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Multiple Vulnerabilities Locking Rural Communities in the South Eastern Low-Veld of Zimbabwe

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Abstract
The study analyses the multiple vulnerabilities of the rural communities. This is an exploratory qualitative case study. One hundred households from ward 20 and 22 participated in this study through questionnaires, Focus Group Discussions (FGDs) and semi-structured interviews. The average household size was 8 with 30% of the households having a member who was chronically ill while orphans were reported to be present in 54% of the households. The livelihood base was largely agriculturally based where over 53% of them lacked the lacked requisite productive assets for communal faming. Ninety nine percent had experienced crop failures in the 3 years preceding the study, attributed mainly to insufficient rainfall. Production levels for both field crops and gardening activities were exceptionally low and the markets were poor. The boreholes for the majority of the households and the two irrigations schemes in the two wards were under breakdown. The communities were vulnerable to more frequent floods, droughts, dangerous wild animal and diseases. The value of the research is that no known study has invoked a holistic approach to study multiple vulnerabilities in rural areas of Zimbabwe. This exploratory study attempt to unravel some of the subtle complexities underlying the vulnerabilities of rural communities in Zimbabwe in a view to recommend empirically based solutions to unlock their potential.
Keywords: Vulnerability, livelihoods, sustainable

1. Introduction

Nowhere are the issues of livelihood vulnerability to multiple stresses more prevalent than in Southern Africa where extreme weather is common and both droughts and floods occur frequently (Quinn, Ziervogel , Taylor , Takama , and Thomalla, 2011). Zimbabwe is one of the countries deemed to be vulnerable to climate change due to a wide range of factors as most of the country is dependent on rain-fed subsistence agriculture making it highly vulnerable to vicissitude of weather patterns (Intergovernmental Panel on Climate Change(IPCC),2010; Tigere, 2010; Chamunoda, 2011). These unfavorable weather patterns have resulted in a number of disasters such as droughts and floods, with varied impacts on peoples' livelihoods. Predictions suggest that agricultural productivity in the country could decrease by up to 30 per cent because of climate extremes that have been linked to climate change (IPCC, 2010). In addition to climate change related problems, Zimbabwe faces an array of challenges, among them the HIV and AIDS pandemic, cholera, malaria, environmental degradation, poverty, economic and political crises that has stalked the country after the year 2000 (Bird and Prowse, 2008). In some areas the long-lasting nature of protracted crises means that the suffering of those living with extreme risks can become invisible as the victims gets desensitized to their problems (Bird and Prowse, 2008).

1.2 Literature review

Although the definitions of vulnerability vary, common elements of most definitions of vulnerability are the capacity to suffer harm from exposure to perturbations or stresses and this capacity is conditioned by a variety of internal factors that shape the state of the people, system/place or being exposed to collapsing (expanding) endowments (Neil, 2002; Quinn et al , 2011). Major causes have been climate change that reduces (increases) productivity of a peasant farmers, politics, poor governance and the weakening of the rule of law, harassment by state actors, insecure land and housing tenure, macroeconomic meltdown and declining access to increasingly fragmented local and national markets, agro-inputs, and to public services of even a rudimentary standard (Neil, 2002, Mutasa, 2011).

Scientific evidence shows that mean annual temperature has increased; and it is expected to further increase at a rate of 0.05°C per decade, while rainfall has been erratic, decreasing on average at a rate of 5 to 10% per annum (Nkomo, Nyong, Kulindwa, 2006). These changes are expected to have serious economic and social impacts, particularly on the rural farmers, many of whom rely on climate-sensitive economic activities, such as rain-fed agriculture (Dougill, Fraser and Quinn, 2009). Projected climate change in Zimbabwe causes simulated maize yields to decrease dramatically under dryland conditions in some regions which could see a rapid deterioration in the livelihood of the overwhelming majority of Zimbabwe's population living in semi-arid

communal areas population (Matarira, Makadho and Makahanana- Sangarwe, 2004). At the same time, the impacts of disease, a lack of institutional capacity, and limited livelihood opportunities can combine with social, economic, political, and biophysical factors to limit their adaptive capacity and decision making in complex and dynamic social-ecological systems (Quinn et al, 2011; Mutasa, 2011).

Chipinge district is located in the extreme south of Manicaland Province bordering with Mozambique to the east and south. It covers an area approximately 5,393 square kilometres with a total population of approximately 420,000 and a population density of just under 80 people per km2 in 2002 (Nyamudeza, 1999). Fifty nine percent of the land in Chipinge fall under natural region 4 and 5 (Susan, 1999). These regions receive approximately 300 mm per year which is highly variable in time and space, with a coefficient of variation of 35% (Cumming 2005). Wards 20 and 22, lies within region 5 and have an average altitude of less than 600 metres (Susan, 1999). Subsistence agriculture is the main source of livelihood of these rural communities in both areas although many of households from these two wards were irrigation plot holders in Musikavanhu and Chibuwe irrigation schemes.

2. Materials and methods

The main objective of the study is to expose the multiple vulnerabilities of the rural communities in wards 20 and 22 of Chipinge districts in a view to recommend empirically based solutions to unlock the potential of these communities. The two wards were purposively selected as they have been at the mercy of nature being highly susceptible to natural disasters like floods, drought and cholera in the past 3 decades. A holistic approach (meshing qualitative and quantitative methods) was employed in this study. One hundred questionnaires were administered to a representative sample in Chisvo and Masimbe villages bordering the Save River which are highly susceptible to floods and were once affected by the flood in 2000 and 2008. The two villages have a total of 1000 households and 10% of them were randomly selected for the questionnaire interviews chosen. Two Focus Group Discussions (FGDs) were also conducted each comprising of 5 females and 5 males to give a total of 20 community members who participated in the FGDs. The survey collected information primarily on socio-economic status (like income sources), coping mechanism, history of crop failure, experiences of natural disasters and level of losses experienced, diseases and other vulnerabilities. In addition, data triangulation was done through FGDs and key informant interviews (village heads, and agricultural extension workers) to get a holistic understanding of vulnerability of the communities to multiple stressors. Data from the questionnaire was analysed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to characterize respondents' demographics, socio-economic status and other related variables. The data from FGDs and key informant interviews provided some interpretations and insight into the information obtained from the questionnaire interviews.

3. Results and discussion

3.1. Demographic characteristics of the respondents

Fifty five percent of the respondents were females and 45% were males. The two wards had relatively large household sizes of about 8 members. Seventy eight percent of the households had at least a child less than five years of age while 21% had members who were over 64 years of age. Thirty percent of the households had a member who was chronically ill, 7% had members who were terminally ill while 9% had members who were either disabled. Orphans were reported to be present in 54% of the households. Nationally the proportion of households with orphans in the rural areas was estimated at 32% in 2011 and 35% in the 2011 (ZimVac, 2011). The proportion of households with chronically ill persons was 8.4% and the proportion of households with mentally challenged persons was 6% in 2010 and 7 % in 2011 (ZimVac, 2011), suggesting that the households in ward 22 of Chipinge had a higher proportion of households with different vulnerability characteristics than the national average. The vulnerability status of the households has a direct negative bearing on the viability of the farming system in that, all the vulnerability categories need to be looked after by women who usually provide labour in other domestic chores.

3.2. Livelihood activities

Households were asked to state and rank their three major household livelihood activities in the last 12 months, by order of their importance. A multiple response analysis of the major sources of livelihoods indicated that crop production, casual labour, vegetable production were the most common livelihood activity cited by 92%, 54% and 52% of the participating households respectively. Livestock production, which is usually a major source of livelihood in predominantly dry parts of the country, was cited by only 29% of the respondents. Twenty four percent engaged in buying and selling while 10% cited poaching wild animals from across Save River in Conservancies, as their major livelihood activities. Beer brewing, basket making and brick moulding were the least important livelihood activities cited by 5% of the respondents. A livelihood is sustainable when it can cope with or recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Bird and Prowse, 2008). It can be deduced from the

above analysis that over 50% were engaged in unsustainable livelihood activities.

On average each household was earning about $74.50 per month from different livelihood activities, indicating that the majority of the interviewed households were living on about $0.31 per person per day considering the fact that the average household size was 8. The low income level of the farmers possibly suggest that the farmers may not be able to make meaningful investments into their farming to boost their productivity neither would they be able to absorb any natural or economic shock that may affect them. The FGDs revealed that after a poor harvest, most household members begin the season by working for richer families to obtain food, losing time for their own cropping. This casual labour reduced their chances of getting a good harvest during a season that follows a drought year.

3.3. Households Coping Mechanisms

Ninety three percent of the respondents reported that, comparing with the year 2011, food was less available for the household in 2012. Asked which months of the year was food difficult to get, over 50% of the households had problems in getting food between July and January with September to December being the climax of the shortages cited by over 80% of the households. During the months when food was difficult to get, 56% of the adults in the household consumed one meal a day, 37% were eating twice and only 7% were having 3 meals. During the same period, children under five years were consuming four meals, three meals, two meals and one meal for 4%, 25%, 51% and 20% of the households respectively. Children under 5 years should be accorded 5 meals per day according to the Healthy Harvest curriculum. The feeding habit reported amongst the fewer than 5 years old children predispose them to physical stunting and (possible) cognitive impairment caused by long-run chronic malnutrition (ZimVac, 2009). According to the Chipinge District Nutritionist, the rate of stunting or chronic malnutrition was 38% for the children under 5 years in Chipinge as at August 2010 against a national average of less than 30%.

Nationally, ZimVac (2011) estimated that 11.9% of rural households were likely be food insecure during the peak hunger period (Jan-Feb 2012). Unfortunately, the climax of the food shortage coincides with the peak labour requirement for the summer season when the farmers will be preparing their fields for planting, cultivation, herding cattle and collection of firewood among other activities as shown in the seasonal calendar for the wards. This gave a high likelihood of severely compromising the productivity levels of the vulnerable households.

In response to either food deficit or other social needs, the respondents indicated that, households do not wait until food stocks are completely depleted but adjust eating habits as soon as food becomes scarce. The following coping mechanism were employed by the participating households: reducing the number of meals eaten per day reported by 78% of the households, eating less food during meals- cutting portion size (80%), collect forest products to eat (66%), borrow food or cash (59%), receive aid from friends and relatives (46%), reduce spending on non food items (70%) and 68% were forced to dispose their assets to buy basic item/food. Despite it being illegal by virtue of the Environmental Management Act [Chapter 20:27] (No. 13 of 2002), 56% had collected firewood for sale. Forty Six percent had taken children out of school while 20% had some children work. Considering that 80% of the households were more likely to have less meals or eaten less during meals, such coping strategies are particularly dangerous for the terminally ill, people living with HIV/AIDS and chronically ill individuals, as proper nutrition is critical for prolonging and leading a productive life. Also the collection of forest products for food and the collection of firewood for sale are some unsustainable survival strategies which can accelerate the rate of environmental degradation in these two wards.

The various coping strategies invoked by the people confirms Quinn et al (2011) finding that the rural people in South Africa adopt forms of adverse coping which may support short-term survival while undermining wellbeing in the medium to long-term, like the liquidation of crucial productive assets, the reduction of consumption in ways that have potentially irreversible welfare effects (eating smaller amounts of less nutritious food, avoiding essential medical expenditures, withdrawing children from school.

3.4. Household Assets Ownership

Twenty six percent of the households owned an average of one ox/ bull, 52% of the households owned an average of two cows and only 20% owned an average of two calves. Seventy percent had neither oxen nor bulls, 56% and 81% did not own cows and calves respectively. This pattern mirrors the national pattern which shows that 45% of the rural households owned at least one beast nationally with Midlands (53%) having the highest and Manicaland (37%) having the lowest proportion of households owning cattle (ZimVac, 2011). Over forty eight percent had no cattle at all and considering that the survival threshold for cattle is more than 3 beasts, the majority of the households were below the survival threshold (Chawatama, 2008), since the average number of cattle owned was 2. Since cattle is the main form of draft power used by farmers throughout rural Zimbabwe and the fact that donkey ownership was not that common (owned by 18%) the animal draft power situation is critically unhealthy for the majority of the households in the rural areas of Chipinge. The lack of draught power can be a more significant binding constraint in conventional agricultural production than even labour shortages,

and could result in households failing to cultivate all the land they have control of. Having many cattle reduces a household's vulnerability, as it is a source of instant cash (plowing for cash, transportation and sale) without immediately jeopardizing the household's productive capacity in crop cultivation. Community members in the two wards also reported that lions from the nearby Humani Safari parks were checking the number of cattle in the two wards directly through depredation and indirectly through disease while elephant occasionally caused extensive damages to the irrigation schemes and dryland fields during the summer season.

It was established during FGDs that, the high prevalence of livestock diseases in the two wards, which affected cattle productivity by reducing their growth rate and reproductive potential) increases with the severity of drought. Drought reduced forage availability, forcing the already weak and emaciated animals to graze in contact with soil, exposing them to infectious diseases. The number of cattle spans used by a household determines the area that can be planted and how fast this can be done. In the lowveld of Chipinge, droughts are usually associated with outbreaks of livestock disease, especially tick-borne disease, lumping skin, and foot and mouth disease (Mudimu, 2007).

Thirty percent of the households had no goats and 90% of those who owned goats had less than 5 goats. Considering that the household survival threshold for goat is more than 5 beasts, the interviewed households were below this minimum survival threshold (Chawatama, 2008), since the households owning goats had an average of 3 goats each. Sheep was not very popular owned by 3% of the households but those owning sheep had an average of 9 sheep each. Poultry ownership in the study areas was widespread with 74% of the households with each household owning an average of 7 Chickens. Poultry is important in both household subsistence and in wealth accumulation, as they can be seen as the first step on the ladder of livestock ownership for the poor families (Chawatama, 2008). Culturally keeping and ownership of poultry is regarded as being the responsibility of women, making it likely that women will be able to control income derived from poultry.

3.5. Physical Assets Owned

Fifty three percent of the households had no ploughs while 57% had no scotch carts. Less than 14% of the households owned cultivators and harrows. This analysis shows that the majority of the households lack basic productive assets for conventional communal farming- a situation which might contribute to food deficiencies in these communities.

On average, 46% of the households lacked a single physical disposable asset. Bicycles, television and radio were only owned by 52%, 20% and 37% of the households respectively. Forty six percent of the households had no beds. FGDs confirmed that, people in the area used carts to fetch water or firewood and carry both inputs and outputs from farm and non-farm enterprises and those households without a scotch carts (57%) were at a significant disadvantage as they had difficulties in accessing markets and obtaining resources from common properties and individual fields. Anecdotally, women in households without scotch carts were walking very long distances (over 10 kilometres) with head loads or carry small volumes of inputs and produce in a wheelbarrow, if they had one.

3.6. Main Food Source

Only 25% of the households were food insecure in wards 20 and 22 by the time of the assessment and 55% of the households' main food sources were from their own production, 43% were purchasing while 2% relied on gifts from relatives and friends. Wild food, borrowing and barter trading were less important food source cited by less than 1.5% of the households. All the interviewed households were not receiving any food aid from NGOs in the 6 months preceding the survey. The food sources for the households in these two ward was at odds with national picture; where 74% of Zimbabwe's rural households were consuming maize from own crop production followed by local purchase with 19%, 3.4% remittances from within Zimbabwe and 1.1%, gifts and Government or NGO food assistance (ZimVac, 2012), suggesting that the two wards had a higher proportion of food insecure households than the national average.

Respondents were asked about the types of foods their household members had eaten a day before the day of the interviews. The results revealed that over 90 percent of the surveyed households had consumed some cereals (mainly maize meal). Leafy vegetables, usually accompany the cereals meals most of the time, possibly justifying why about 79% reported having consumed vegetable during the survey. Meat, eggs, fish, beans and milk (protein source) was consumed in less than 30% of the households a day before the date of the interviews. Few people had eaten these protein rich food stuffs possibly because of the cost associated with their acquisition, unlike other crops and vegetables households can produce on their own.

Conversely, the ZimVac (2011) indicated that 60% of the rural households had an acceptable diet which is nutritionally balanced, 27% had a just adequate diet, while 13% had a poor diet which could compromise nutritional wellbeing of household members. This food insecurity prevalence above the national average in Chipinge has been attributed to impacts of poor rainfall, low income, limited employment opportunities, and chronic illnesses (Chinyavavanhu, 2008; USAID, 2011, ZimVac, 2012).

3.7.Agro ecological vulnerabilities

3.7.1 Causes of Crop Failure

Ninety nine percent of the respondents had experienced crop failures in the 3 years preceding the assessment, 63% of which three times, 29% twice and 8% once. Eighty eight percent of these crop failures were due to insufficient rainfall while 9%, 2% and 1% were due to pests attack, wild and domestic animals and lack of fertilizers respectively. FGDs confirmed that crop failure is almost a yearly phenomenon for those practicing dry land farming in wards 20 and 22 of Chipinge district. However there are some years of extremely low rainfall which cause memorable droughts in the area. According to the historical trend analysis produced by the community members during community meetings, droughts were experienced in 1946, 1951, 1962, 1972, 1982-3, 1986, 1992, 2002, 2004, 2007, 2008 and 2010-11 as shown in Table 1 below. This substantiated earlier findings indicating that drought is one of the most common disasters in Zimbabwe, and that documented horrors associated with it date back to the pre-colonial times (Iliffe, 1990).

Table 1. Historical Timeline/Trend line Analysis for ward 20 and 22

Period	Events
1935	Eclipse of the sun
1942	Flooding of Save River & Establishment of Chibuwe irrigation scheme
1946	Drought Mutendeni
1951	Drought (Chigojo)
1952	Locust Gore redongwe
1971 – 1975	Cholera Outbreak
1972	Drought
1973	Eclipse of the sun
1975 -1980	Liberation War Struggle
1980	Zimbabwe Independence
1982	Drought
1986	Cholera Outbreak
1992	Drought, ESAP
1993	Cholera outbreak
1996	Establishment of Musikavanhu irrigation scheme
2000	Cyclone Eline and floods
2002	Cholera Outbreak and drought
2003 – 2004	Tsikamutanda- witch craft exorcising
2004	Eclipse of the sun, drought
2007- 2008	Flooding of Save River & Drought Gwakuradana
2008	Political violence
2008	Zenith of hyperinflation
2008-2009	Cholera outbreak, drought
2009 – 2011	Cholera Outbreak, Eclipse of the moon, drought
2010-2011	Drought
2012	Drought

The country has experienced severe droughts at least five times over the last 30 years, but the study area reported more severe droughts than those nationally documented (Table 7) which shows that the wards in the low veld of Chipinge are more vulnerable to drought than the national average. The impact of the drought in 1991-1992, which was reported in the historical time timeline (Table 7) was particularly severe and led to significant macro- and micro-level effects. At a macro level, more than 40% of Zimbabwe's population was affected in 1992, the GNP fell by up to 12% and inflation reached about 48% at the drought's height and at least 600,000 head of cattle had to be slaughtered due to shortage of browse and water (International Federation for Red Cross and Red Crescent Societies (IFRRCS)(2008). Impact on water availability was severe, causing 40% of water points to fail in rural areas and an overall fall in the level of the Kariba dam reservoir forcing substantial reductions in electricity generation (IFRRCS, 2008). At a micro level, the FGDs revealed that, for the first time in the history of the area, some baobab trees succumbed to the 1991/1992 drought and wilted and people would go for up to 3 days without a decent meal (sadza).

3.7.2. Floods risk

Ninety seven percent of the respondents were once affected by floods in the 20 years preceding the assessment and only 3% were not affected. FGDs confirmed that these two wards, along the Sabi Valley, were hurt by floods and households from Maronga, Gumira, Chibuwe and Masimbe villages (ward 20 and 22) lost their household belongings and in some cases domestic animals. The Tongogara Refugee Camp (ward 20) located in the same area was also affected and refugees lost most of their food provisions and other household belongings.

Eighty nine of those affected by floods were affected two times while 11% were affected once. On average, each household lost $1477 worth of domestic appliances and furniture and $799 worth of live stocks and $326 worth of crops to the most significant memorable floods experienced in the area. The average total loss incurred per household during the last significant floods was $2656. From the less significant floods, the loss from domestic materials was $225, $105 from livestock loss and $134 from crops to give an average total loss of $470 from the less significant floods experienced. The most significant floods were last experienced in the year 2000 under Cyclone Eline while the less significant drought was experienced between December 2007 and January 2008. The Department of Meteorological Services reported that rainfall received in Chipinge under cyclone Eline (year 2000) was the heaviest experienced in the last 127 years (Chamunoda, 2011). Anecdotally, the floods also aggravated significant out migration to other areas in and outside Chipinge. Households were displaced as floods destroyed houses, household assets, field crops and livestock. FGDs showed that people were forced to build makeshift homes whilst waiting for the floods to subside and the conditions that ensued exposed the community member to poverty, instability, and hardships created an environment conducive to risk behaviour, HIV and sexually transmitted infections (STIs), internal conflicts as well as the deterioration of family ties. The last two flood experiences in the two areas coincided with outbreaks of diseases such as cholera, diarrhoea, malaria, intestinal worms and scabies, due to poor water and sanitation conditions and exposure to disease vectors (like mosquitoes, fleas, lice).

3.7.3 Access to farmland

All the interviewed households had access to farmland and the majority of them (80%) owning the land while 20% were renting. On average each of the interviewed households owned about 1.9 hectares. In both Chibuwe and Musikavanhu irrigation scheme members were allocated at least one hectare each. It was clearly visible, from mere observation that, cultivable land was fully allocated and communal grazing land (often inappropriate for cultivation) was sacrificed. This was exposing the fragile land to degradation further threatening the sustainability of communal farming systems in the area. The irrigation schemes in the area (Musikavanhu and Chibuwe irrigation schemes) were largely non functional with only 5% of the irrigation blocks working at 25% capacity. Participants in the FGDs expressed that the irrigation schemes were their only hope for independent livelihoods. This explains why Non functional irrigation schemes were highlighted as their major problem according to the problem ranking done by the community members as shown in Table 2. The status of irrigation schemes in the two wards is consistent with the Zimbabwe Rural Vulnerability Assessment findings that in 2012, of the 24% wards with irrigation schemes in Zimbabwe, only 38% had functional schemes, whilst 30% had partially functional schemes (ZimVac, 2012).

Table 2 Problem Ranking

Problem	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC	BB	P	MRB	PA	SWS
LSWS	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC	BB	P	MRB	PA	SWS
PA	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC	BB	P	MRB		
MRB	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC	BB	P			
P	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC	BB				
BB	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA	BC					
BC	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA						
SF	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL	DAA						
DAA	NFI	LSF	LIS	SF	LSWS	CA	CC	LM	SL							
SL	NFI	LSF	LIS	SF	LSWS	CA	CC	LM								
LM	NFI	LSF	LIS	SF	LSWS	CA	CC									
CC	NFI	LEF	LIS	SF	LSWS	CA										
CA	NFI	LSF	LIS	SF	LSWS											
LSF	NFI	LSF	LIS	SF												
SF	NFI	LSF	LIS													
LIS	NFI	LSF														
LSF	NFI															
NFI																

Key:

NFI = Non functioning irrigation
LSF = Lack of sanitary facilities
CA = Child Abuse
LM = Lack of market for farm produce
SL = Shortage of land
LMR = Lack of maintenance of Road and Bridge
PA = Problem animals especially elephants and lions
P = Poverty
SF = Shortage of food
SIS = Shortage of input supplies
CC = Conflicts among communities
DAA = Drug and alcohol abuse
BB = Borehole breakdown
LSWS = Lack of safe water supply
LIS = Lack of input supplies

According to most FGDs conducted in the 2 wards, conflicts between the people who were displaced by floods (Internally Displaced People-IDPs) and the host households have been revolving mainly around land issues, with

accusation that the IDPs were settled on their grazing land. In Chiso and Nyamutamba villages (ward 22) the shortage of grazing pastures caused domestic animals to regularly broke into irrigation schemes in search of food, exacerbating the conflicts between IDPs and host members.

3.7.4. Field crops grown in the 2010/2011 season

An average of 1.2 hectares per household was cultivated by maize in the 2010/2011 agricultural season in almost a uniform pattern in all the 2 wards. On average those who grew maize harvested about 468 kg and 330kg for sorghum. Considering that, for an average household size of 6 members, the grain requirement for one year is 900kg, going by Sphere Standards; the majority of the households were facing critical food shortages. Over 96% of the households did not harvest any cowpeas, beans and or round/ground nuts (source of protein) and the average yields for those who produced are shown in the table below. Cotton was not a very popular crop for the season grown by only 8% of the households and the average quantity harvested was 265 kgs as illustrated in Table 3 below.

Table 3. Summary of field crops grown and average utilization pattern in the 2010/2011 season

Crop Type	No. of farmers	Area planted (ha)	Yield (t/ha)	Qty produced (kgs)	Value of production (US$)	Qty consumed (kg)	Qty retained (kg)	Qty sold (kg)
Maize	56	1.2	0.39	468	124.02	396	9	63
Sugar beans	15	1.5	0.37	555	555	81	129	345
Cotton	8	1	0.265	265	198.75	0	0	265
Sorghum	45	0.3	1.1	330	87.45	207	18	105
Ground nuts	11	1.2	0.20	240	120	121	86	33
Roundnuts	2	0.5	0.01	5	0	3	2	0
Millet	1	1	0.18	180	0	180	0	0

The level of productivity for the season was exceptionally low with maize, sorghum, millet, cotton and sugar beans averaging 0.39, 1.1, 0.18, 0.265 and 0.37 tons per hectares respectively. These low yields were attributed mainly to low and poorly distributed rainfall for the 2010/2011 season. According to local Agritex officers, an average total of 380mm of rainfall was received in the two wards, all of which was received between the last week of November 2011 and the last week of January. As if the erratic rains were not enough for season, the communal farmers in ward 20 and 22 suffered crop damages by elephants from Human Safari Ranch, just across Save River. The elephants destroyed rainfed and irrigated crops in Musikavanhu irrigation schemes as well as the fences and infield canals for the scheme.

3.7.5. Gardening activities

Rape was the most popular vegetable grown in the two wards with 65% of the households producing an average of 140 bundles during the survey. Barter trading dominated as a form of exchange for vegetable sales owing to cash flow challenges in rural areas during this multi-currency regime. Most of the vegetables were sold locally with only 3% selling their vegetable at growth points or nearby town. Cabbages were grown by only 20 % of the households while tomatoes were grown by 38% and onions were grown by 23%. Paprika and contender beans were grown by less than 3.5% of the households. The summary of the average volumes and values of production in the previous cropping cycle are as depicted in the Table 4. According to the FGDs conducted with the community members, the majority of those who were engaging in vegetable production had no intrinsic drive to increase production due to the lack of lucrative markets for their vegetable.

Table 4. Summary of vegetables grown and yields in the last cropping cycle

Vegetable Type	No. of farmers	Qty produced	Value of production($)	Qty consumed	Qty sold	Value of Sales($)
Rape	59	140 bundles	70	43 bundles	97 bundles	48.50
Cabbage	18	92 heads	46	32 heads	60 heads	30
Tomatoes	35	37 buckets	185	4 buckets	33 buckets	165
Onion	21	39kg	39	14kg	25kg	25
Paprika	3	546kg	710.66	0	546kg	710.66
Covo	20	85 bundles	42.5	46 bundles	39 bundles	19.50
Contender beans	2	792kg	880	160kg	632kg	701.52
Spinach	17	21bundles	10.50	13 bundles	8 bundles	4

3.7.6. Agricultural Input Source

The majority of the household (68%) had obtained their seeds from their stocks as retained seed, 7% from the local retailers and from local farmers (3%). Retail vouchers (7%), Agritex (4%), GMB (1%) and NGOs (7%) less important players as sources of seeds cited by less than 1% of the households. The two major problems

farmers had with their seeds was poor germination (4%) in the last season and the fact that some of the seed varieties were unknown (49%) to the area which made their management very difficult. Since the major source was own stock, poor storage of the seeds might have compromised their germination percentage. Seventy percent could not obtain certified seeds due to lack of money while 4% attributed it to limited supply or unavailability in the local shops. The participants in the FGDs expressed that they were experiencing serious cash flow challenges since the introduction of multiple currencies in 2009 and the unavailability of income generating activities and credit facilities. According to the ZimVac (2009), the credit culture in rural Zimbabwe is poor, and government administered rural credit schemes have suffered from extremely low repayment rates while Commercial financial institutions are rarely willing to lend to farmers in communal areas, due to their lack of adequate collateral and the absence of formalized land title.

Fifty percent of the interviewed households did not use fertilizer during the 2010/2011 agricultural season season. The reasons for not using fertilizers included lack of money to buy the fertilizer (40%), the belief that the soil is already fertile and need no more fertilization (10%). Unfortunately, 10% reported that they were not allowed to use fertilizers by their village heads in keeping with the myth that the soil is already fertile and any addition will destroy the soil. For some (20%), the fertilizer was not available in the shops while some felt their areas are too hot for fertilizer use as crops can be burnt by fertilizer. This finding was consistent with Bird and Prowse (2008) finding that in most rural areas in Zimbabwe yields from the exhausted soil are reported to have fallen by three-quarters without fertilizers, driving many households into a downward spiral of increased food insecurity, income declines and an inability to purchase the next season's agricultural inputs.

Seventy percent had no idea of what Conservation Farming (a way of farming that conserved both the soil fertility and moisture) was. The interviewed households were asked to state any method of improving crop production they knew. Fertilizer and manure application were the most popular techniques cited by over 30% of the respondents followed by mulching and crop rotation cited by 23%. Boko et al. (2007), argued that where farmers enjoy agricultural extension services provided by the government ,they are most likely to initiate climate-change adaptation measures(such as conservation farming) on their farms like changing their planting and harvesting periods, change crop varieties, conserve soil and water, intensify water harvesting and the planting of trees.

3.8.Hydrological vulnerabilities

3.8.1 Access to Water

Eighty percent of the households had access to boreholes 85% of which were perennial while the other 15% were seasonal. Only 25% were walking a maximum of 500metres to access borehole water, which is the standard maximum distance going by the sphere standards. Unfortunately, 72% of those who had access to boreholes reported that their nearest boreholes were malfunctional by the time of the survey. Fifty percent had access to wells and half of these wells were seasonal and 95% of those accessing wells were walking less than 500metres to access them. Fifty eight percent of the boreholes were shared by over 100 households. The Sphere Standard states that each water point should sustain a maximum of 500 people (Mombeshora, 2003). Considering the fact that, the average household size was 8; each water point should serve a maximum of about 63 households. Only 30% of the boreholes in the 2 wards were meeting this threshold suggesting that the majority of the boreholes (70) were highly over burdened.

Forty percent reported that they had times when they had less access to irrigation. Twenty six percent indicated that they had less water available for them during the dry season spanning between July and November depending on the amount of rainfall received along the Save catchment during the summer. Fifteen percent cited failure to pay electricity bills in time, which usually resulted in the disconnection of the power supply, while 6% cited borehole break downs as the reason for limited access to irrigation water at times. These dry phases crippled farming activities in the irrigation scheme, further exposing the communities to food insecurity.

Sixty five percent had times of the year when they have limited access to safe drinking water and the reasons were: dry season (26) when shallow wells would have dried up and some boreholes yielding poorly due to lower water tables, usually between August to November Borehole break downs were cited by 8% of the respondents as a reason for limited access to safe drinking water. Three percent cited circumstances when they were forced to share the same water source with more people like during church gatherings in the area or breakdown of other boreholes or drying up of other sources of water as their reason for limited access to safe drinking water during certain times of the year.

UN population projections indicate that Zimbabwe's population will reach 19.6 million by 2025 and 26.7 million by 2050 (World Bank, 2006). It is also assumed that the amount of water potentially available for internal development in Zimbabwe is 8.5 cubic kilometres (cu km), this amount of water yield will be sufficient up to 2025, after that it will be necessary to find new sources of water (Mtisi and Nicol, 2003; World Bank, 2006). This projected scenario would have the following possible implications (among others): reduced economic viability of water supply projects, reduced economic viability of water-dependent activities such as

irrigation and industries, permanent water scarcity, and increased competition for water among sectors and sub-sectors, resulting in increased conflict, social unrest, political disturbance and more importantly, the outbreak of water borne diseases.

3.9.Health vulnerabilities

3.9.1. Water borne diseases

According to the historical trend analysis history of the residence of Chibuwe and Gumira (ward 20 and 22). Cholera was first reported in 1971 and was experience on almost a yearly basis until 1975. After independence, it was experienced in 1986, 1993, 2000, 2008, 2009, 2010 and 2011. Considering this unfortunate trend, it was prudent to take a glimpse of the general awareness and level of emergency preparedness to this deadly disease amongst the citizens of ward 20 and 22. The respondents were asked about their knowledge on the methods of preventing cholera. Hand washing was the most popular method cited by 49%, followed by eating of warm/hot food (29%); drinking safe water (19%) use of toilets and refuse pits (18%). Although the range of preventative measures cited by the respondents is quite comprehensive, one would expect everyone (100%) to appreciate the importance of hand washing, drinking of safe water and use of toilets. The percentage of respondents knowledgeable about cholera prevention measures shows that the people still need to be educated further about the disease. This explains why it was reported that more than a third of rural households in Zimbabwe engage in open defecation, which is a risky sanitation practice and 51% of them, own either an improved or unimproved sanitation facility (MIMS, 2009). The World Health Organization (WHO) (2010) also affirmed that, 80 per cent of the diseases in Zimbabwe are due to unhygienic conditions and unsafe drinking water. The epidemiology of Chipinge district is fundamentally affected by cross-border movements (especially between Chipinge and Mozambique), which not only spread infections, but altered disease ecologies, complicating disease control efforts (WHO, 2010; Dube, 2009).

It was also revealed from the screening of all the primary school going pupils in 8 primary schools in the 2 wards the prevalence rate for bilharzia was 85%. This was mainly attributed to the culture of bathing in pools and rivers and ignorance about the cause and effects of bilharzia amongst the community members. Malaria was the disease with the highest prevalence in the two wards and was the major cause of death despite the fact that malaria tablets were available at clinics. The communities attributed this to disguised nature of the disease at time and the negative treatment seeking behaviour of some religious sects in the wards.

4.0. Conclusion and recommendations

The research revealed that the livelihoods of the people in wards 20 and 22 of Chipinge district were at the mercy of nature as they are highly vulnerable to droughts, floods, wild animals attack and diseases (cholera, malaria and bilharzia). These natural stressors conspired with various socio-economic and demographic factors to limit their capacity to adapt to natural shocks. Factors contributing to their multiple vulnerabilities included lack of the necessary farming knowledge, lack of draught power (usually cattle and/or donkeys) and difficulties accessing the appropriate inputs, inadequate farming space, poor rains and/or poor rainfall distribution and cash flow bottlenecks following the introduction of multiple currencies in the economy. Lack of accessible and functioning markets for agricultural products was one of the disincentives for increasing agricultural productivity, pushing many of the households into poverty. Most households were trapped in a vicious cycle of increasing food insecurity; as they were usually inflicted with droughts; do not have draught power and money to buy agricultural inputs forcing them to engage in casual labour during the cropping season instead of concentrating in their own fields. Availability and access of water remains a challenge as most of the boreholes and irrigation pumps were non functional. These findings revealed that the vulnerabilities of these communities reflect multiple forces and processes at work to reduce their resilience.

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