

## **Climate Change Effects on Local Livelihoods: The Impact on Food Security Strategies for Elderly, Orphans and Vulnerable Children in Eswatini**

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### **ABSTRACT**

*This study assesses climate change related socio-economic impacts in Eswatini particularly its influence on agriculture production, livelihoods and food security strategies for the elderly, orphans and vulnerable children. Using a mixed-methods approach, data from 100 participants were analysed using descriptive and inferential statistics and thematic qualitative analysis. The results indicate substantial disruptions in agricultural operations (average: 2.65) and household income (average: 2.89) attributed to extreme weather phenomena such as droughts and storms, with catastrophic impacts on crop yields (average: 3.14) and economic well-being (average: 2.71). Urgent action is required because of challenges such as decreasing livestock production, drying earth dams and maize smallholders switching to livestock production. 40% of social protection beneficiaries in Eswatini rely on government social grants targeted to vulnerable populations, specifically the elderly as well as orphans and other vulnerable children, but inconsistent and poorly harnessed social protection programs have hampered their effectiveness in alleviating poverty. Deepening food insecurity has led some orphans and vulnerable children to drop out of school to seek work. The new study highlights the urgent need for strategic interventions, including adopting sustainable agricultural practices, improving social protection systems, and combating political mismanagement. However, there is a need for collaboration among government, international agencies, and local communities to mitigate the longer-term effects of this crisis, build resilience, and ensure sustainable livelihoods for vulnerable and marginalised groups.*

### **Introduction**

The Kingdom of Eswatini, covering an area of 17 364 sq. km in southern Africa, is among the world's most unequally exploited countries and is disproportionately affected by climate change. Eswatini, which has a population of around 1.2 million, is dependent on agriculture that employs

70% of the population (World Bank, 2021). These challenges affect the elderly and orphans and vulnerable children who depend solely on social grants from the government for their survival more than any group in society. This study hopes to examine how climate change affects local livelihoods with a particular emphasis on food security strategies of the elderly and orphan and vulnerable children in Eswatini. The study will further explore how these vulnerable populations are often neglected in national relief and emergency programs, despite representing the apex of vulnerability to climate change.

Food security among the elderly and orphans and vulnerable children look at how climate change has significantly affected Eswatini's agricultural sector, resulting in rising food insecurity among the elderly and orphans and vulnerable children. Frequent droughts, unreliable rain, and extended dry periods, have rocked crop yields and impact the lives of rural families reliant on farming (World Food Programme, 2023). The elderly and orphans and vulnerable children are especially vulnerable as they are generally unable to afford the adaptations required to mitigate these changes. The aim of this research is to assess the vulnerabilities of different groups, with a focus on the difficulties they face adapting to climate change and the implications for food security strategies. Additionally, the research will discuss the implication of policy frameworks and programs by government in mitigating these challenges faced by the elderly and recommend best practices for improving care and support provided to both demographic groups.

The national adaptation plan of Eswatini recognizes the country's vulnerability to the effects of climate change and provides answers to how to adapt (Government of Eswatini, 2021). Unfortunately, the plan fails to adequately address the challenges facing the elderly and orphans and vulnerable children, who face the adverse impacts of climate change, more than any other population group. The national adaptation plan and other national policies and programs have several shortcomings, and this research will identify gaps and propose solutions for better inclusion of these vulnerable groups in climate change adaptation action. It will also investigate the role of international organisation and non-governmental organisations in supporting the elderly and orphans and vulnerable children in ESwatini. With the intention of proposing a way of harmonizing these efforts. Another area of concern is the impact of climate change on health and nutrition outcomes in Eswatini. UNICEF (2023) states that, climate change has cause malnutrition among children particularly in rural areas. Older people, who often lack access to healthcare and nutritious food, are also in danger. This project will investigate the pathways through which climate change affects health and nutrition outcomes for older people and orphans and vulnerable children and develop recommendations for improving access to healthcare and nutrition for these populations. The toughest questions will centre on the role of community-based organizations in meeting the needs of these vulnerable populations.

## **Problem Statement**

Climate change is a substantial risk for local livelihoods in Eswatini, especially to older people and orphans and vulnerable children who depend solely on government social grants for their survival. Extreme weather events like droughts and floods are becoming more frequent and severe, constraining agricultural production, and causing food insecurity and economic instability. They do not have the economic means to mitigate against climate change as it happens, and as such are incredibly vulnerable to its harmful impacts. This will entail limiting the financial burden that needs to be borne on climate change adaptation, building resilience in terms of infrastructure, sustainable agricultural practices, health and access to drinking water among others. Nonetheless, the limited access to financial resources in Eswatini increases the vulnerability of the elderly as well as orphans and vulnerable children. Their limited financial means prevent them from implementing measures to be able to adapt adequately, thus exposing them to the threat of disease outbreaks and poor health and nutrition status. This study seeks to unpack how climate change is impacting local livelihoods in Eswatini by outlining food security strategies for the elderly and the orphans and vulnerable children. Through the specific challenges these vulnerable populations face and the shortcomings in existing policies and programs, the study will generate recommendations to strengthen support and resilience as climate change advances.

## **Literature Review**

Impacts of climate on local livelihoods are profound, especially in vulnerable parts such as Eswatini. The elderly and orphans and vulnerable children have less adaptive capacity and are disproportionately affected. According to Thornton et al. (2019), climate change increases the prevalence of food insecurity through impacts to agricultural productivity, the primary source of livelihoods for a majority of rural households. In addition, more frequent extreme weather events including droughts and floods exacerbate food systems and make it more difficult for these at-risk populations to access sufficient nutrition. This literature review focuses on the theoretical concepts and practical implications for climate change and food security for older people and orphans and vulnerable children in Eswatini.

Theoretical perspectives pertaining to climate change and food security recognize the interplay of environmental, social, and economic factors. Owino et al. (2022) stress how climate change influences our food systems from the soil on the ground to the nutrient-chemicals and in between in crop yield, planting and harvesting. The barrel affects food security for older persons and orphans and vulnerable children who rely on subsistence farming. These groups are particularly vulnerable because they have less resources and adaptive strategies. One such theoretical framework the sustainable livelihoods approach, which is widely used, helps us to

understand how climate change affects food security by examining the interplay between various livelihood assets and strategies. Studies have also found links between climate change and food insecurity in Eswatini. Climate change has already impacted agricultural productivity and food prices, and this is expected to increase as weather patterns shift due to climate change (Muluneh, 2021). This carries greater implications for the elderly and orphans and vulnerable children, people who often do not have the money needed to purchase increased food prices. The study also seeks to emphasize the role of climate resilient agricultural practices and social safety nets in reducing impact of climate change on food security. These findings highlight the importance of tailored interventions and how they should target the unique susceptibilities of these individuals.

In Eswatini, diverse adaptive strategies for food security among the elderly and orphans and vulnerable children have been documented. Thompson et al. Community-based measures (such as communal gardens or food banks) are mentioned by Allaire et al. (2010) as potential solutions for promoting food security. Engaging with such programs not only assists in meeting people's basic needs but also plays a part in building social resilience. Nevertheless, the effectiveness of these strategies is contingent upon resource availability and institutional backing. There are better ways and worse ways to fight such battles, and comparative analyses of food security strategies across different regions show substantial differences in effectiveness. Richardson et al. (2018) found that food security outcomes were often better in regions where substantial climate adaptation and mitigation investments were made). Fighting the food security challenges wrought by climate change therefore requires a multi-pronged approach of policy interventions, technological innovations and community engagement. It also reiterates the need to have climate change in the national development plans and policies.

Polling research findings have shown a trend that emphasizes the importance of holistic and context-specific food security. Reyes-García et al. (2024) assert that local knowledge and practices are fundamental in constructing adaptive strategies. The elderly and orphans and vulnerable children in Eswatini have traditionally depended on adaptive coping measures. Generalisation of results should be avoided as all these studies were conducted in differing contexts and therefore present a heterogeneous body of evidence. Theoretical perspectives and empirical findings highlight the significance of a holistic approach that embraces environmental, social, and economic factors. Food security strategies need to be context-specific and inclusive and draw on local knowledge and practices.

### **Methodology**

This study adopted a pragmatism paradigm in its research design on the effect of climate change on local livelihoods and food security strategies for the elderly and orphans and vulnerable

children in Eswatini. Pragmatism is a philosophical approach that allows researchers to use both qualitative and quantitative methods to get complete view of the research problem. Thus, engaging with these methods have allowed the study to capture both the quantitative and qualitative dimensions of the research concept (Creswell & Plano Clark, 2018). A descriptive design was well suited to carrying out the analysis of the existing conditions and relationships between climate change, local livelihoods and food security without the manipulation of variables (Bryman, 2016), which could potentially be impractical in this case. That ensured that the research realistically represents the context, critical to formulating effective strategies and interventions. A mixed-method analysis provided insights into climate-change impacts on vulnerable human populations, enabling enhanced research and preparedness efforts.

This study utilized a purposive sample of 100 elderly, orphan-headed households, and community leader respondents in the Dvokodweni and Gilgal constituencies. The non-probability sampling technique used in this study allowed for the purposeful selection of participants with specific experiences and knowledge related to the research area, thus facilitating the gathering of rich, in-depth data (Etikan, Musa, & Alkassim, 2016). By utilising purposive sampling, the researchers were able to select the individuals who might provide rich and detailed data about how climate change is affecting local livelihoods and food security strategies. Recruitment for the study took place via community meetings, local announcements, and partnerships with community-based organizations. Working closely with community leaders and organizations helped the investigators gain the trust and rapport of the participants and to collect the data.

Structured questionnaires were used to collect quantitative data, consisting of closed-ended questions to study the demographic profile and the influence of climate change on food security (DeVellis, 2017). Students were asked to complete a structured questionnaire to yield similar data from every participant. Semi-structured interviews were conducted in person to collect qualitative data, enabling participants to describe in detail their experiences and coping mechanisms. The semi-structured format allowed participants to provide more detail in their answers and share personal stories and insights, adding depth to the data collection. This strategy enabled triangulation of the data, cross-validation of findings, and a richer comprehension of the interactions among climate change, local livelihoods, and food insecurities.

For quantitative data, the questionnaire was pre-tested to determine the reliability and validity. A pre-test in which the questionnaire was administered to a small group of people similar to those expected in the study. As a result, we were able to pinpoint problematic items, including those which were confusing or ambiguous, and make appropriate revisions. Cronbach's alpha coefficient was calculated to assess internal consistency and a value of 0.8 was used to indicate

good reliability (Field, 2018). This indicated that the items in the questionnaire were consistently measuring the same underlying construct. Content validity was achieved through a review and refinement process of the questionnaire items involving subject matter experts. After the consultation with experts, changes were incorporated based on the relevance and clarity of questions and the adequacy of covering the research topic. Triangulation, member checking, and keeping a rich audit trail were applied on qualitative data to establish trustworthiness (Lincoln & Guba, 1985). Triangulation and member checking was utilised to establish credibility. The audit trail was kept to provide flashing lights and backup for the transparency and rigor of the data analysis.

The study was conducted in accordance with the ethical principles of the declaration of Helsinki, and the rights and well-being of the participants were safeguarded. Ethical considerations were of utmost importance in this research because we must treat participants with respect and dignity. All procedures were approved by the institutional review board of the medical institution where the study was conducted and informed consent was received from all subjects prior to inclusion in the study. It was indicated to participants that their responses will be kept confidential and that their identities and personal information will not be shared with others. This study was approved and overseen by the appropriate institutional review board to ensure ethical studies (Resnik 2018). All participants were also informed that they could refuse to participate in the study at any time without facing any consequences. This meant that participants could participate in confidence that they could leave at any time if they did not wish to participate. The researchers ensured that any potential harm or discomfort to participants was minimized, providing support or resources before and after if sensitive subjects were discussed in the interviews.

This study was conducted over a three-month span, where in researchers either interviewed or filled out questionnaires with participants at their homes or at community centres. This meant that participants felt more at ease and familiar with their surroundings, prompting more frank answers. This was complemented by a mixed-methods approach which enabled triangulation through both qualitative and quantitative data collection methods, increasing the credibility and richness of the findings (Creswell, 2014). Qualitative data were collected using field notes and audio recordings during interviews to ensure the integrity of participants' narratives and experiences were preserved. The interviews were each transcribed separately for the purpose of this study; have conducted the audio recordings verbatim. Structured questionnaires were used to collect quantitative data, consisting of closed-ended questions to assess the demographic characteristics and the influence of climate change on the strategies for food security. Quantitative data were entered into statistical package for social science to conduct statistical analysis and identify patterns and relationships. The diversity of data types not only enhanced

the quality of the data but also allowed for a more nuanced understanding of the interplay between climate change manifestations, local livelihoods, and social and ecological variables.

With descriptive statistics (including means, medians, and standard deviations), such as these, the data was clearly outlined, and insight into trends, etc. This information enabled the researcher to reach valid conclusions and conduct inferences about the larger population from the sample data. Qualitative data were thematically analysed, where the researcher identified and coded recurrent themes and patterns in the interview transcripts (Braun & Clarke, 2019). Data were thematically analysed via a systematic process of coding data then collating codes into themes that were refined to fully portray the participants' experiences and perspectives. Data analyses provided insight into the impact of climate change on local livelihoods and food security strategies.

## **Results and Findings**

### **Impact of Climate Change on Agricultural Production and Local Livelihoods**

The study found a notable correlation between climate change and the impact on agricultural production and livelihood within their communities. The mean values indicate that the respondent has experienced a significant impact on their agricultural activities (2.65) and household income (2.89) due to climate change. According to the ANOVA results, all questions proportionate impact achieved statistically significant differences ( $p < 0.05$ ), it indicates differences in the impact of crop yields, household income, and economic stability (Barret et al., 2019). Extreme weather events (2.34) have significantly affected crops (3.14) and economic stability (2.71). These results are consistent with prior studies that highlight the sensitivity of agricultural practices to climate change and its cascading effects on food security and livelihoods (Haug, 2017). This observed decline in crop yields and household income reflects the urgent need to adopt adaptive measures to lessen such impacts (Madan & Sharma, 2013). Babaci-Wilhite et al. (2012) underscore the significance of resilient agricultural practices and community-based interventions in improving the adaptive capacity of poorly nourished communities. This reinforces the need for targeted interventions to maintain agricultural productivity and economic stability as climate's risks undermine vulnerable subsistence systems, while it continues to accrue risks to further import and trade dependence especially among most vulnerable communities (Agbo, 2015). This is just one example of the many challenges populations faces due to climate change, highlighting the need for comprehensive policies and programs that address these complex issues as one of the many challenges populations face.

**Table 1: Impact of Climate Change on Agricultural Production and Livelihoods**

Question	Mean	ANOVA F- Value	P-Value
Impact on Agricultural Activities	2.65	3.92	0.027
Experienced extreme weather events	2.34	4.56	0.015
Effects on crop yields	3.14	6.23	0.002
Impact on household income	2.89	5.11	0.009
Effect on economic stability	2.71	4.01	0.022

According to qualitative data, similar themes are repeated; ongoing agricultural activity and crop selection continues to change. As one of the participants mentioned, *"I am trying to adapt because my yields are not stable, and I started to grow crops which need less water,"* echoing the challenges of adaptation highlighted by Madan and Sharma (2013). Extreme weather events like droughts and storms were often mentioned, and another participant added, *"Last year we had a severe drought that killed half of my crops."* According to Babaci-Wilhite et al. these weather take such factors into account lead to economic instability (2012), emphasizing the pressures that rural communities are experiencing from economy-induced climate changes. *"When my crops are not good, it will affect my income and my family,"* one farmer said, a finding reflected in existing research that supports social safety nets and community-based interventions. Water resources scarcity became a crucial issue also aggravating the problems related to agricultural production and food security (UNESCO, 2017). *"Our wells have dried up, so now we need to travel further to get water,"* said one participant. It comes as a reminder of the need for sustainable water management solutions, like rainwater collection and efficient systems of irrigation, to counter water scarcity. The impact of climate change is not limited to agriculture as it affects the overall health and nutrition of vulnerable populations like the elderly and children. The orphan and elderly population who already may be at risk of nutritional deficiency, disease and economic instability are vulnerable to increased impacts of climate change (Bucens and Van Vuuren, 2010). Reduced agricultural productivity has wide-ranging implications for food security, especially in groups where subsistence farming and local food systems are crucial lifelines. Babaci-Wilhite et al. (2012) call for community-based interventions and social safety nets that foster resilience, while Agbo (2015) highlights the need for targeted initiatives, prioritizing nutrition-sensitive agricultural programs and food assistance, that protect the well-being of vulnerable groups. The results reinforce the urgent need for comprehensive policies and programs that tackle the multifaceted threats of climate change. Drawing from the findings, Eswatini needs to focus on sustainable farming programmes that have a resilience-

building aspect; implementing support mechanisms such as food aid to affected communities as well as financial support to vulnerable groups; infrastructure development, particularly for the efficient use and conservation of water; and community-based initiatives aimed at increasing adaptive capacity and resilience. Such measures are crucial for protecting agricultural output and allowing the communities at risk to continue with their livelihoods.

### **Food Security Strategies for the Elderly and Orphans and Vulnerable Children**

This analytical work on coping strategies to handle climate-induced food shortage among the elderly and orphans and vulnerable children’s households has the following key findings. The strategy that has been utilized the most is reliance on social assistance provided by the government, with 40% of respondents, further attesting to the significant role of government grants in household food security (Barret et al., 2019). And then there were reducing meal sizes (25% doing this), growing drought-resistant crops (20%), and asking community members for help (15%). Most of the households reported sometimes (40%) or very often (30%) food shortages, showing that it is a recurrent and severe problem (Haug, 2017) (López Álvarez Campos and Cortés Riascos, 2018). There are some strategies that seem to be more effective than others as they are seen as being moderately effective by 45% of respondents. This indicates the need for better and more comprehensive measures in tackling food shortages (Madan & Sharma, 2013). Moreover, half (50%) of the respondents had experienced a slight increase in food shortages caused by climate change in the last five years, indicating that a growing challenge towards combatting climate change exist and that action is urgently needed (Babaci-Wilhite et al., 2012). The importance of government social grants in this situation is also key: 40% said they depend on government support for their household food security, making this continued and enhanced support, from the government, necessarily. Similar studies revealed the importance of adaptive strategies and community participation in managing food insecurity (Agbo, 2015) and the findings echoed these results. The findings suggest that although current strategies offer limited relief, there is an urgent need for more effective and targeted interventions to reduce the impact of climate change on vulnerable populations.

**Table 2: Food Security Strategies for the Elderly and OVC**

QUESTIONS	CATEGORY	FREQUENCY	PERCENTAGES
Strategies to cope with Food shortages	Relying on governments grants	40	40%
	Reducing meal portions	25	25%
	Growing drought resistant crop	20	20%

	Seeking help from community members	15	15%
Frequency of food shortages	Never	10	10%
	Rarely	20	20%
	Sometimes	40	40%
	Often	30	30%
Effectiveness strategies	Not effective	10	10%
	Slightly Effective	25	25%
	Moderately effective	45	45%
	Very effective	20	20%
Change in food shortage frequency	No change	10	10%
	Decreased	15	15%
	Slightly Decreased	50	50%
	Significantly Decreased	25	25%
Role of government social grants	No role	10	10%
	Minor	30	30%
	Major	40	40%
	Sole source of food	20	20%

Characteristics of the qualitative data show that households (particularly the elderly and orphans and vulnerable children) have applied several adaptive strategies to achieve food security in the face of climate change. Participant 8 mentioned, we cultivate drought-resistant crops and use food preservation methods, underlining adaptive agricultural practices. This aligns with McCann (2017), which highlighted the need to promote drought-tolerant crops to counter climate change. This development of these strategies was apparent in Participant 1’s comments, “*Our planting schedules have changed to better align with shifting weather patterns.*” This agrees with Ensor et al. (2019) draws attention to the importance of adaptive measures to address variability in

climate. Participant 6 concurs, stating that government social grants are essential to securing food: *"When there's no food in the house, the grants help us buy things like bread and dairy."* This observation is similar to the work of Devereux (2016), which concluded social protection programs ameliorate food security among the most vulnerable. However, these strategies have a differential efficacy, with Participant 9 articulating, *"Some strategies work better than others, but keeping food secure is always a struggle."* As researchers Dannenberg et al. (2019) find that success of adaptive strategies is often context- and implementation-specific. Traditional and community-based practices also figure into adaptation to food insecurity. Participant 4 asked, *"What community do we gather to share resources,"* and which was being mitigated in the community. Adger et al., which this finding builds upon (2013), which focused on the importance of social capital to community resilience to climate change.

### **Financial and Infrastructural Barriers to Climate Change Adaptation**

The qualitative data also highlights significant barriers to adapting to climate change, mainly lack of finance and infrastructure. According to participant 3, one of the common reasons stated is limited financial resources, *"We don't have the funds to invest in resilient infrastructure."* Allam & Martin (2021) found similar limitations, indicating that inadequate financial capacity frequently inhibits climate resilience initiatives (Allam & Martin, 2021). Insufficient infrastructure, including not-so-good roads and storage facilities, makes adapting harder. Participant 11 elaborated, saying *"Our roads are in terrible condition which makes transporting goods hard"* and this view was supported by Apolinali (2019) who emphasized that ensuring good infrastructure is one point to fortify climate resistance in the community. Such monetary and infrastructural inadequacies put even more strain on vulnerable groups, like the elderly and wards of the state, that are dependent on local food systems and subsistence agriculture.

The ANOVA and mean data analysis support just how critically challenging these are. Barrier type-wise, financial limitations were rated 3.01 on average and infrastructural limits even higher 3.27. The broadening of supportive resources (mean: 2.48) and also government support (mean: 2.54) were both found to be lower given the difficulties around acquiring much needed resources and perceived insufficiency of government support. These barriers have shown statistically significant differences ( $p < 0.05$ ) reinforcing the pressing need for investment and support (Barret et al., 2019). These results align with Haug (2017), who determined that finances and infrastructure are the two most important challenges to effective adaptation. These barriers are especially harmful to food security for the aged and orphans, who usually have less financial capacity and more inadequate social safety nets. Ensuring the accessibility to these resources has always been a major challenge in alleviating the challenges of climate change. Participant 5 pointed out, *"It's hard to get healthcare; extreme weather events make it harder."* This is consistent with Babaci-Wilhite et al. (2012) noted that to adapt effectively, we must be able to

manage sustainable resources. Food insecurity, particularly for the poor, is worsened by water scarcity, shortages in health care, and limited access to farming inputs. Strategies are available that can help mitigate some of these challenges and work toward building the resilience of an elderly population and children dependent on local food systems, e.g., through sustainable resource management practices, such as rainwater harvesting and community-based healthcare interventions.

**Table 3: Financial and Infrastructural Barriers to Climate Change Adaptation**

Barrier	Mean Value	F-Value	P-Value
Financial Obstacles	3.01	4.23	<0.05
Infrastructural Hindrances	3.27	5.87	<0.05
Accessibility Of Resources	2.48	3.69	<0.05
Government Support	2.54	4.02	<0.05

Table 4: Summarizes the severity of the barriers analysed, showing statistically significant differences ( $p < 0.05$ ) for all variables. Considering their implication on even the holistic development of the nations, such findings multi-fold the need to enhance investment, infrastructure and management of the resources to lessen the challenges mentioned. If further refinements are required, please advise

They also stressed the inconsistency and the inadequacy of government support. As participant 7 said: "We got support once in a while, but still not enough for us to manage. Mabuza et al. (2022) also emphasized the essential role of sustained government support in building climate resilience. It requires enhanced government interventions, including subsidies for drought-resistant crops and investments in rural infrastructure, to protect agricultural productivity and ensure the access of beleaguered segments of the population to food. To overcome those barriers effectively Madan & Sharma (2015) condense some evidence based adaptive policies that integrate local community efforts with governmental support. These results have important implications for food security strategies in Eswatini. That increases cost of living and until they able to live in adaptation the elderly and orphans suffer because of financial constraints and lack of infrastructures. Examples of grassroots movements (involving community-based organizations and local initiatives) that can fill the gaps would be improving the distribution of resources in disaster-affected areas and building resilience (Babaci-Wilhite et al., 2012). Moreover, targeted nutrition-sensitive agriculture initiatives and food assistance in the communities are crucial to reducing the observed gaps in nutritional intake among the groups that are vulnerable to nutrient deficiencies (Agbo 2015). In development planning for Eswatini,

addressing these barriers is key, and robust strategies required to address these barriers should be in place. Among the recommendations the report highlights are: investing in rural infrastructure to ensure access to markets and resources; increasing financial support through subsidies and microfinance initiatives; and promoting sustainable water management. Cross-sector collaboration by public agencies, civil society, and global actors can increase the adaptive capacity of vulnerable groups and sectoral resilience (Arnaiz-Sánchez et al., 2023). The literature review addresses the issue of climate change development in Eswatini in broadfaced level, viewing adaptive strategies at both policy and aggregate levels.

### **Recommendations for Enhancing Resilience and Support Systems**

Analysis of data has shown important findings that recommend actions to improve resilience and support for older people and orphaned and vulnerable children. The mean values (3.11) of measures to improve resilience are greater than the mean values of gaps in current policies (3.07), and the role of community-based organizations (2.97) which indicate there are efforts for improvement but there are still gaps and areas in need improvement. Efficacy of the measures recommended (2.83) and government assistance to vulnerable populations (2.68) signals the perception of moderate effectiveness; implying a necessity for more vigorous strategies and interventions (Barret et al., 2019) ANOVA confirms significant differences in the effectiveness of these measures ( $F=4.21$ ,  $p=0.019$ ) and the role of community-based organizations ( $F=5.13$ ,  $p=0.010$ ) with implications for understanding the details of how these interventions are received and supported across different states. Compared to those responses greatly need preventive and evidence-based strategies for making those deficiencies noticed (Babaci-Wilhite et al., 2012). The results are consistent with earlier research stressing the importance of community-based organisations in supporting at-risk populations. For instance, Haug (2017) provides an example on the role of inclusive education and community involvement, which are critical during times of social and economic vulnerabilities. Additionally, Madan, and Sharma (2013) describe the need for adaptive policies and the collaboration among government sectors and community organizations to sustain support systems.

**Table 4: Recommendations for Enhancing Resilience and Support Systems**

Question	Mean	ANOVA F- Value	P-Value
Measures to improve resilience	3.11	5.78	0.006
Effectiveness of recommended measures	2.83	4.21	0.019
Gaps in current policies	3.07	5.54	0.007
Government support for vulnerable populations	2.68	4.44	0.016

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Role of community-based organizations	2.97	5.13	0.010
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Specific measures to enhance resilience and support systems in the face climate change are highlighted by the qualitative data gathered. The suggestion by participant 4 for the necessity to train on sustainable agricultural practices aligns with the conclusions published by Rosenzweig et al. (2014) emphasizing knowledge transfers' role on climate resilience. Participant 9 called for improved government policies and a targeted approach to support programs, suggesting existing frameworks are not simply adequately focused on vulnerable populations. This finding reflects the research of Adger et al. (2013), emphasizing the importance of adaptive governance in the context of climate policy. This is also reinforced by participant 6 who stating, "Community based programs can provide the immediate aid as well as create a sense of shared resilience." This is in line with the findings of Cinner et al. (2018), which asserts the necessity of community-based management to foster resilience. NGOs were also mentioned, with one participant stating that "NGOs can provide resources and know-how that are instrumental for this community." As discussed by Ford et al. (2016), and highlight their role as providers of resources and capacity building. "Local communities should have a voice in climate adaptation planning," suggested Participant 10, who called for increased community engagement in decision-making processes. This is consistent with findings by Few et al. (2007) assert that adopting participatory methods in policy development improve the efficiency and credibility of climate adaptation efforts. These insights collectively highlight the necessity of diverse strategies that blend educational, policy, community, and NGO-driven initiatives to create resilience and support mechanisms in the face of climate challenges.

### **Summary and Conclusions**

Climate change impacts agriculture and threatens the socio-economic sustainability of the Kingdom of Eswatini. The elderly and orphans and vulnerable children are especially vulnerable. This research endeavours to explore the impact on local livelihoods and food security strategies, identify potential gaps in national policies, and make recommendations related to better support for these groups, including the role of international organizations. The study design on climate change in Eswatini employed a pragmatism paradigm and incorporated qualitative and quantitative methods to adequately reflect the complexity of the subject matter. This study employed a purposive sampling method among 100 participants from relevant households and key community leaders. The quantitative data were collected through structured questionnaires and the qualitative data were collected through semi-structured interviews. Quantitative data were analysed using descriptive and inferential statistics, and qualitative data

using thematic analysis. The ethical principles were adhered to at every stage of the study. The data elaborates on the major effects of climate change and extremes (e.g., floods and droughts) on agricultural production and livelihoods of the community members around rural areas of Eswatini (mean: agriculture activity disrupted = 2.658, household income by climate change = 2.897). The crop yield (3.14) and economic stability (2.71) are negatively affected by extreme weather events like droughts and storms, confirmed by statistically significant differences with  $p < 0.05$  as determined by ANOVA. These results highlight the susceptibility of agriculture to changing climatic conditions, warranting the need for adaptive measures such as resilience mechanisms and local-scale interventions. The food security strategies used by the elderly and orphans were evaluated, with 40% of households relying on social grants provided by the national government, alongside other strategies such as planting drought resistant crops, portioning down meals, and others. But 45% of respondents rated these strategies only moderately effective, suggesting a need for more comprehensive measures. Over the last five decades, food shortages have grown more common, highlighting one of the many challenges of climate change. The findings highlight the need for strong sustainable farming policies, better infrastructure, and improved access to resources. To holistically dress these challenges, strengthening leadership efforts by the government and communities will be critical in securing food security and building resilience among vulnerable populations.

### **Recommendations**

Mitigate the adverse impacts of climate change by developing and implementing sustainable agricultural practices, such as the promotion of drought-resistant crops and efficient irrigation systems. Invest in rural infrastructure, from roads to storage facilities, to ensure smooth transport of goods and make resources more accessible to vulnerable populations. Make government social grants more effective (better targeted where appropriate), and extend targeted social cash transfers to vulnerable groups like the elderly and orphaned children. Create adaptive policies that align with local community efforts and provide consistent financial and resource-based support. These policies need to focus on financial assistance, provisions of agricultural inputs and rewards for climate-proofing agriculture practices. Encourage the growth of community-led initiatives, such as resource-sharing networks and cooperative efforts, that strengthen resilience and social support networks. Implement sustainable resource management practices, including rainwater harvesting and community-led conservation efforts, to combat water scarcity and promote the health of impacted populations.

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