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The Impact of Flooding On the Livelihood of People Living In the Luhonono Area in the Zambezi Region, Namibia

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ABSTRACT: *This study examined the impact of floods on the livelihoods of the community of the Luhonono area (formally called Schuckmansburg) in the Kabbe constituency in the Zambezi Region of Namibia. The problem identified is the persistent flooding in the Luhonono area, giving rise to the need to look at the impact of floods on the livelihoods of the local community. The study employed both qualitative and quantitative approaches, utilising both descriptive and exploratory designs. The target population for the study was all the heads of households, community leaders and a political councillor of government in Luhonono area. The study applied both purposive sampling and simple random sampling techniques. Structured questionnaires and an interview guide were used as research instruments to collect data from the sample. The data was used to measure the impact of floods on the livelihood of the people in the flood prone area. The data collected were computed using the Excel computer program version 16.0 and the data were analysed by both qualitative and quantitative techniques. Chi Square tests were carried out to determine the association of villages and the severity of the flooding to the respondents. Hypotheses to test this association were examined using the Chi Square method. It was established that there is no association between the villages and the overall severity of the floods in the Luhonono area. This implies that all the villages were equally affected by the flood. There is a need for further studies to develop baseline data on the impact of flood that will help the Government of the Republic of Namibia in establishing strategies that will help the communities in flood prone areas to develop resilience against the impact of floods.*

KEYWORDS: Disaster, Flood, Hazard, Preparedness, Resilience, Vulnerability

INTRODUCTION

The community of the Luhonono area, just like many other parts of the Zambezi region, has been experiencing a flooding phenomenon for years and this has had diverse impacts on the inhabitants. It goes without saying that crop and animal farming have remained severely affected. This study has been premised on the effects that this incessant flooding has had on the livelihoods of Luhonono inhabitants who have been forced to lag behind in terms of development and standard of living (Mashebe, 2015). To compound matters in the affected areas, indispensable amenities and social services are rendered inaccessible, with the resultant

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plague of communicable diseases, children failing to attend classes, hunger and other related challenges. Communities in flood-prone area of the Zambezi region have, for years, been living from hand to mouth, being at the mercy government flood food relief aid. This study aimed to explore options which the Government of the Republic of Namibia may adopt in alleviating the plight of the people affected by floods so that this perennial challenge is completely eradicated. Further to this, the study envisaged to equip communities with the requisite survival strategies when hit by snap floods and to help the communities in flood prone areas to cultivate resilience to counter the impact of floods. =

MATERIALS AND METHODS

Study area

Luhonono is situated in the Kabbe constituency of the Zambezi region of Namibia. The Zambezi Region is divided into 7 constituencies namely Kabbe, Katima Mulilo Urban, Katima Mulilo Rural, Kongola, Linyanti, Judea Lyaboloma and Sibbinda (Jones & Dieckmann, 2013). Luhonono is located on latitude 17°303′061″S and longitude 024°48′861″E (Mashebe, 2015, p. 2). The climatic condition of the study area is generally characterized by plenty of sunlight, with stable eastern wind movement, a little amount of evaporation and high rainfall. Luhonono area is much warmer than the rest of the country. This makes the study area an ideal place for most plants to flourish very well (Mendelsohn & Roberts, 1997). The area is characterised by heavy rainfall from November to mid-April of the following year. Subsistence farming (29 %) and fishing (41 %) are the predominant livelihood strategies for the people in this area and "this makes up the social wellbeing, demography and the economic status" of the community (SPC, et al., 2015, pp. 57-70). The majority of the people are engaged in cash crop farming (at a small scale); mainly on the Fluvisol soil type with limited application of external inputs, such as inorganic fertilisers. No irrigation systems are used in this area, with farmers rather practising only dry land farming. Cattle and chickens are evident in every village throughout the whole Luhonono area.

Methods

The design for the study encompassed both descriptive as well as exploratory designs. The former permitted for the explanation of a particular occurrence and the later allowed for testing of associations. Exploratory study provides the ability to enable researchers to seek answers to problematic questions by addressing the questions "why", as opposed to questions such as "what", "where", "when" which are addressed by a descriptive approach. Descriptive research encompasses the identification of the characteristics of an observed occurrence or discovery of potential relationships among two or more occurrences. Descriptive research scrutinises the situation as it is (Leedy & Ormorod, 2001). As a result, the consolidation of these two designs allowed the study to articulate the association(s) between the specified variables (Singleton, 2005); (Babbie, 2010). The study embraced both qualitative and quantitative research by way of gathering data for both.

Study population

The study focused on impacts of flooding on the livelihoods of the rural community in the Luhonono area, thus, the target study population for this study were all the heads of households, community leaders and government institutions in Luhonono. The Luhonono area is inhabited

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by a population of about 30 villages, a school and a health centre, with a total population of 800 households. The study was confined to the entire area and from the whole area, 12 affected villages were randomly selected from the 30 villages. From the selected villages, 169 households were randomly selected. The heads of the households comprised males (79) and females (90). A sample of 169 households was determined from the total of 800 households residing in Luhonono area. The key informants were purposively selected at household level and community level, respectively, from the 800 households (Poggie, 1972) and (Seidler, 1974). Purposive sampling is based on the judgement of the researcher and the sample is made up of the elements that comprise the major characteristics, and its representation of the entire population (Strydom, et al., 2005).

Data analysis

Quantitative data from the household survey were subjected to descriptive statistical analysis wherein tables and graphs were used and frequencies were determined. "Data are empirical representations of concepts and measurements link data to concepts" (Neuman, 2006, p. 181). Cross tabulations were used in order to compare the relationships among variables. Qualitative data were analysed and also presented, based on the pre-determined themes, categories and patterns, into which data from the field were compounded. Chi-Square analysis was used to determine the relative overall effects of flooding in different villages.

Results

Observed values of effects on households

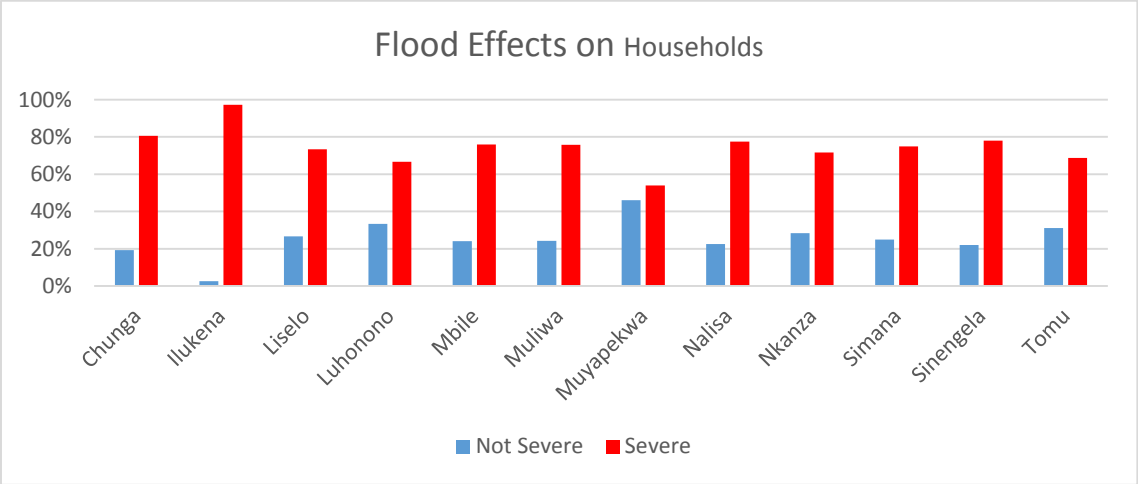

Figure 1: Flood Effects of Households

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Relative effects

Table 1: Relative Effects per Village

	Relative Overall Effect	
	Not Severe	**Severe**
Chunga	19 %	81 %
Ilukena	3 %	97 %
Liselo	26 %	74 %
Luhonono	33 %	67 %
Mbile	24 %	76 %
Muliwa	24 %	76 %
Muyapekwa	46 %	54 %
Nalisa	22 %	78 %
Nkanza	29 %	71 %
Simana	25 %	75 %
Sinengela	22 %	78 %
Tomu	31 %	69 %

Key: 0-50% Not Severe; 51-100% Severe

Overall Effect

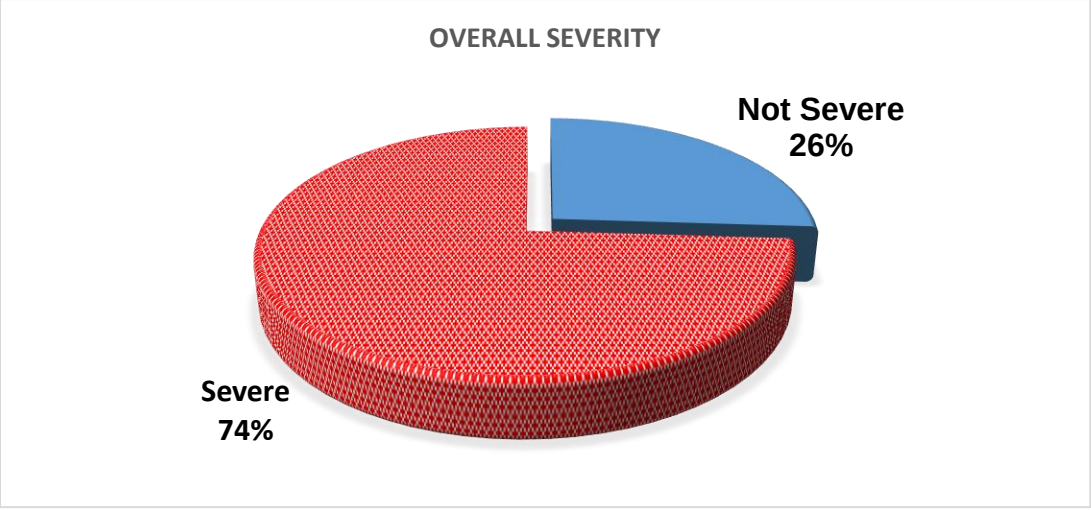

Figure 2: Overall Severity

Test 1: Chi Square test

H_0: There is no association between the village and the overall severity –

(That is, the severity of the floods was uniform across all villages).

H_a: There is association between the village and the overall severity of the floods –

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(That is, the severity of the floods was most uniform across all villages).

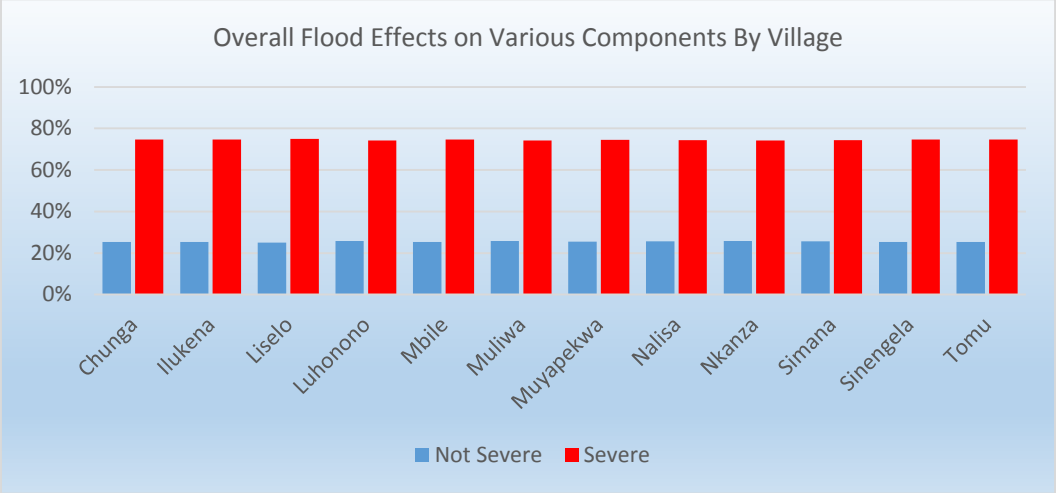

Figure 3: Overall Flood Effects of various components by village

$$\chi^2_{calculated} = \sum \frac{(Observed - Expected)^2}{Expected} = 9.3$$

$$\chi^2_{statistic} = \chi^2_{(0.05,11)} = 19.675 \text{ at 5 per cent level of significance}$$

"Hence, we do not reject H_0 and conclude that there is no association between the village and overall severity. This means that all the villages were equally affected by the floods. There might be a notion that some of the villages included in the survey are affected more by the floods than others because of slight differences in geographical setup, such as higher altitude or proximity to Zambezi River. This was the essence of the test, and in accordance with the conclusion set out above, there seems to be no difference in the intensity of the floods among the villages" (Mashebe, 2015, p. 63).

Test 2: *Chi Square test*

Observed values

Table 2: Chi Square Test Observed Values

	Moderate/ Not Severe	**Severe**
Effect on:		
Crops	9 (5%)	160 (95 %)
Livestock	36 (21%)	133 (79 %)
Water Quality	30 (18%)	139 (82 %)
Child Education	20 (12%)	149 (88 %)
Livelihood	30 (18%)	139 (82 %)

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Dwelling	34 (20%)	135 (80 %)

H_0: The floods diverted equally severely between the crops, livestock, water, child education, livelihood and dwelling.

H_a: The floods diverted more severely in the crops, livestock, water, child education, livelihood or dwelling.

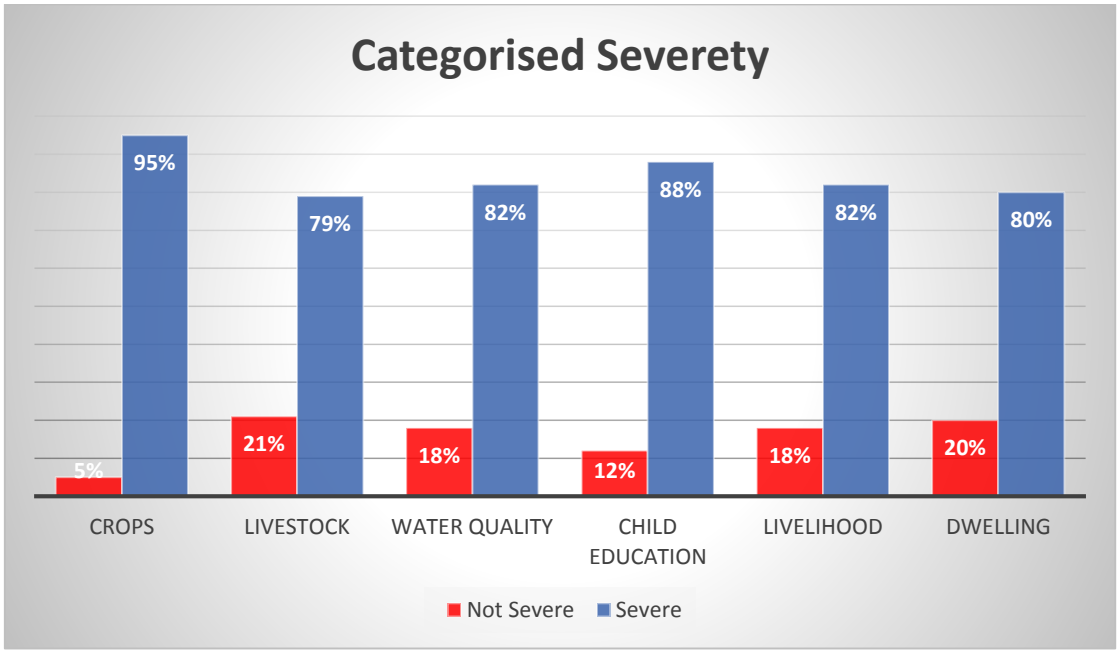

Figure 4: Categorised Severity

Effect of flood

Table 3: Expected Values for the Chi Square Test

	Moderate/ Not Severe	Severe	Total
Effect on:			
Crops	26.5 (15.7%)	142.5 (84.3%)	169
Livestock	26.5 (15.7%)	142.5 (84.3%)	169
Water Quality	26.5 (15.7%)	142.5 (84.3%)	169
Child Education	26.5 (15.7%)	142.5 (84.3%)	169
Livelihood	26.5 (15.7%)	142.5 (84.3%)	169
Dwelling	26.5 (15.7%)	142.5 (84.3%)	169
Total	159 (15.7%)	855 (84.3%)	1014

$$\chi^2_{calculated} = \sum \frac{(Observed - Expected)^2}{Expected} = 23.25$$

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$\chi^2_{statistic} = \chi^2_{(0.01,4)} = 15.09$ at 1 per cent level of significance

"Hence, we reject H_0 and conclude that floods divested more severely in one or more of the crops, livestock, water, child education, livelihood or dwelling. It can be noted that crops and child education were the most affected. There might be a notion that the floods affect the livelihoods in the same way, with the same intensity. This test was conducted to verify this and, as in the conclusion noted above, the impact of floods seems to be more on some areas of livelihood than others, more especially on child education, water and livestock. The effect might not be very much pronounced in crops, as compared to other livelihoods, because the community depends much on fishing and livestock" (Mashebe, 2015, p. 69).

DISCUSSIONS

The objective of this study was to examine the impact of flood on the livelihoods of the people residing in the Luhonono area of the Zambezi region. The problem is the frequent flood that affects the study area annually and this instigated the need to study the impact of flood in Luhonono area. The study employed both quantitative and qualitative research strategy in particular utilising both descriptive and exploratory designs (Mashebe, 2015). Very essential to understand is that people who were affected by flood in the study area were the only ultimate sources of data for this study. It was evident from the results of this study that 76% of the respondents were severely affected by flood and only 26% of the respondents were not severely affected by flood (Mashebe, 2015).

The outcomes of this study also showed that floods distracted further rigorously in one or more of the crops, livestock, water, child education, livelihood or dwelling (Mashebe, 2015). Conversely, it was established that crops (95 %), water quality, livelihood (82 %) in that order, and child education (88%) remained the elements furthermost affected, compelling the community to voyage into dangerous domiciles (Mashebe, 2015). This was also observed by Mwape (2009) in her study of *"an impact of floods on the socio-economic livelihoods of people: A case study of Sikaunzwe community in Kazungula district of Zambia"* (Thesis), where the majority (94 %) stated that their crops were seriously damaged by flood (Mashebe, 2015). Therefore, this entails that these components inevitability require significant thoughtfulness meant for aid or, to some extent, charitable upkeep (Mashebe, 2015).

Though the population was greatly affected by the floods, a good percentage (16%) indicated that they were not willing to be relocated. Citing the predictable reasons that the study area is where their ancestral have been put to rest and this formed their basis for their heritage (Mashebe, 2015). In addition to that, they indicated that they could not be relocated to higher grounds, citing the fact that they were not used to staying far away from the water source. They have built solid foundations to this type of life-style and relocating them will only add more suffering (Mashebe, 2015). One of the major aspects that were cited by those who did not support the aspect of relocation was the fear of losing their ancestral land to foreigners, in particular to Zambian migrants (Mashebe, 2015).

The study revealed that, should they be relocated to higher grounds this would fuel their problems, given their low income status, as their current daily subsistence is largely depended

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on local natural resources such as fish and other nutritional food that come with flood (Mashebe, 2015). However, the majority (84%) have indicated that relocation to high ground is of social and economic benefit, citing the aspect of normal crop production and also reduced mortality rate of their livestock (Mashebe, 2015). Nonetheless, their willingness to be relocated should go along with precise support from the central government, citing the provision of building materials and food as they key for their willingness to be relocated (Mashebe, 2015). Those who have the will to be relocated with the conditions indicated herein felt that when they are relocated to the higher grounds, access to other villages and towns in likely to improve and this would reduce financial burden to the central government (Mashebe, 2015).

Literacy level of the people in the area is objectively great with more than 80% of the population having gone past grade 8. However, these people have the fear that should they be relocated to the higher ground, their life would be difficult, since the level of their education would not permit them to secure goods jobs, despite the fact that they have passed through to grade 12.

CONCLUSION

This study have significantly concluded that flooding has wedged on the livelihood assets of the community in the Luhonono area, and also stimulated the likelihoods of famine (food insecurity) (Mashebe, 2015). It was further established that crops and animal farming practices, which are the key livelihood assets for their viable livelihoods, have remained severely affected. Incidentally, the study has confidently concluded that the livelihoods of the flood sufferers have remained, to a pronounced point, retrogressive quite a lot over the years and ultimately this state of affairs forces them to work harder for their resilience (Mashebe, 2015).

RECOMMENDATIONS

In the centre of the conclusions of this study, the following recommendations are made:

- The Chi Square test that were tested in this study exhibited that the villages were completely remained equally hit by the floods, and the implications are that in the event of relocation (considering the willingness of the affected people) or aid, totally villages have the same needs. On the other hand, it can be acknowledged that aid is a main concern in the form of crop and livestock protection, flood food relief, indispensable services, and that the child's education ought to be at the topmost of the government's itinerary in its efforts to shape resilience and capacity within the community (Mashebe, 2015).
- It is further recommended that the Government of the Republic of Namibia may perhaps pursue to educate people with regard to the hazards that are associated with floods, in particular, the dangers related to the point of residing adjacent to river banks, in this respect the Zambezi River.
- The Government of the Republic of Namibia may perhaps seek to embark on further research studies in areas related to the feasibility of relocation of the affected communities to the higher ground. Above all, provision of essential basic amenities to

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the communities during the flood periods should be set as a component of highest priority.

- Baseline data would need to be established with an effort to devise the approaches that will help the communities in flood-prone areas to cultivate resilience to counter to the impact of flood.

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