Examining barriers and opportunities for sustainable adaptation to climate change for smallholder farmers in semi-arid Buhera District, Zimbabwe

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Abstract

Climate change adaptation is increasingly becoming a more visible and pressing issue in smallholder agriculture of semi-arid environments. In some cases, what seems to be a successful adaptation strategy to climate change may in fact undermine the social, economic and environmental objectives associated with sustainable development of a nation as a whole. This paper examines opportunities and threats to sustainable adaptation to climate change in the case of semi-arid Buhera District in Zimbabwe.

Key words: *Sustainable adaptation, Livelihoods, Semi-arid, Agriculture, Zimbabwe*

Introduction

Adaptation to climate change is comprised of adjustments in response to (or in anticipation of) climatic impacts to reduce disruption to key resource flows and the adverse effects on people's general well-being and quality of life. Although adaptation can potentially reduce the negative impacts of climate change, little attention has been paid to the consequences of adaptation policies and practices in terms of sustainability (Bhatasara and Nyamwaza, 2018). Strategies or policies that make sense from one perspective, or for one group, may at the same time reduce the livelihood viability or resource access of other groups. Reduction of climate risk through specific technologies or infrastructural changes may sometimes lead to the neglect of other environmental concerns, such as biodiversity (Eriksen, 2011). Hence, adaptation can have unintended negative effects both on people and on the environment – so-called maladaptation. A recognition that not every adaptation to climate change is good has drawn attention to the need for sustainable adaptation strategies and measures for enhanced livelihoods, and for qualifying what types of adaptation are desirable or not. The increase in attention to mobilise

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resources for adaptation suggests that it is critical to get adaptation right in order to solve, rather than exacerbate, problems resulting from climate risks (Chanza, 2017).

Consequently, it is crucial to understand what it means to sustainably adapt to climate change. A working definition of sustainable adaptation would be adaptation that contributes to socially and environmentally sustainable development pathways, including both social justice and environmental integrity. This paper presents and discusses the concept of sustainable adaptation to climate change, and illustrates the principles of sustainable adaptation as outlined by Eriksen (2011) and their significance by examining the case of smallholder farmers in the semi-arid region Buhera District, Zimbabwe. Buhera District is characterised by relatively low rainfall of <650mm p.a. There is evidence of warming of 1^0C over the last several decades in Zimbabwe and the country has begun to experience more hot days and fewer cold days. A rainfall simulation of the country has estimated that rainfall will be 15 to 19% lower by 2075 and that evapotranspiration rates could increase by between 7.5 to 13%, creating a great moisture deficit scenario (GoZ 2016). The length of the growing season has become short and is now characterised by late onset of rainfall, prolonged intra-season dry spells and early cessation of rainfall. Such a pattern has negatively affected both crop and livestock farming. The area has also experienced increased incidences of weather extremes in the past 10 years (droughts, heat waves, windstorms, hailstorms). There is a general decrease in river flows and drying up of boreholes shortly after the rain season. The district has a poor road network and general low development infrastructure. Education levels are relatively low for the people living in that community as the young and educated population continue to migrate to urban areas in search for a better living. The area is characterised by general low food production and low incomes (ZIMVAC, 2016). This research thus examined the social-ecological system responses of the communities to climate change effects.

Methodology

The study used a qualitative approach comprising of three focus group discussions and 15 key informant interviews. Participants for focus group discussions were conveniently selected due to their availability, and effort was made to include various age groups (young adults, roughly 18-30; middle aged 31-45; and the elderly 46+ years), and to balance the number of female and male participants. Focus group 1 comprised of 13 participants (8 females and 5 males) group 2 had 11 participants (5 females and 6 males) and group 3 had 12 participants (7 males and 6 females). The interviewees were purposively identified due to their positions of influence and involvement in livelihood systems in the district. These were community leaders, agricultural extension officers, livestock production officers, gender and community development officers and district livelihoods and welfare officers.

Findings

Major livelihood options in the area are climate sensitive i.e. rain-fed agriculture (97%), gardening (87%) and livestock rearing (78%). The research established that the communities are resorting to soil-water conservation, planting of climate tolerant crop cultivars (small grains like sorghum and millet), strategic cropping, animal husbandry and embarking on alternative livelihood options to support income levels of their households. Red sorghum contract farming, improved livestock breeding (cross-breeding) and Small Ruminants 'Pass On' projects (where a female goat or a heifer is passed on to the next household when it gives an offspring in order to increase livestock ownership) were found to be major intervention activities, though their implementation are marred with challenges. The following are the principles of sustainable development examined in this research:

i) Recognition of context in which vulnerability to climate change occurs.

Farmers are increasingly concerned about unfamiliar climate dynamics, which results in uncertainty around planting, loss of crops and livestock, and damage to infrastructure because of hydrological extremes. The community is living in an area of perpetual aridity, and experiencing the occurrence of climate-related extreme events such as heavy storms, windstorms, hailstorms and other unpredicted weather regimes. These have led to extensive damage to property. The livelihood dynamics form part of the vulnerability context, with support networks from family and friends being fundamental. It was also evident that several organisations dealing with livelihoods enhancement programmes through income generation are in operation. Some of the non-governmental organisations only operate for a short period of time with a relatively weak exit strategy, thus leaving the community still at risk. It is against this recognition that there is need to broaden adaptation responses by a livelihood diversification enabling environment.

ii) Acknowledgement of different values and interests that differently affect adaptation outcomes.

Strong vested interests within particular adaptation strategies may act as a barrier to sustainable adaptation. There was evidence that most programmes were gender specific or targeted a certain group of the population. For example, men were mostly in higher capital projects, while women in relatively low income projects. This generates some divisions within households and may challenge project viability and longevity. Some projects beneficiaries are divided on political affiliations and this challenges the sustainability of adaptation initiatives. This is because development projects, in as much as they are part of policy implementation, change with a change of political regime. Infrastructure

provision ends up being dependent on individuals and some government structures instead of being an institutionalised adaptation policy process.

iii) Consideration of potential feedbacks between the local and global processes.

Some adaptation strategies affect other socio-ecological systems. For example, the promotion of livestock production in the area may result in increased production of methane; the establishment of woodlots of exotic trees in riverine systems has resulted in depleted wetlands; and out migration to urban areas has reduced labour force in the source area and created relative pressure on resources in the receiving area. Households benefit from remittances from members who would have moved to the city and this creates an attraction for continued migration.

iv) Integration of indigenous knowledge systems into climate change adaptation.

Over time, vulnerable people have developed responses to climate risks based on their knowledge and understanding of the conditions and environment where they live (Brown, et al., 2012). In-depth interviews revealed that a crucial aspect that helped the community to survive after a weather extreme is the knowledge people had of their environment. It is imperative, therefore, to generate local knowledge and integrate it with other sources of knowledge in order to develop successful responses to climate change and empower local decision-making. Integration of local knowledge into adaptation planning and decision making is also important in determining which interests or development paths can be prioritised. Development initiatives (prioritized according to potential harm to livelihoods), should be matched with adaptation needs and cultural acceptance to enhance local level participation.

Conclusions

There is need to capacitate communities with skills that create an adaptive society through participation and alignment of community adaptation interests with the national economic development plans. Human and social capital development would therefore enable communities to balance between losses and gains and also to take advantage of opportunities that arise with climate change and deal with probable climate risks. There is a need for increased political commitment to an integrated approach to sectoral development to enhance livelihoods and creation of an enabling adaptation environment. Major opportunities can be necessitated by the existence of a new policy arena, i.e. the launch of the national climate policy to guide the implementation of adaptation in the country. This would increase confidence in investors and development partners. Communities have experienced livelihood losses and generally want change. However, if there is no political commitment to policy implementation, financing and capacity building, sustainable adaptation will remain a dream.

Acknowledgements

This research was supported by funding from the UK's Department for International Development (DfID) under the Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) programme implemented by the African Academy of Sciences and the Association of Commonwealth Universities

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