‘The Sustainability of Rural Livelihoods in the Face of Climate Change in Chadereka Ward I of Muzarabani Rural District in Zimbabwe’

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The sustainability of rural livelihoods in the face of climate variability and change in developing countries like Zimbabwe remains debatable. Climatic conditions adversely affect agriculture which is the main rural livelihood in Chadereka Ward I of Muzarabani Rural District making its sustainability limited to a greater extend. The purpose of the study was to assess rural livelihoods in terms of their sustainability in Chadereka Ward I of Muzarabani Rural District in Zimbabwe. In order to accomplish the study, both qualitative and quantitative research approaches employing key informant interviews, focused group discussions, review of literature and household interview-questionnaires were used in data gathering. The sustainable livelihood framework was used in the analysis of the data. Besides assessing the sustainability of the rural livelihoods practised in the area, the study further sought to identify challenges faced by households in Chadereka Ward I in an attempt to adapt to climate variability and change. The results of the study revealed that flood recession cultivation of maize (Zea mays L. or mudzedze in Shona), gathering of wild fruits such as (Zizphus-mauritiana or masawu), cultivation of drought tolerant rain-fed crop such as sorghum (Sorghum bicolor) and livestock production are no longer fully sustainable according to the economic indicator for sustainability analysed in this research. The challenges faced include water scarcity, lack of constant institutional support, inaccessibility of the area during the rainy season, poor infrastructure and poor marketing services for their commodities. Finally, the roles played by major stakeholders in the area studied were established such as provision of food handouts, provision of agricultural input, early warning systems, provision of the indigenous knowledge system and the provision of educational material. The study implies that climate change phenomenon is now inevitable and people need to team up from local level especially at household level to find and implement adaptable ways for survival.

Key words: Sustainability, Rural Livelihoods, Adaptation and Climate Variability and Change.

1. INTRODUCTION

Rural economies in the marginal areas of developing countries like Zimbabwe are sustained by their natural resource endowments (Butterfield et al., 2008, Cooper et al., 2008) and agriculture is mainly rain-fed (Molnar, 2010; Moyo et al., 2012). Chadereka Ward 1 in Muzarabani Rural District generally experiences extreme weather conditions in form of recurring droughts and occasional floods.
Rural livelihoods are a combination of all the capabilities and assets or capitals (natural and socio-economic) at the disposal of humankind for survival in the countryside (Khanya-aicdd, 1999; Scoones, 1998, 2009). Chisinga (2003), Scoones (2009) and Goredema et al. (2011) argue that the livelihoods are the weapons to salvage rural people from the extremes of poverty ensuring their food security and self-sustenance. According to Unganai (2000) in Chadereka Ward I the issue of livelihoods which are sustainable is critical as people entirely depend on the natural capital which is often insufficient.

Below et al. (2011) and Gentle and Maraseni (2012) consider adaptation as all forms of alterations in the socio-economic and biophysical environmental systems in response to observed or anticipated variations or changes in climatic inducements. In Chadereka Ward I the knowledge and understanding of adaptive strategies are of great significance as it would form a learning platform at micro level of places with similar conditions. Adger (2006) describes vulnerability as being susceptible to harm after being exposed to stress, in this case to climate variability and change with limited adaptive capacity. Adaptive capacity is context-specific and spells the ability or potential of a system to respond successfully to climate variability and change (Gentle and Maraseni, 2012).

The climate variability and change scenario is receiving a lot of documentation currently. Shalizi and Lecocq (2010); Lin, (2011) and Below et al., (2010) reiterate that adaptation to this physical phenomenon is critical the world over calling for more innovations, scientific researches, conferences, conventions and seminars. This adaptation points to rural livelihoods transformation and relevant information dissemination which enhance survival or sustainability (Bryan et al. 2012). The purpose of adaptation is to reduce risks and vulnerabilities faced by the marginalized communities. The sustainability of the livelihood practices which is the focus of this study depends entirely on the nature of interaction between the local community and the natural resources base available in rural areas. This study therefore identified the current livelihood activities in the face of climate variability and change in the study area.

Hinkel (2011) as cited by Below et al., (2011:223) posit that insufficient literature exist to address the phenomenon especially considering, “…forward-looking and site specific characteristics of the adaptive process.” This also came out in Ruij et al. (2010) who observed that at global level costs on climate change adaptation had been estimated. They further pointed that in such literature, there is limited information on adaptation practices at household level. The tendency is of ‘Top-down’ technical solutions with little attention on household low cost effective strategies. Gentle and Maraseni (2012) on another note observed limited knowledge and information at local level on how the different wellbeing
clusters respond to the climate issues. Focus should also be directed towards a multitude of challenges faced by the local people as they try to adapt. These short falls are worth exploring in an endeavor to alleviate the problem. The call is for institutional support structures to be put in place and influence behavioral change and enhance development as postulated by Ruij et al. (2010).

Quantification of climate change impacts or adaptation potential and adapters for mitigation policy development as done by Below et al. (2011) is good. Ngugi and Nyariki (2003) named the sustainable livelihoods *regenerative livelihoods* while those not sustainable were termed *extractive*. The Chadereka inhabitants base their regenerative livelihoods mainly on the natural capital (land, water and forest). Little is supported by the social capital (remittances) and economic capital (informal trade). The operations of different institutions like the Zimbabwean Civil Protection Unit (ZCPU) the Non-Governmental Organizations (NGO) and educational institutions like Bindura University of Science Education determine what, where, how and when such activities are done.

The conceptualization of adaptation to climate variability and change as site-specific according to Below et al. (2011), promotes extensive local-level analyses that yield a clear understanding of the phenomenon and adaptive policy development for the small scale farmers by stakeholders. The rural livelihood options need to be assessed in terms of their sustainability so as to become well informed on their local variations. From Yohe and Tol (2002) as cited in Below et al. (2011) the following factors that determine small-scale farmers’ adaptive capacity and local level adaptation are selected and analysed due to their impact and relevance in Chadereka Ward 1. These are: the technological options available, natural resources endowment and their accessibility by the local populace, institutional support, the human capital (educational level and skills), social capital (property rights), information availability and dissemination and awareness of climate change in this scenario. Chambers (1989) through his theory of vulnerability and adaptation of small scale farmers, observed the undisputable role of livelihood diversification to sustainable practices, a situation assessed in Chadereka Ward I in Muzarabani Rural District.

The determination of the sustainability of the livelihoods practised in such circumstances is called for so as to provide recommendations on best practices in this era of climate variability and change. Moyo et al., (2012) affirms that with limited evaluations of climate-induced risks in the semi-arid areas of Zimbabwe, stakeholders are misinformed and make erroneous decision about natural hazard.
2. Study Area

The study was conducted in Chadereka Ward 1 of Muzarabani Rural District (Figure 1). The area is found in the semi-arid and northern low-veld of Zimbabwe. Like what Moyo et al., (2012) wrote, Chadereka occupies the agro-ecological zone IV characterised by little rainfall ranging between 450 to 600mm per year. Thus, the area is prone to seasonal droughts and severe dry spells in between summer months (Campbell, 1994, Murwira et al., 2012). Temperatures are excessively high (up to 40°C during the hot season – September to November) and floods are experienced occasionally according to Murwira et al., (2012). The Zimbabwean government encourages semi-extensive agricultural activities like livestock production (Moyo et al., 2012). However, smallholder farmers usually grow drought-tolerant varieties of maize (Zea mays L.), sorghum (mapfunde), pearl millet (mhunga), finger millet (rapoko) and cotton in addition to the keeping of small to large livestock like guinea fowls and cattle respectively.

The soils in the area are chromic luvisols which are sandy textured making them prone to wind and fluvial erosion. These have low nitrogen, phosphorus and other organic content as pointed out by Nyamapfene (1991). Their water retention capacity is generally poor and the rivers are always dry for a longer period of the year. However the alluvial soils along Nzoubvunda and Hoya Rivers are rich soils with a favorable water retention capacity and sustain the flood recession cultivation of maize (Zea mays L.), a practice known as (mudzedze) by the locals during the autumn and winter seasons. Chadereka Ward 1 occupies the interfluve sandwiched between Hoya River to the east and Nzoumvunda River to the west. It stretches from the confluence of these two rivers towards the south were it borders with ward 7. It is when these two rivers receive excess rain water flow from the highland area of Mavhuradonha Mountain Range and fail to drain into the would be flooded Musengezi River downstream that backflow occurs and flood the low lying area of Chadereka Ward 1. Initially the area had more wildlife than people but currently it is home to 7 505 people due to migration as population grows (Zimbabwe National Statistics Agency (Zimstat), 2012). This pressurizes the rural area in meeting the human needs thus justifying the choice to consider Muzarabani Rural District, particularly Chadereka Ward 1 under this study with the hope to encourage and/or reinforce alternatives for survival in the area.
Figure I: Chadereka Ward I showing villages sampled.

Methodology

**Sampling Frame:** Given the Zimstat (2012) population statistic of 7505 people in Chadereka Ward 1, there are 1594 households in 51 villages. On an average 31 households are found in each village. For the purpose of this research, a 10% sample of the villages was considered and (5) villages were purposively sampled (Marshall, 1996) depending on their accessibility during the time of data collection (January and September 2013). This gave a total of 155 households upon which a household questionnaire-interview was to be administered. This was not feasible given the time and resources available; hence 15 households (48.4%) per village which is representative enough were randomly selected giving a total of 75 households from the 5 villages. During the random selection of the households, the village heads from Chadereka, Gunduza, Karue, Kwariramhere and Chidavaenzi villages supplied the household names which were then assigned computer generated random numbers. Fifteen (15) names per village were randomly selected for the questionnaire-interview. Thus, a multilevel mixed sampling method was followed (Teddlie and Yu, 2007). Figure 2 summarizes sampling and research methods used together with the type of data collected.
Data collection tools.

The data collection instruments were the key informant interview guides and the household questionnaire-interviews with structured and semi-structured questions. Five focus group discussions (FGDs) comprising of 10 to 12 members of mixed social status (age, gender, educational level and marital status) were conducted at the homesteads of the village heads whose villages were sampled. The discussions provided more data to substantiate the responses given during the household questionnaire-interviews on livelihoods practices, challenges faced by the local people as they implement the adaptive strategies obtained through the other two methods: the key informant interviews and the household questionnaires. Other information to do with the stakeholder roles in promoting sustainable rural livelihood adaptation to climate variability and change was also authenticated (See Figure 2).
The key informant interviews were conducted by the researcher and two assistants with the then Ward Counselor, a resident member of the Zimbabwe Republic Police (ZRP) representing the Civil Protection Unit (CPU), a Health practitioner at Chadereka Rural Health Center, the Agritex officer in the ward, the Chief for the area, the Meteorological Services Department representative, World Vision Organisation representative and a school head. Themes for the interviews were the ones enunciated in the focus group discussion.

The household survey questionnaires were administered to the household heads, and adult members of the household (18 years and above) in cases where the actual head was not available. Only 10% of the household heads completed the questionnaires on their own. The rest requested for help from the research member in filling their answers to the questions. The vernacular language in the area is Shona and due to the prevalent low level of education, all the questions were translated into the language understood by the respondents. Thus, prior to visiting the research site, the researcher and the assistants familiarized with all the research instruments written in English and Shona. Given that most of the respondents were assisted, there was a 100% return of the completed household questionnaires. The household survey questionnaire explored issues on the demographic data of the respondent, livelihoods and assets, awareness of climate issues at household level, adaptation issues and stakeholder participation. For this paper focus was given to demographic data (age, sex, household size, and educational level), current livelihoods practices, climate variability and change adaptation strategies, challenges faced and selected stakeholder roles (local authorities, non-governmental organisation, educational institutions and the Meteorological Services Department). Of interest to note is that a consent letter was first given to all the participants or respondents informing the time to be spent answering the questions, purpose of the research, confidentiality issues, perceived benefits and risk matters before one’s commitment. A pilot study was done earlier before the actual survey.

The qualitative data analysis techniques considered in this research were coding, content quote technique, content analysis and descriptive statistics. The most appealing responses given by key informants and members who participated in the focus group discussion were verbally presented (content quote). The descriptive statistical analysis like what was done by Ofuoku (2011) presented the data in frequency counts, percentages and calculated averages. Some questions on the household questionnaire made use of the Likert’s scale like the one on the assessment of crop and livestock production in the past ten of more years. Qualitative terms ranging from greatly increased to greatly decreased were used. These assisted in determining the sustainability of the practices basing on the responses given by the household heads using the economic variables. In all this the sustainable livelihood framework was considered in data analysis.
3. RESULTS AND DISCUSSION

The results are presented and discussed in sections each focusing on a particular issue raised in the study. For the purpose of a proper analysis, an understanding of the demographic and socio-economic characteristics of the respondents is given first as shown in Table 1. This is followed by the presentation of the sustainable livelihood framework and how it is applied to Chadereka Ward I. The livelihood strategies / options are also presented and discussed followed by the challenges faced by the inhabitants. Stakeholders’ roles in promoting livelihoods in the area are given at the end.

Demographic and socio-economic characteristics of the respondents (Household Heads)

The questionnaire interview reveals that there are more female household respondents (66.7%) than males (33.3%) in Chadereka Ward I. Usually females are the ones who remain manning homesteads as males get engaged in outdoor activities like migrant labour to supplement the inadequate food provisions for the family. After harvesting their last crops of maize (mudzedze) in early August rarely does one finds males at home. This emerged from the focus group discussions as the research tried to explore further on the livelihoods by the members of the households. Females remain at home with the siblings attending to other domestic chores like market gardening and gathering wild fruits-masawu. Female headed households are exceptional as they venture into the trading activities locally and outside the ward. It also came out that about two thirds (60%) of the respondents were married having a great bearing on the household livelihoods. On an average the household size of 6 made it possible to diversify livelihoods.

The ward has more economically active population which if given proper training, adequate support and guidance would drive the economic base of the area. Only 13.4% are those respondents above 51 years of age. The remainder (86.6%) is the age group between 21 and 50 years. Chadereka Ward I is characterised by low levels of education despite all the respondents having acquired some form of education. This is a draw back on the human capital and compromises the sustainability of resource usage in the area. Adoption of livelihoods options suitable for this era of climate variability and change is minimized. Only 9.3% of the respondents have attained tertiary education. The majority 62.6% have gone for the basic primary level. Female education is not fully supported as evidenced by the lower percentages of those who have attained secondary and tertiary education than for the male counterparts. Inhabitants of the area still perceive education for the girl child as mere waste of resources rather they get married early and families benefit from lobola. Generally there are more primary schools than secondary schools (Zimvac, 2012) and during the rainy season pupils are disturbed from attending school by the flooded rivers; Nzoubvunda and Hoya. In times of floods they spent weeks without going to school. All this came out during the interviews with the key informants (the school headmaster, the councilor, the kraal head, the chief and the agritex officer) resident in Chadereka Ward I and during the focus group discussions in each of the five
villages. Education needs great priority in any form of development and responses to vulnerability like climate variability and change.

The hectrage for farming activities, especially crop production according to the respondents is low. The majority (86.7%) of the households have less than 5ha, a situation also observed by Ofuoku (2011). This leaves these smallholder farmers with no alternatives to the growing of more different kinds of crops. Instead they concentrate on sorghum which is grown on raised dry area and maize on flood plains after flood recession exacerbating stream bank cultivation and siltation of the two rivers. Table 1 shows the percentages of respondents and their characteristics.

It also emerged from the questionnaire-interview and the key informant interview that 75% of the inhabitants of Chadereka Ward 1 are immigrants, majority of which came from the southern lowveld of Zimbabwe during the first phase of land redistribution programme. In the early eighties cotton was doing well fetching enough money for families (Zimvac, 2012). Thus, the majority of the immigrants got attracted to the northern lowveld in which lies Chadereka Ward 1. In the area they relied strongly on the production of cotton which was marketed in the nearby Cotton Marketing Boards in Mt Darwin, Centenary and Bindura. This was before market price distortions which have seen many people leaving the growing of cotton. Livestock has continued to be a major income source for the rural people in the study area. This outcome from the household head interviewed is also clearly shown in Figures 4 and 5.
Table 1: Demographic and Socio-economic characteristics of the respondent household heads in Chadereka Ward I (n=75)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>25</td>
<td>33.3</td>
<td>50</td>
</tr>
<tr>
<td>Females</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total %</strong></td>
<td>25</td>
<td>33.3</td>
<td>50</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;21</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21-30</td>
<td>3</td>
<td>4.0</td>
<td>12</td>
</tr>
<tr>
<td>31-40</td>
<td>10</td>
<td>13.3</td>
<td>30</td>
</tr>
<tr>
<td>41-50</td>
<td>4</td>
<td>5.3</td>
<td>6</td>
</tr>
<tr>
<td>51-60</td>
<td>3</td>
<td>4.0</td>
<td>2</td>
</tr>
<tr>
<td>&gt;61</td>
<td>5</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>4</td>
<td>5.3</td>
<td>6</td>
</tr>
<tr>
<td>Married</td>
<td>15</td>
<td>20.0</td>
<td>30</td>
</tr>
<tr>
<td>Widowed</td>
<td>5</td>
<td>6.7</td>
<td>10</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
<td>1.4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>4</td>
<td>5.3</td>
<td>43</td>
</tr>
<tr>
<td>Secondary</td>
<td>15</td>
<td>20.0</td>
<td>6</td>
</tr>
<tr>
<td>Tertiary (College)</td>
<td>6</td>
<td>8.0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Farm size in (ha)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1ha</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-5ha</td>
<td>20</td>
<td>26.7</td>
<td>45</td>
</tr>
<tr>
<td>&gt;5ha</td>
<td>5</td>
<td>6.7</td>
<td>5</td>
</tr>
</tbody>
</table>
The Sustainable Livelihood Framework and its Application in Chadereka Ward I

The sustainable livelihood framework proposed by Scoones (2009) as applied to Chadereka Ward I presents two main factors that increase vulnerability to the inhabitants which are annual rainfall of 450-650mm and annual mean temperatures of 23°C. These are the characteristics of Natural Farming Region IV of Zimbabwe as given by Moyo et al., (2012 and Murwira et al., (2012). The main capital assets, policies, institutions and processes, livelihood options and outcomes are also shown in figure 3.

The respondents revealed that climatic conditions in the area were changing given the excessively high temperatures of over 40°C and unpredictable occasional floods which affect the area currently. These generally have negative impacts on the capital assets at their disposal. People in the area rely mostly on the natural capital (land, water and trees). According to the key informants the area traditionally was sparsely populated with abundant forests, wild animals and river flow was perennial. Cultivation was done for selected crops like millet, sorghum bicolor, cotton and maize (mudzedze). Livestock production had always been the major activity and even sustains the inhabitants up to this day as revealed by the study. Currently the yields continue to decrease inversely proportional to the increasing population in the area. For instance, household assessment on the quantity of crop yields from the past 10 or more years in Chadereka Ward 1 had shown a great decrease in the production of cotton, maize and millet with 86.7%, 65% and...
53.3% decrease respectively. While cotton, a cash crop does well in semi-arid areas, it has since lost favour from the small scale farmers as its market price has continued to decrease. The land area for crop production per household has also been decreasing due to population increase and the unfavorable climatic conditions. However, sorghum bicolor which is drought tolerant had a 60% response by household heads as increasing in terms of its production. Market gardening is yet another activity which sustains the lives of Chadereka Ward I people as it provides them with vegetables of all kinds. The practice of stream bank cultivation has left the main rivers silted and surface water no more flowing as before during the greater part of the year. Figure 5 presents an assessment of crop production according to households interviewed.

The councilor of the ward interviewed said,

“Here most people rely on flood recession cultivation of maize-mudzedze, livestock such as cattle and goats which browse the mopane and musawu tree leaves and also keep guinea fowls. People do not mind that mudzedze is stream bank cultivation which is prohibited.”

It is clear from the statement that inhabitants are not worried about environmental degradation as they continue to practise their traditional type of cultivation. Rather they associate decreased changes in production as punishment from the
ancestors for the deterioration of the traditional values in the area, an observation also made by Musarurwa and Lunga (2012).

While there are marked variations in crop production on the decrease and increase on figure 4, figure 5 shows a minor variation on livestock production since the last 10 or more year according to the household heads. Well over 33.3% of the household heads have noted an increase in all the types of livestock. The increase in goats and sheep had been observed by 73.3% and 66.6% of the respondents respectively while increase in chicken or guinea fowl and cattle production was reported by 60%. This economic activity partly supports the sustainability of the livelihoods in the area as already noted. Besides, some of the livelihood practices which depend on the natural resources are threatened by the malpractices. Thus using the economic indicators of crop and animal production together with household income from different livelihoods, one can say that the sustainability of the livelihoods option in Chadereka Ward 1 is limited.

The household questionnaire-interview also confirmed the above discussed livelihoods and further noted wild fruit (musawu) gathering as a safety net in times of drought. What the key informants said revealed the kind of people in the area. Regulations might be there but if they are against food provision they are ignored. The chief, the counselors, the kraal heads, and other stakeholders always lobby for food handouts from donors and the government.
The human capital as already discussed in Table 1 is of low education and uptake of conservation measures to protect the natural resource base for livelihood options is minimal as reflected in Table 2. Respondents who practise conservation farming are a mere 10%. Social capital is also critical especially when households face food scarcity in times of drought and/or flood disasters. Respondents acknowledged remittances from some family members who usually cross to Mozambique or go to other places as migrant labour whenever food supplies dwindle. This is one livelihood option worth noting as observed by Chihiro (2010) in her study of the role of labor migration to neighboring small towns in rural livelihoods in Zambia. Other support comes from non-governmental organisations and government who donate food stuffs on a yearly basis. Thus, the livelihoods options do not fully sustain the people of Chadereka according to the research participants. Figure 6 shows the percentage household income benefit calculated per month from livelihood practised in the area. This partly describes the livelihood outcomes which are also found in the livelihood framework.

![Figure 6: Percentage Household Income Benefit per Month from Livelihood Practices in Chadereka Ward 1](image)

Farming, wild fruit or *Ziziphus-mauritiana* (masawu) gathering and other sources like vending inadequately sustain the residents of Chadereka Ward I given an average household size of 6 members according to Zimstat (2012). Almost sixty-seven percent (66.7%) of the households confirm that farming provide them with US$51-US$75 per month. Thus, an individual survives on less than 50cents per day which is far below the poverty datum line in Zimbabwe. Other sources like wild fruits gathering and vending supplement strongly family incomes though these are not reliable due to market fluctuations and scarcity in marginal area with poor infrastructure. The major market especially for livestock is Harare and offer very low prices for the commodities. Like what the Chief said,
“People from Harare come to buy livestock at low prices such as US$150 per beast citing high transport cost due to the poor roads and broken bridges. With no option one sells the beast in order to buy maize, our staple food which is in short supply.”

This implies that the physical and the financial assets in Chadereka Ward I are a cause for concern in enhancing the sustainability of the livelihood practiced. Transport communication is a challenge. Roads and bridges are really a menace. The ward is inaccessible especially during the wet season. The focus group discussions even raised that people use ox drawn scotch carts and wheel barrows as local modes of transport to ferry both people, water which is fetched from far away boreholes and any other loads for domestics needs. The houses for the people are built of cheap material; poles and daga and thatched with grass. Therefore the sustainable livelihood framework as applied to Chadereka Ward I shows more challenges than positive issue to enhance development in the area given this era of climate variability and change. Musarurwa and Lunga (2012) also expressed how a particular community can be shaped by the inter-linkages within the sustainable livelihood framework.

**The Livelihood strategies / options in Chadereka Ward I**

The sustainable livelihood framework outlines the kinds of livelihoods options practised in a particular community. These are directly influenced by the policies and institutional processes. Awareness of policies governing the use of natural resource, the drivers of livelihoods is critical in Chadereka Ward I. Famous institutions to the community are the ones which bring food on their table.

<table>
<thead>
<tr>
<th>Adaptive Strategy</th>
<th>Number of Household Heads (n=75)</th>
<th>Percentage of Households %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of drought tolerant crop and animal varieties</td>
<td>75</td>
<td>100.0</td>
</tr>
<tr>
<td>Flood recession cultivation of maize (Zea mays L.) or mudzedze.</td>
<td>70</td>
<td>93.3</td>
</tr>
<tr>
<td>Conservation farming</td>
<td>10</td>
<td>13.3</td>
</tr>
<tr>
<td>Livelihood diversification (informal trade)</td>
<td>50</td>
<td>66.7</td>
</tr>
<tr>
<td>Changing crop calendar and pattern</td>
<td>65</td>
<td>86.7</td>
</tr>
<tr>
<td>Irrigation</td>
<td>30</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Table 3: Livelihood strategies / options as practised by households in Chadereka Ward I
Table 3 shows the livelihood options for Chadereka Ward I. It is clear that the ones with less than 50% are relatively new or difficulty to implement in the area such as conservation farming 10%, and irrigation with 30%. Irrigation is only practised by few households who live near the water points like the bore holes and open wells dug in the small holder gardens/mudzedze fields or on the silted river beds (sand scooping). Like what was found by Below et al., (2012) practices to do with agricultural water management are a challenge in Chadereka. The wells are not sustainable given the high temperatures experienced in the area. Water is lost to evaporationtranspiration during the hot months September to November each year. Rather, wells only hold water during and immediately after the wet season. Youth get to an extend of selling water to inhabitants for they are paid some money to ferry the buckets of water to their homes. Climate risk insurance cover is a new concept which needs to be taught first before assessing it. No one even mentioned it. On this issue the key informants explained that the inhabitants continuous dig the wells to a depth of more than 10 metres and eventually they give up. During the period when water would be available and smallholder gardening flourishing, the household heads usually cut and dry the vegetables for future use when water is no more. All the households interviewed confirmed the use of drought tolerant crops and animals. These enhance sustainability though to a limited extend for not all of the people have enough livestock. Ofuoku (2011) also cited livestock as a an important livelihood in this era of climate variability and change.

Livelihood diversification is slowly gathering popularity in the area. This was also an observation by Below et al., (2012). According to the key informants, in chadereka people are now getting involved into the informal trading sector. They buy items in short supply from other districts and sell in the villages.

Challenges faced by the local people of Chadereka Ward I in implementing the livelihood strategies according to the household heads.

Table 4: Challenges faced by the local people of Chadereka Ward I in implementing the livelihood strategies according to the household heads.

<table>
<thead>
<tr>
<th>Challenges faced</th>
<th>Number of Household Heads (n=75)</th>
<th>Percentage of Household Heads (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water scarcity</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Lack of constant institutional support</td>
<td>63</td>
<td>84</td>
</tr>
</tbody>
</table>
Inhabitants of Chadereka Ward I face a number of challenges some of which have already been highlighted like water scarcity and poor infrastructure with 100% and 93% respectively. Other noted constraints are inaccessibility of the area 73.3%, poor marketing services 83% and natural disasters 53%. Natural disasters were the least considered as challenges by the repondents since the key informants exposed, “… for the inhabitants natural disasters are a source of livelihood as once they occur people are given the humanitarian aid in the form of food, clothing and at times decent shelter is provided.” The International Organisation for Migration (IOM) for the inhabitants constructed houses for the flood victims in 2009. They further said that people were relocated to higher ground but did not stay there for long as they returned to their former low areas. This signifies the great importance the inhabitants attach to their livelihood of flood recession cultivation. Table 4 shows the challenges and household heads as a percentage.

**Stakeholder roles in promoting sustainable livelihoods in Chadereka Ward I**

Various stakeholders play a significant role in promoting sustainable livelihoods in Chadereka Ward I. Using the stakeholder matrix, the respondents presented the roles of the main stakeholders. Generally the roles are to do with the provision of food handouts during disasters such as floods and drought, provision of agricultural input, early warning systems, provision of the indiginous knowledge system and the provision of educational material such as text books and educating the people on climate change issues. This is shown in Table 5.

**Table 5: Stakeholder Roles in promoting sustainable livelihoods in Chadereka Ward I**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role(s) in promoting sustainable rural livelihoods adaptation to climate change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Provides food handouts, certified seeds for drought resistant crops, mobilizes donations in all kind for poor families.</td>
</tr>
<tr>
<td>Meteorological Services</td>
<td>Provides early warnings for weather conditions</td>
</tr>
</tbody>
</table>
Department

Chief
Oversees that local people abide by what policy makers say from the top. Provides indigenous knowledge to the young and old.

Ward Councillor
Cascades information obtained from conferences, seminars and official meetings by experts on best practices

Agritex Officer
Educate farmers on sustainable practices

Non-Governmental Organisation(NGO)
Provides food relief, clothes. High yielding varieties of drought tolerant crops, shelter in time of floods.

Education Institutions
Schools provide education on survival skills, BUSE carries out researches, extension workshops on climatic issues.

CONCLUSION AND IMPLICATION

The sustainability of livelihood practices in Chadereka Ward 1 of Muzarabani Rural District was assessed basing on the economic indicators of development. The views of the sampled household heads were considered in the assessment. Thus, the assessment of both crop and animal production for the past 10 or more years as having greatly increased or greatly decreased on either end of the likert scale was useful. The study established that the sustainability of the livelihood practices in the area studied was limited as some of the practices ignored their impacts on the natural environment which is the resource base. Crop production showed great variations in quantities for the past ten or more years considered. While a decrease in maize and cotton production was noted, sorghum was the main crop doing relatively well in addition to small holder market gardening. Livestock continue to support the resilience of the Chadereka community to climatic variability and change. Cattle, goats, sheep, chickens or guinea fowls and pigs were reported as safety net for survival in the area over a number of years.

The respondents provided challenges they are facing in their livelihood practices. These include shortage of water, poor marketing system of their commodities, poor infrastructure such as roads, bridges and other constructions and lack of institutional support in the implementation of new livelihood options. Various stakeholders have their share in promoting livelihood practices in Chadereka. Government, non-governmental organisations, Civil Protection Unit and other local authorities have their share of important roles in promoting adaptive strategies to climate variability and change in the community of Chadereka. The roles range from food provision to education of the young.
and the old on the encroaching climate variability and change phenomena. However, the inhabitants of the area need to be involved for the success of the implementation of new strategies proposed. The participatory proposals are better understood and executed than the autocratic ones as reveal by various literature consulted. Government policies to do with climate variability and change need to consider all the stakeholders. Especially training of small scale farmers is critical. Extension workers should be increased and enforce practicals. Water harnessing methods should also be improved in the area. With adequate water food shortages will be averted. Resettling of more vulnerable farmers should also be enforced. More researches by universities and vigorous campaigns on awareness and adaptive strategies by various stakeholders should be taken seriously to avoid laggards in this issue of climate variability and change.

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