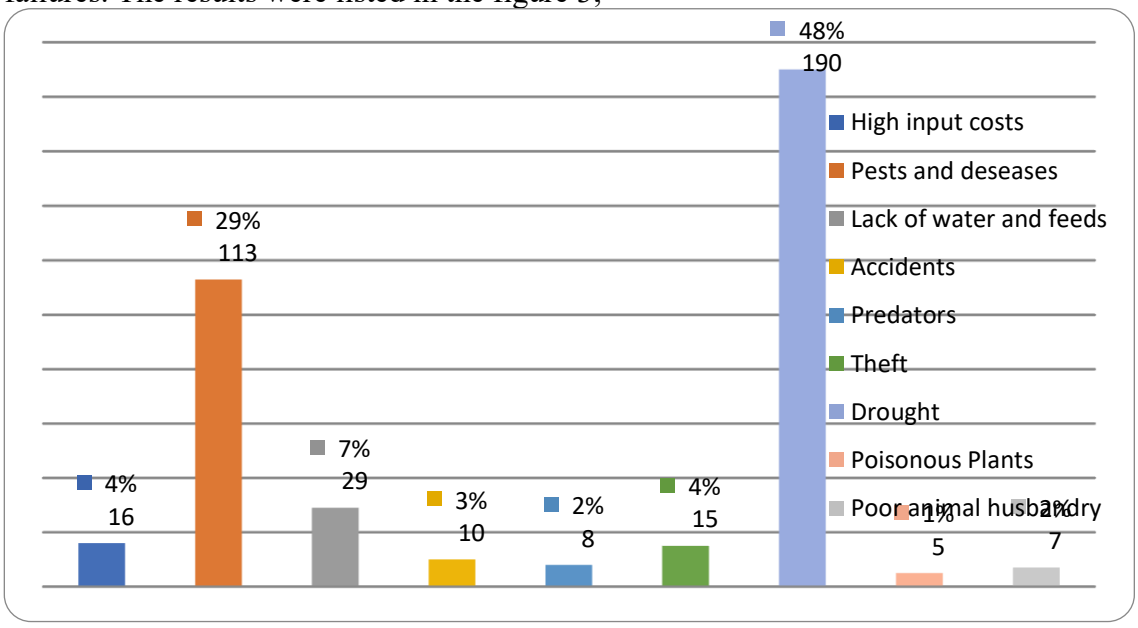


Figure 3 failure of Crops and Livestock

Source: *researcher's field survey (April 2025)*

According to the figure 3, the relative significance of various restrictions of crops and livestock production was shown. Drought (48%), and pests and diseases (29%) were considered to be the most significant constraints. The other 7 constraints were considered minor and of limited impacts to crops and livestock production. The majority mentioned birds, insects, worms, and wild animals as the causes

of crop and livestock failures. The animals included the *quelea*, hippopotamus, Elephants, battles locust, and armored ground crickets and diseases such as foot and mouth disease among others

The study also sought to demonstrate the relationship between climate variability effects on agricultural activities. The findings are presented in figure 4. The correlation analysis to judge the relationship between climatic variability and agricultural activities, the researcher probed the respondents to state the degree in which flood and drought have affected their agricultural activities. The findings were calculated using Pearson product moment formula and summarized in the scatter plot;

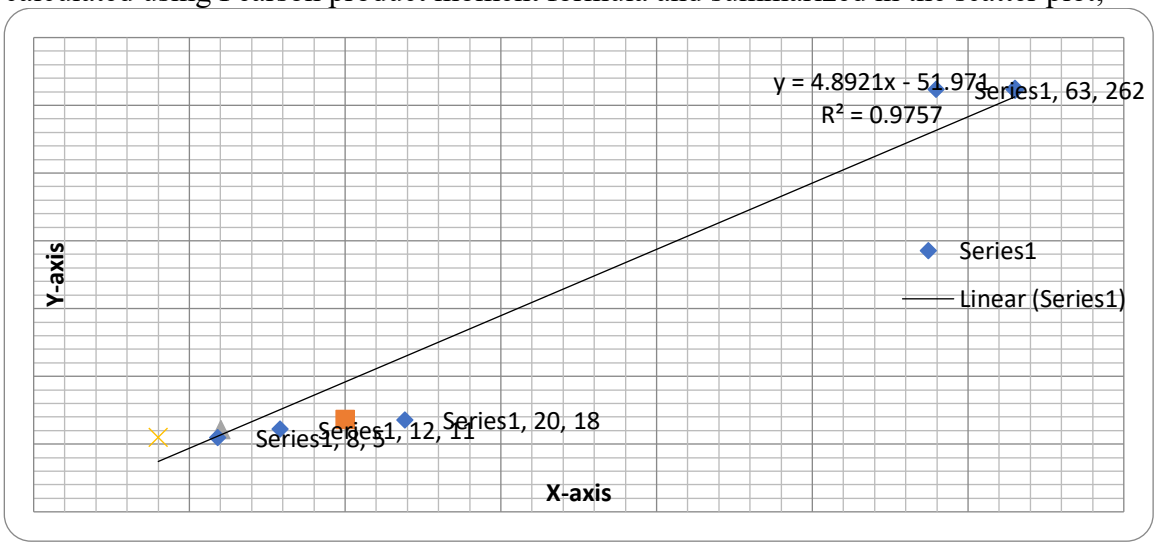


Figure 4 A graph showing a strong positive relationship between climatic disasters and Agriculture
Source: *researcher's field survey (April 2025)*

The findings in Figure 4, indicates that the majority 66% of the respondents reported that drought had extreme effects on their farms, while 16% reported flood to be having extreme effect, 5% reported moderate effects of drought and another 5% moderate effects of flood, 3% were for slight effects of drought and another 3% slight effects of flood. Finally, the remaining 3% of the respondents were not sure whether drought or flood disasters had an effect on agriculture. Therefore the drought was found to be the most disastrous in the Constituency destroying the crops and animals that the community depends on. Over the last decade, Namibia has faced national emergencies in 2013, 2016, and 2019 as a result of severe drought conditions. These recurring droughts have had a broad impact, affecting human populations, livestock, agricultural crops, vegetation, and the overall functioning of ecosystems (Liu & Zhou, 2021).

1.7.3 The Coping Strategies among the Residents of Onesi Constituency

The researcher sought to establish which crops are grown in Onesi Constituency as a way of coping with climate variability in the region. The findings are presented in figure 5.

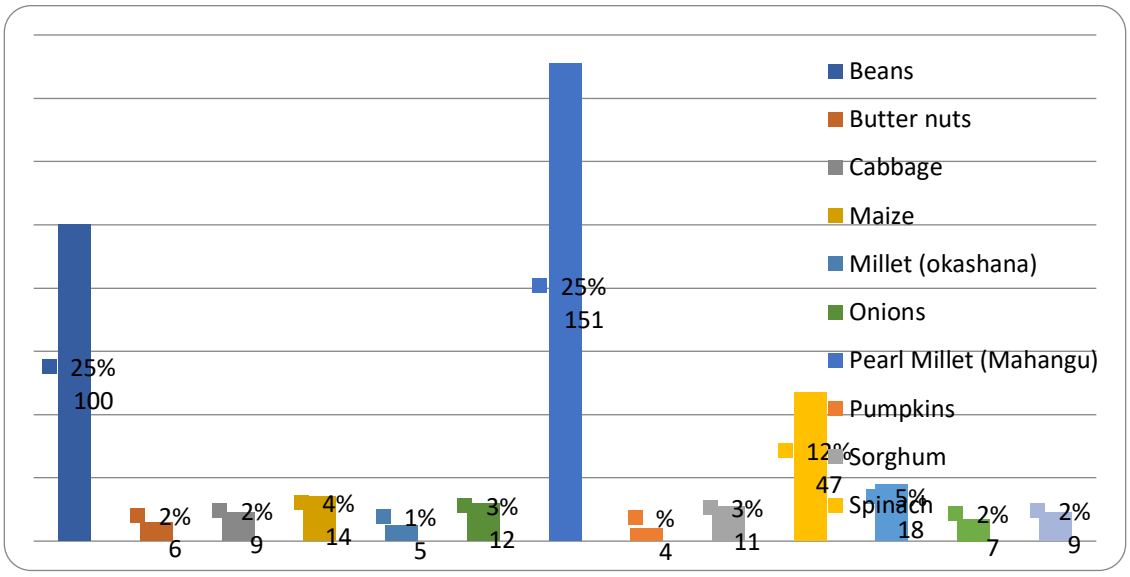


Figure 5 Crops grown in Onesi Constituency

Source: *researcher's field survey (April 2025)*

According to the findings in figure 5, the majority of the respondents 38% reported that they grow Mahangu (pearl millet), 25% said that they grow beans, and 12% grows spinach, the rest reported butter nuts, cabbage, onions, pumpkins, sorghum, sugarcane, tomatoes and water melons. Therefore the community could be using Pearl Millet as their staple food, being subsidized with maize and beans. Additionally, Spinach must be a popularly grown vegetable in Onesi constituency community

The study also sought to establish the domestic Animals reared in Onesi Constituency as a way of coping with the climate variability effects. The results were presented in the table 4.

Table 4 Domestic Animals Production in Onesi Constituency

Animals	Frequency N=393	Percentage
Cattle	54	14%
Sheep	7	2%
Goats	201	51%
Pigs	9	2%
Donkeys	11	3%
Chicken	111	28%

Source: *researcher's field survey (April 2025)*

From the findings in table 4, it is observed that 14% of the respondents reported having cattle, 2% had sheep, another 2% had pigs, 3% had donkeys, 28% had chicken, and the majority 51% were rearing goats. Therefore, the study deduced that goats were the common species reared in this constituency because of their hardy nature suited under dry conditions of Onesi.

1.8 Conclusion

The findings concluded that irregular rainfall patterns and variable temperature trends in Onesi are the major contributors of famine in the area because the farmer cannot predict the right time to plant the crops. The decrease in rainfall has been experienced for a period of about 10 years, and the famous 2018-2019 drought in the Namibia was the worst in the country. More so, the study revealed that drought has

extreme effects in Onesi Constituency than flood effects. The farmers adapt to growing drought resistant crops such as pearl millet, sorghum, and *Bambara* groundnuts and provide a good environment for *mopane* worms' harvest. Though, maize is also grown to some extent.

1.9 Recommendations

The study recommends the government to focus on ensuring access to water for domestic consumption and small-scale irrigation to the residents of Onesi Constituency. This will help foster food production and transform the livelihoods of the residents. The Ministry of Agriculture should further provide education to local communities about the optimal timing for plowing and planting crops in relation to rainfall patterns, and they should distribute more drought resistant crops and livestock at affordable rates.

The government mainstream social networks in gathering to pass climate related information in order for the residents to be updated. All the Nongovernmental organizations (NGO), the community based organizations (CBOs) and the faith based organizations (FBOs) should be invited to promote bench marking initiatives among the residents of Onesi Constituency.

The study also recommends to the residents of Onesi Constituency to adopt indigenous knowledge system in adapting to climate variability. Such knowledge will assist in water harvesting and storage. They small holder's farmers should plant drought resistant crops and rear animal as a buffer to crop failure.

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