

**ASSESSING THE COPYING MECHANISMS FOR CLIMATE CHANGE IN
ZVISHAVANE- MAZVIHWA**

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ABSTRACT

Climate change has been a subject that has caused a lot of debate and concern the world over. Most scholars have contemplated on the causes, effects and results of this phenomenon. The Food and Agriculture Organization posits that climate change affects agriculture and food production in complex ways. It affects food production directly through changes in agro-ecological conditions and indirectly by affecting growth and distribution of incomes, and thus demand for agricultural produce. This paper seeks to illustrate copy mechanisms that have been adopted by the Zimbabwean population in the Mazvihwa area as result of climate change. The researchers used mixed scanning methods involving interviews, questionnaires and desktop researches in data acquisition. This study becomes relevant in a Zimbabwe that has struggled with food security since time immemorial, as the affected have started taking the matter into ‘their own hands.

Key Words: Climate change, Agriculture and food production, Time Immemorial.

1. INTRODUCTION

This article investigates different copying mechanism in Mazvihwa area (Rural Zvishavane) in the face of climate change. Mazvihwa which falls under Zvishavane district area receives poor rains due to climate change and the livelihoods of people has been affected. Due to climate changes yields have been affected, grazing pastures have been not been sufficient to feed livestock resulting in their death and deforestation as new trees have not germinated. Mazvihwa falls under Zvishavane rural and is in Midlands province. Mazvihwa area is pre-dominantly characterised by peasant small-holder agriculture which is highly susceptible to climate change to heavy dependence on natural rains.(Hove,2017) The mean start of the growing season for Zvishavane district is around the 9th of December and on average the growing season in Zvishavane district ends on the 7th of April. (Simba FM and Chayangira J, 2017). This has prompted farmers to seek adaptive interventions in order to cope with the devastating effects of climate change. (Hove, 2017). The researcher made use of the mixed research approach. The use of this mixed approach allowed the researcher to use both words and numbers to communicate the results and findings and thus appeals to a wider audience. Tashakkori, and Teddlie, (2003)

2. RESULTS AND DISCUSSION

The study conducted in Mazvihwa area found that farmers employ various coping strategies against climate risks below are some of the copying mechanisms which were employed by the farmers.

Conservative Agriculture

Conservation agriculture is also another noteworthy climate change adaptation intervention that is being carried out in Mazvihwa community in order to cope with the effects of climate change. Owing to the effects of climate change, communal farmers in the district were unable to harvest well, their crops were often affected by high temperatures averaging 26 degrees Celcius, poor and sporadic rainfall of less than 250mm per annum.. (Hove, 2017). With the coming in of conservation farming, farmers were able to practice minimum tillage, conservation of water through digging holes where water for the crop is planted and also saving inputs like fertilizer by placing the fertilizer directly on the crop. This has enabled farmers to engage in environmentally friendly farming practices but producing high yields at the same time.

The interview with the AGRITEX officers revealed that maize production had increased tremendously by 30% as compared to the previous years where in most cases householders were not food secure, they had limited access to food, though there have not been able to eliminate food insecurity totally, there is significant evidence that if communities are educated more on conservation farming, they can realize high yields as evidence shows that conservation agriculture is indeed working.

Furthermore, farmers in the district, interviewed reiterated that conservation tillage produced high grade maize as compared to those practicing conventional farming methods. There was strong evidence that this was true as the researcher was able to see stocks of maize in the wards where conservation agriculture is being carried out. For example, where farmers used to harvest five bags of maize, there has been a slight increase of seven to eight bags as compared to previous years.

Conservation farming in Mazvihwa is an effective adaptation strategy in dealing with the effects of climate change in the district as it increases yields. The findings were similar to those observed by Nzabi (2002) who established that in Kenya conservation farming produced higher yields of 2.6 t/hectare as compared to 1.8 t/hectare produced with conventional farming methods. Nyagumbo et al (2009) observed that yield levels of the main cereal staple crops increased compared with conventional ploughing in Zimuto area of Masvingo. Nyagumbo et al. (2009) highlighted that average yield increases from 0.8 t ha⁻¹ in 2006 to 3.7 t ha⁻¹ in 2007 in Zimuto were also observed by compared to a national average of 0.4 t ha⁻¹ that year. Moreover respondents from the Mazvihwa revealed that it was a cheap agricultural practice which conserves the environment hence making it an effective tool in promoting food security in the area. Erenstein (2003) concurs with the above finding and postulates that conservative farming achieve maximum yields taking advantage of the natural resources and protecting the environment and as well as making effective use of external inputs

Small Livestock Rearing

Livestock has also been affected as a result of climate change in Mazvihwa community. Cattle rearing in Mazvihwa has been the most dominant livestock activity but has also been on a decrease due to poor climatic conditions which have resulted in the recurrence of drought more particularly the 1992 and 2002 drought which killed notably more than 60% of the district herd cattle in the area as reported by the veterinary department. (Hove,2017).

In response to the above, the district embarked on a small livestock production as climate change adaptation strategy in a bid to cope with the effects of climate change on the environment. Winnie Onyimbo ,2015 In Kenya, most livestock keepers prefer to raise cattle. But with the changing climate, a few small-scale farmers in eastern Kenya have recently discovered that goat farming is a lucrative substitute for cows. Winnie Onyimbo 2015 highlighted that Goats are hardy animals, especially in dry areas. They do not consume a lot of fodder, can go for several days on the water in the food they eat, do not require much land, and, if well-managed, gain enough weight to be sold in six months. Shalander Kumar etal observed that in Rajasthan, where drought is frequent, goat rearing was adopted by all categories of farmers as a copying mechanism. Small stock livestock rearing has indeed enhanced the livelihoods of people in Mazvihwa.

Irrigation

Irrigation remains one of the most effective climate change adaptation interventions in Mazvihwa but has been implemented on a very limited scale due to financial constraints that have scuppered attempts to construct dams. (Hove,2017) This is despite the fact that two of the biggest rivers in Zimbabwe, Runde and Ngezi both flow through Mazvihwa. The Mhototi-Mupani irrigation scheme in Mhototi ward is one of the few irrigation systems that has transformed lives of people in Mazvihwa community. The scheme was set up by Zvishavane Community Share Ownership Trust.(Hove,2017) Muzerengi and Mapuranga (2017) note that small-scale irrigation schemes in many less developed countries, particularly in Africa, were initiated mainly to boost agricultural production. Information gathered from field indicated that farmers that benefited from the Mhototi-Mupani irrigation scheme as it increased their yields by more than 60%. (Hove,2016) Furthermore the farmers are now able to farm throughout the year and practice mixed cropping which has boosted food security as compared to farmers solely relying on rain fed agriculture which has proved to be highly sensitive to climate variability. Chazovachii (2012) postulated that irrigation schemes for smallholder farmers in Zimbabwe are a mitigation measure, especially against droughts and the mid-season dry spells where crops severely suffer from moisture stress. Chitora irrigation scheme in Mutuko district is one example of an irrigation scheme in Zimbabwe that is playing a pivotal role in the reduction of food insecurity, malnutrition and poverty, as well as contributing towards economic empowerment of the local people (Chikwati,2018). Irrigation has thus been effective copying mechanism in Mazvihwa however it has not been exploited fully as alluded above.

Water harvesting and soil moisture management



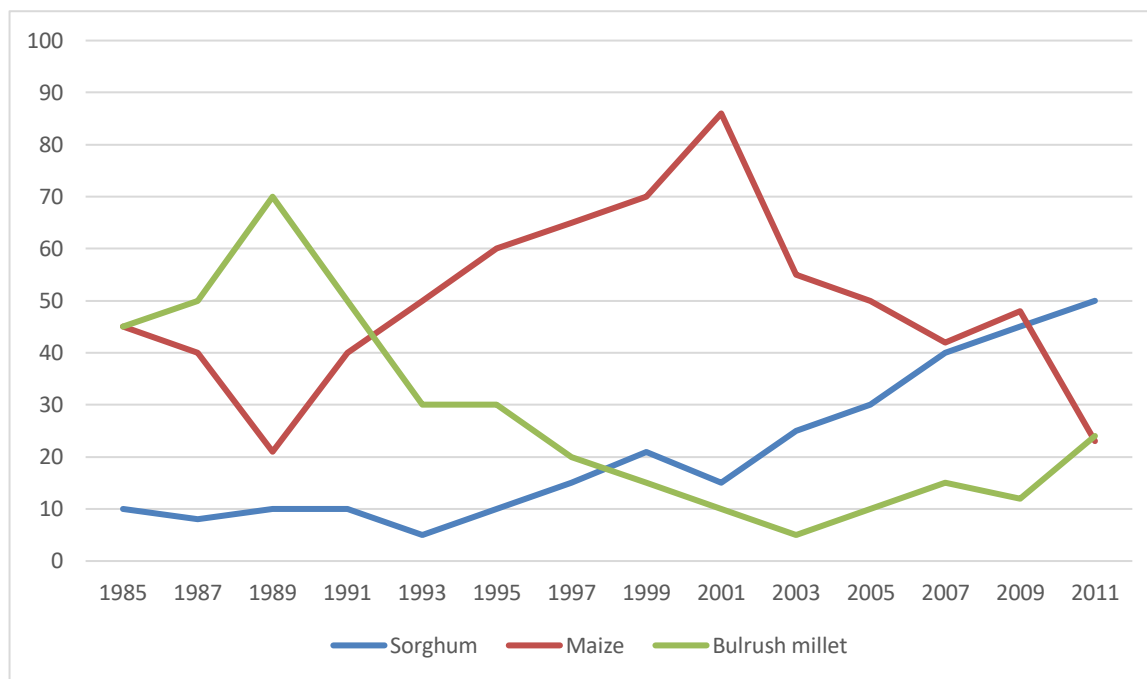
In field water conservation

Photo credit: Muonde Trust

Above is an image showing water harvesting canal in a maize field Mazvihwa's Madzoke village. The area receives erratic rainfall which when collected in these canals can increase the soil's moisture retention. These canals have become a common feature across Mazvihwa area as farmers have realised the importance of water harvesting in the wake of little rainfall and climate change. According to Muonde Trust, a community based organisation that actively participates in fostering community based adaptation interventions, by 2011 between 30 and 60% of farmers were practicing different kinds of water harvesting in the different ecological zones of Mazvihwa. Even more amazing was that by this time up to a third of farmers had switched their sacred Rhodesian contour ridges (or swales) into new designs to gather and hold water for infiltration and storage.

Drought Tolerant Crops

The era of maize in Mazvihwa seems to have ended with the turn of the millennium as data collected from various stakeholders including AGRITEX, Muonde trust and the GMB has shown an exponential decline in maize yield due to insufficient rainfall and erratic climate. The data shows that there has been a gradual decline in maize yields over the past 30 years. Subsequently maize has successfully been replaced by sorghum. The macia sorghum variety was introduced in Mazvihwa in the 1990s but gained popularity in 2000s due to successive rainfall failure and successive droughts



Source: Zvishavane GMB

The graph showing a steady rise in the yields of Sorghum and a steep decline of maize production over the years from the mid-1980s.

Optimizing Breed Mix

Another adaptation strategy that has been implemented in the community is optimizing breed mix. This strategy is the process of cross breeding animals in order to have more resilient and more productive livestock varieties.(Hove,2017) The strategy improves the breed of the animals and makes them resistant to diseases and parasites. Goat and sheep production have also been introduced in Mazvihwa communal lands to increase meat production. In rural areas people are more hesitant to kill or sell cattle as it symbolizes wealth and bear family respect as compared to goats where people can kill and improve their dietary needs henceforth improving their sustainable livelihoods options. Goat mixed breeds have been introduced for drought and disease resistance in the area. In an interview with an AGRITEX officer in ward 19 revealed that a farmer in the ward on plot number 19 is cross breeding 1 Boer goat Ram with goats in the area. This in turn has improved the local breed of goats in the area. Goats are sold and money is used

to supplement their diet and sending children to school. Thus optimizing breed mix has been an effective adaptation strategy in dealing with the effects of climate change in Mazvihwa community.

Changes in agricultural practices reported by farmers in Mazvihwa community in response to perceived climate change.

3. RECOMMENDATIONS

1) There is need for the private sector and government to invest in irrigation in Mazvihwa to ensure that there is food security. Runde and Shashe river flow through the area yet irrigation is not fully utilised.

2) There is need to incentivise the Agriculture extension officers with better salaries. The officer were contemplating greener pastures as they were filling the effects of the economic decline of the country

3) There is need for government to assist the rural communities to cushion the communities financially as some of the community cant afford some of the copying mechanism such as irrigation and cross breeding.

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