

# Gender Perceptions of Small Holder Farmers on the Impact of Climate Change in Communal Areas of Zimbabwe

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## ABSTRACT

Climate change has caused severe havoc to social, economic, environmental and physical repercussions to development. The world has encountered the unprecedented natural catastrophes which encompass climate induced calamities such as hurricanes, floods, volcanoes, droughts and cyclones. The study was aimed at unpacking the gender dimensions of small holder farmer on the impact of climate change, vulnerability, adaptation in communal areas. Quantitative primary data was collected from a sample of 244 selected smallholder communal famers, in which stratified random sampling was used to select the respondents to this study. A self-administered structured questionnaire was used to solicit quantitative data from smallholder communal farmers, Bikita rural district council (department of environment) and from Agriculture Extension department. A total of 188 questionnaires were responded to and used for data analysis. Using SPSS version 16.0 quantitative data were analysed using a mix of descriptive statistics, correlation analysis and regression analysis. The study established that the negative effects of climate change and variability are mitigated through growing of drought resistant small grains, growing early maturity seed varieties, adjusting crop planting times, application of lower levels of fertilizers, winter ploughing and ridging and pot-holing. Participation of smallholder farmers in climate change adaptation interventions in Bikita district is subject to socio-political, resources and physical systems and processes barriers. It also established a negative relationship between resource availability and female smallholder farmers' participation in climate change adaptation practices and the study concluded that availability of resources is a key factor to female small holder farmers' participation in climate change intervention. There is also need to avail agricultural research results relevant to the small holder farmers and train them on how to use the results to make informed on-farm investment decisions.

**Key Words:** Climate change, gender, adaptation, gender mainstreaming, perceptions

**Research Area:** Social Science

**Paper Type:** Research Paper

## INTRODUCTION

Globally, climate change is one of the major topical threats to livelihoods development. Climate change has caused severe social, economic and physical repercussions in developing countries (Hove, Ngwerume and Muchemwa, 2013). A plethora of climate change has caused adverse effects to the environment. Climate Change is the significant variation of the mean state of climate relevant variables such as temperature, precipitation and wind in a certain period of time, commonly over 30 years (IPCC 2007). These changes

have resulted in the dynamic of human daily activities. Maximum effort has to be given towards the hurricane urgent effects of climate change. Moka, et al., (2015) support that major changes in weather patterns has resulted in unprecedented disasters such as floods, droughts, heat waves and many more. Zimbabwe is regarded as the bread basket in Sub-Sahara. Agriculture activities are the most vulnerable to climate change. There is growing evidence that Zimbabwe has been affected by dramatic climate change in recent years (Government of Zimbabwe (GoZ), 2012). For instance, in 2019 Zimbabwe had encountered the unprecedented natural catastrophes of Cyclone IDAI which destroyed the environment and has claimed lives. This shows that Agro-sector in Zimbabwe is the most casualty of climate change hence there is need for resilience and adaptation. The agriculture sector is mostly composed of commercial farmers and the subsistence farmers. The subsistence farmers are popularly known as small holder farmers and they are the key players in food production. Agriculture is the backbone of Zimbabwe's economy. The game of smallholder farming is played by children, males and females are so vulnerable in different stature. Therefore it is prudent to understand the gender perceptions in operationalizing farming activities. Meinzen-Dick et al., (2012) posit that gender is the socially constructed roles for males and females. The biological make up of males and females can be affected by climate change differently. Several researches suggest that vulnerabilities of small holder farmers are lopsided towards the implications of climate change on communities (Dankelman et al., 2008; Babugura, 2010; Morchain et al., 2015), Few (2007) suggests that gender vulnerability is central in understanding people's capabilities to adapt to effects of climate change. In the Zimbabwean culture females and males have different roles especially in agriculture. Males are expected to be more manual than the females who are always expected to do light and caring roles in the community. This study was motivated by the need to close knowledge gap of gender dimension in climate change in Bikita Communal Lands, Zimbabwe. There is patch-knowledge on climate-related vulnerabilities and adaptation options centred on gender in communal areas of Zimbabwe.

The impact of climate change in agriculture has been recognised and experienced across the globe. Zimbabwe has not been spared since her socio-economic development is heavily backed by agriculture. According to Nitya Rao et al., (2019) women are largely perceived as marginalised and disadvantaged in controlling the socioeconomic developmental status. On the contrary, males are often absent from the majority of the discussions available, and whenever they appear, they are portrayed as lazy, choosing to leave rural areas and agriculture, and having less responsibility for family and community (Mitra, Wajih and Singh, 2015). Females often have little access to agriculture resources. This is usually a result of socially and culturally constructed roles and inequalities. Ncube et al. (2009) argue that the resource differences influence crop management decisions and production. Kalungu (2017) argues that gender plays a crucial role when it comes to the implementation of sustainable adaptation strategies to climate change. This clearly shows that there are existing differential effects of climate change and variability on men and women. This was affirmed by Oxfarm (2011) who reported that the impact of climate change affects women disproportionately by increasing the burden borne in terms of food production and household food security. Rosegrant et al., (2002) concur that climate change and variability is accompanied with increased gender disparity in food production which may result in household food insecurity. Consistently, the UN (2011) reported that climate change severely affects women's livelihoods thereby exacerbating the already existing gender inequalities world-wide. According to Kimani-Murange (2011), about 3.8% of Kenyan population lives in a dire state of food insecurity with the majority of those being women and children. Multiple women roles like food production and provision, caregiving and economic acting are cited among other factors that increase vulnerability of women to climate change and variability (IFAD, 2011). FAO (2006) support the supposition that men are less prone to the impacts of climate change and variability than women. Therefore there is greater and urgent need for enriching women's capability to adapt to climate change. Bernabe (2009) found that women farmers were unable to adopt a number of appropriate technological support system. The UNDP (2009) mentioned poverty, inadequate income, illiteracy and discrimination by their male counterparts, retrogressive cultural rules and norms, among factors affected female's capacity to adopt relevant technology and action on climate change and environmental vagaries. In conformity with the World

Bank (2003), USAID (2010) singled out institutional factors which limit women's access to financial services when compared to men due to lack of collateral security for bank loans. This ultimately leads to retarded growth of the agricultural sector, which will further complicate women's chances of economic emancipation.

Smallholder farmers are identified as farmers who are in communal areas, resettled in small scale areas such as in Bikita District. Smallholder farming is mainly marked with production system which is characterised by mixed crop-livestock farming (Dunjanaetal, 2018). Key crops that are grown by small holder farmers are maize, millet, ground nuts and many more. Maize is grown primarily as the staple crop. Musiyiwa (2014) indicated that small holder farmer also grow tobacco and cotton which are regarded as cash-crops. Livestock mainly consists of cattle, goats, sheep, donkeys and free ranging chickens, from which draught power and organic manure are also obtained (Dunjanaetal, 2018). The homesteads are in villages and farmers have fields at a designated area. The Zimstats (2019) survey report farmers who live in villages and have vast areas for cropping and grazing land. The population in the communal lands makes up to about 51% of Zimbabwe's population. The sector occupies 42% of total land area. Further, ) provides that the old resettlement scheme came into existence following the Government's early land redistribution programme, between 1982 and 1998, where the government bought land from Large Scale Commercial Farming areas on willing buyer willing seller (ibid). The farmers were resettled on an individual family basis or as co-operatives.

The majority of smallholder communal farmers in Zimbabwe rely heavily on agriculture for production. Adaptation involves the decision-making process associated with change management as well as the set of actions undertaken to maintain the capacity to deal with current or future predicted change (Smit and Wandel, 2006). According to Nelson (2007) the approach for adapting to climate change and mitigating vulnerability is through emphasising on the individuals or actors who directly respond to environmental stimuli. Literature provides evidence that various communities across the world have already taken some action to cope with climate variability and change, albeit at a slower pace (Kurukulasuriya et al., 2006; Mano and Nhemachena, 2007; IPCC, 2007). Burton and Lim (2005) suggest, and IPCC (2007) concur that future climate change implications are likely to occur at a faster rate than previously experienced, hence, in future, farmers may not exhibit similar levels of resilience. Consistently, Challinor et al., (2007) assert that in future, adaptation capabilities for individuals and communities may fail to adequately deal with the intensity and frequencies of climate change effects like droughts.

Climate change variability and change adaptation strategies previously identified include cost-effective water management, use of mulch, growing of crop varieties tolerant to climate stresses, intercropping crops adapted to reduce climate vagaries (Howden, 2007; Challinor et al., 2007). The common adaptation strategies used by smallholder farmers in Zimbabwe include dry planting, early planting, altering planting dates, winter-ploughing, pot holing, planting basins, off-farm income generating initiatives and irrigation (Mano and Nhemachena, 2007; Mubaya, 2010;

In Zimbabwe, some of the adaptation strategies used by smallholder farmers are dry planting and early planting, altering planting dates and introducing irrigation (Mano and Nhemachena, 2007). Mubaya (2010) also noted adaptation strategies used by farmers in Zambia and Zimbabwe (including study areas for this study) to include winter ploughing, pot holing, use of planting basins, embarking on off-farm activities to get income and reliance on remittances from relatives working in towns and abroad.

## **MATERIALS AND METHODS**

### **Aim of the study**

To unpack the gender dimensions of smallholder farmers on the impact of climate change. The study

hypothesised that men have a better perception of climate change and variability impact than women in agriculture

### **Theoretical framework**

This study adopted the Sustainable livelihood framework (SLF) to explain the impact of climate change and agricultural activities. This theory was used as the bedrock of analysing gender dimensions of small holder farmers on the impact of climate change.

### **Sustainable livelihood framework**

The current study adopted the Sustainable livelihood framework (SLF) to identify gender vulnerability to climate change. The SLF is useful for analysing how individuals and communities can make a living, and the ways in which their livelihoods can be made more sustainable in the long term (Smith, 2012). Ellis (2000) posits that livelihoods can include assets, access to assets, competencies and activities that are necessary to make a living. Chambers and Conway (1992) argue that the ultimate goal is to attain a sustainable livelihood, which can cope with and promote recovery from shocks and seasonal cycles. Arku and Arku, (2011) suggest that the SLF enhances ecological sensitivity, economic sustainability and socially just livelihood strategies. The Department of International Development (DFID) (1999) identifies six principles to the SLF which are: people centeredness, holistic, builds on strength, multi-level, conducted in partnership, sustainable and dynamic. Carney (1999) argues that the SLF gives the main factors that affect the livelihoods of people, their importance relative to one another and the typical relations between them. According to Oxfam and United Nations (2009), the SLF is focused on gendered analysis of entitlements, competencies, division of labour, risk perception, climate interpretation, livelihood strategies and outcomes.

The SLF was useful in this study for determining gender inclined adaptation strategies and access to, and control over resources (International Institute for Sustainable Development, 2012). Further, the SLF assisted in the exploration of transforming structures as well as processes that may shape adaptation decisions (Burnley et al., 2008). Being a dynamic framework, the SLF helped the researcher to focus on a local study, and at the same time being conscious of the effects of wider factors at the local level processes and institutions (DFID, 1999). The theory also enabled the researcher to adopt quantitative methods in order to assess the implications of gender on adaptation to climate change variability (Allison, 2005).

### **Participation and setting**

The study was conducted in Bikita District of Masvingo Province, targeting smallholder farmers. The population of the study were the smallholder farmers who have been residing Bikita District and Agricultural Extension Field Officers who had served in the District for a period of not less than five years. The study excluded the aspect of animal husbandry context of farming and concentrated on crop farming. Thus, according to the Bikita Rural District office records, there were 8,924 households within the targeted area of study. Stratified random sampling was employed for selecting the respondents. This helped to provide more accuracy and flexible design covering a smaller sub-population. Stratification was completed by separating the target population into clusters of identified villages and then on the basis of gender of the household heads. From the seventeen villages identified, nine villages were selected randomly. In each village, twenty-six households were randomly selected. This was narrowed down to Male headed households (MHHs) and Female headed households (FHHs). Ultimately, a total of two hundred and thirty-four from the site and subjected to further random sampling using excel to limit any possible bias in selection of respondents. Eventually, a total of 118 households were selected and maintained in the study.

### **Sample size**

In coming up with the sample, the study adopted the sample size formula as proposed by Daniel (1999):  $n =$

$$N * X / (X + N - 1),$$

Where n = sample size,

N is the population size = 8,924

$X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2$ , ( $Z_{\alpha/2}$  is the critical value of the Normal distribution at 95% confidence level,  $\alpha$  is 0.05 and the critical value is 1.96, MOE is the margin of error of = 5%, p is the sample proportion = 85%). Therefore, the study used a sample of 244 smallholder farmer household heads.

### Research design

The researcher used the descriptive research design in order to describe the gender dimensions on the impact of climate change among the small holder farmers. The descriptive research design helps to have a wide range of economic and social problems affecting the community understudy. Therefore, the descriptive research design gives the researcher an opportunity to evaluate the perceptions of the respondents. Data was fished from the participants using questionnaires. The structured research questionnaires to solicit conceptions of the smallholder farmers regarding climate change. The data collected was coded, entered and analysed descriptively using the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics in the form of percentages, frequencies, mean scores and standard deviations was calculated for different variables and presented.

### Ethical considerations

Cooper and Schindler (2014) describe ethics as the norms and standards that should be adhered to so as to ensure that no one is harmed or suffers adversely consequential to participating in a research. Diener and Crandall (1978) identify, as most recurrent, four ethics transgressions namely: harm to participants, lack of informed consent, seeking permission from gatekeepers, invasion of privacy and deception. All the above ethical principles were considered as the flagship of the study.

## RESULTS

### Response rate

A total of 192 questionnaires were administered to smallholder farmers. Of these, 188 questionnaires were returned. A total of 9 questionnaires were discarded for lack of completion and ineligibility, while 179 questionnaires were retained for further analysis. Table 4.1 below shows how the respondents' responses were distributed on gender basis:

Table 5.1: Study Response Rate

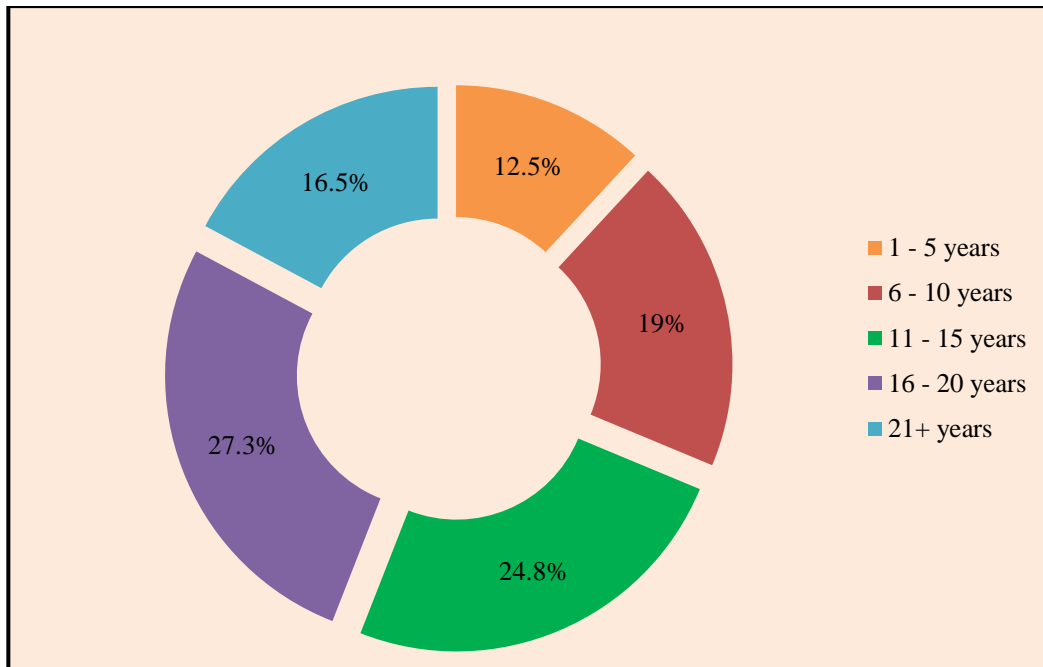
Form of Data	Respondents	Target Sample	Responses	Discarded	Percentage Response Rate (%)
Quantitative	Male headed household heads (MHHs)	96	92	3	92.71
	Female headed household heads (FHHs)	96	96	6	93.75
<b>Total</b>		<b>192</b>	<b>188</b>	<b>9</b>	<b>93.23</b>

Source: author's own conception from responses received

Therefore, a response rate of 93.23% was obtained and this rate was high enough to proceed with the analysis using SPSS 16.0.

### Experience of smallholder farmers

Figure 5.25: Smallholder farmers’ experience



Source: primary data

From the results, it is clear that the majority of the respondents had been involved in farming for a period spanning 16 – 20 years and constituted 27.3%, followed by those with 11 – 15 years at 24.8%. The smallest portion of the sample consisted of farmers with least experience (1-5 years) who constituted only 12.5%. The results indicate that most of the smallholder farmers in Bikita district have more than 16 years farming experience.

### Gender and adaptive capacity

Table 5.4: Association between gender and smallholder farmer adaptation practices

		N	Mean	Std. Deviation	Std. Error Mean
Gender	Male	89	1.31	0.471	0.083
	Female	90	1.21	0.415	0.064
F(1) = 3.449					
df = 0.172					
sig. (p-value) = 0.067					

Source: author’s calculation from primary data

The table above shows the means of the two gender groups. Variances were recorded (F(1) = 3.449, p =

0.067), and measured at 95% confidence level. The results, with a level of significance (p-value) exceeding 0.05, it entails that there is no difference in the means of the two gender groups. Hence, the adaptation practice of smallholder farmers in Bikita District is not influenced by gender.

## DISCUSSIONS

The results contradict findings by Deressa et al. (2008), Demetriades and Esplen (2010), and Belay et al. (2017) who found that male headed households were in a better position to practice diverse adaptation strategies compared to their female headed counterparts. Makate et al. (2017) in conformity reported that women in South Africa have limited contact with extension service providers, while Ng'ombe, Kalinda and Tembo (2017) also reported that agricultural extension service providers in Zimbabwe prefer visiting male farmers. As a result, FHHs are less resilient to climate change impact than male smallholder farmers.

Houghton (2002) affirms that climate change is one of the major threats to sustainable development which causes a plethora of adverse impacts starting from the environment, to food security, human life, economic activities, and to even physical infrastructure. The Agro-sector in Zimbabwe has been at the receiving end of climate change effects, hence the need for adaptation strategies that foster resilience against the impact of climate change. In Bikita District, where the majority of the population consist of smallholder farmers who are reliant on rain-fed agriculture for their livelihoods, crop yields is decreasing and being affecting mostly FHHs. This therefore, calls for robust climate change adaptation strategies to be adopted to avert the dangers thereof (Parry et al., 2007; Schlenker and Lobell, 2010).

The study observed that male-headed households were more likely to access technologies and climate change information than their female-headed counterfactuals. Consistent results were also reported by Demetriades and Esplen (2010) who found that male headed households were in a better position to practice diverse adaptation strategies compared to their female headed counterparts. It was also observed that women have limited contact with extension service providers and the agricultural extension service providers in Zimbabwe prefer visiting male farmers. The implication, therefore, is that male smallholder farmers are more resilient to climate change impact than female smallholder farmers. Married women are more adept at adopting adaptation strategies. Consistently, the UN (2011) reported that climate change severely affects women's livelihoods thereby exacerbating the already existing gender inequalities world-wide.

The study established that farmers responded to climate change induced variability through knowledge of the use of stored grains, changing sowing and harvesting times, dry season gardening, soil conservation and growing new crop varieties. The study concurred with the findings of Codjoe et al. (2013), who ascertained that the most adopted practices to manage climate risk were changing planting dates (100%), mixed farming (95.3%), intercropping (94.3%) planting early maturing varieties (76.4%), composting (62.3%) and off-farm activities (42.5%). It was also observed that seasonal migration and use of chemical fertilisers were the least employed strategies while water harvesting, insurance and irrigation were not adopted.

## CONCLUSIONS

Based on the findings presented above, the study made the following conclusions: It has been concluded that the impact of climate change on Female Headed Households in Bikita District is real and material. The study concluded that the negative effects of climate change and variability in Bikita are mitigated through growing of drought resistant small grains, growing early maturity seed varieties, adjusting crop planting times, application of lower levels of fertilizers, winter ploughing and ridging and pot-holing. Without doubt, people who do practice these climate change adaptation initiatives enhance their chances of reducing negative implications resulting from climate change.

The study concluded that participation of women in climate change adaptation interventions is subject to socio-political, resources and physical systems and processes barriers. Socio-political barriers negatively affect meaningful participation of women in the identified climate change adaptation interventions in the district. This called for all the actors to be socially and politically conscious of the need to take deliberate actions aimed at achieving the common goal of mitigating the quirks caused by climate change. The study, therefore, concluded that availability of resources is a key factor to women participation in climate change intervention practices. The study also concluded that physical systems and processes play a significant role in enhancing women commitment and participation in climate change adaptation initiatives, and lack of such is detrimental to any efforts to mitigate the negative effects of climate change.

## RECOMMENDATIONS FOR PRACTICE

The study recommends the government to increase support to small holder farmers through adapting irrigation farming. The study also recommends that the government considers setting up targeted climate change funding initiatives. This will go a long way in improving the resources for the various women involved in climate change adaptation activities. A key recommendation for Policy makers is to enhance local policy capacity in Zimbabwe through the establishment of a clear legal mandate for climate change adaptation that makes it a fundamental concern. Education and enhancement of knowledge and skills for women at community level on the long-term effects of climate change and more adaptation practices may help further local adaptation drive, and enhance socio-political willingness to actively engage in climate change adaptation actions. Farmers are encouraged to grow drought resistant crops such as sorghum, rapoko and millet.

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### Conflict of interest

The authors declare that they have no clash of interest.

### Authors Contribution

Liberty Takazira developed the research work under the close guidance of Prince Dzingirayi.

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