

The Impact of Climate Change on Migration Patterns of Rural Women in Marange, Zimbabwe. (2006-2016)

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Abstract:

The paper looks at the impact of climate change on migration patterns of women in Marange, Zimbabwe between 2006 and 2016. Correlational research design was used. Both quantitative and qualitative data were collected. A sample of 384 households was selected using a systematic deliberate convenience sampling technique. Focus group discussions, direct observation, desk research, a questionnaire survey and key informant interviews were used to collect data. The SPSS version 12 software was used to analyse quantitative data, while themes were developed for qualitative data. The results established that the major push factors for migration were due to the negative impact of climate change, particularly prolonged drought (94%) and hot temperatures (88%). Locally, migrants settled at water sources, wetlands, river banks and pasture lands with the worst affected areas being Mpudzi, Odzi, Burma Valley and Vumba. These new settlements posed social, economic, and administrative challenges and generated natural resource use conflicts at local level. Internationally, migrants settled in Mozambique, South Africa and Zambia. It emerged that young and single women (18-25 years) migrate more and permanently than older and married (>25 years) who were seasonal migrants. Women from large families (5-9 members) migrated more than those from smaller families (<3 members). The study concluded that the impact of climate change especially prolonged drought increases migration of young and single women from large families. It recommended an investment in infrastructure that promote irrigation and employment creation for locals in the diamond mining field to diversify their livelihood options and reduce outward migration of women.

Key words: Women and migration, climate change, conflicts, rural livelihoods.

Introduction:

Climate change threatens to be one of the greatest human calamity in the next decades and in some cases exacerbating other disasters. Anthropological

activities such as technological inventions, consumption of large quantities of fossil fuels, desertification have been identified to increased

emission of greenhouse gasses leading to exacerbating the changing global climate (Newland, 2011; Jayalakshmi, 2015). The anticipated impacts of climate change will result in the migration of over 200 million people by year 2050 (UNFCCC, 2016). The severity on women will be exaggerated, particularly in poor nations (UN, 2013; OCHA, 2015; The World Bank, 2017). In 2015 alone 20 million people globally had to forcibly leave their homes due to the negative effects of extreme weather elements (OCHA, 2015).

A large body of work has illustrated that climate change mainly influences the movement of people in four ways which are rising sea levels, higher surface temperatures, disruption of the hydrological cycle, wild fires, biodiversity loss and frequent severe weather events (Newland, 2011; UNFCCC, 2017). This movement is a spontaneous action as women are more sensitive and naturally escape from danger to areas of relative safety (Wondimagegnhu and Zeleke, 2017). Such spontaneous and unplanned migrations consequently results in overpopulation, an array of conflicts and competition of social amenities in the receiving areas.

This paper assesses the impact of climate change on rural women migration patterns in Marange communal area of Mutare district, Zimbabwe. It establishes their migration patterns and volume due to the effects of climate change. Further, the reasons behind the preferences of the new migration destinations points of the women are evaluated and policy recommendations made to reduce the outward migration.

Overview on Climate Change and Migration Patterns:

The effects of climate change on migration are multifaceted. This is due to a number of impacts that include shifting of seasons (Jayalakshmi, 2015), coastal flooding, agricultural disruptions (The American Research Council, 2012), rise in sea levels (UNFCCC, 2018), shoreline erosion, extreme drought, and water scarcity (Jayalakshmi, 2015), desertification as well as diseases and pest infestation. The unpredictable weather patterns has made it difficult for meaningful and sustainable agricultural production resulting in recurrent famine. For example, the migration of the people from the horn of Africa is testimony to the effect of climate change (Research and Evidence Facility, 2017). For Dominic (2008) the proliferation of

water borne diseases and malaria will increase the deaths of people.

More recent literature shows that Coastal Bangladesh and the Pacific Island nations are almost inhabitable due to flooding from increased precipitation or the rising sea level (Vitousek, et al., 2017; Storlazzi et al., 2018). In South Pacific islands 10 000 people of the small nation's 70 000 people migrated to areas in the United States like Springdale and Arkansas (Dominic, 2008). As livelihoods get threatened, affected people will seek and migrate to alternative safe habitats of high resilience such as higher ground. New settlements create unanticipated competition of resources and other services ultimately increasing chances of generating conflict with local residents (UN, 2013; Freeman, 2017).

Climate Related Mechanisms of Displacement (Migration):

Knutti (2013) propounded that many conflicts in the next fifty years will be largely influenced by the fight for resources. His estimation was that 37 million people will be displaced in East Asia, ultimately causing pressure on resources in receiving destinations. Planning for such uncertainties can be a challenge. McDermott (2011) concluded that in 2010, 10 million Somalis experienced an acute food shortage due to a severe drought. Importantly, Moya (2008) reported that females make up 49% of the total global migrants. A century ago the proportion was slightly lower at 47%. In Northern Kenya, the Daadab refugee camp received 1500 arrivals daily. Similarly, South East Ethiopia also received over 1700 arrivals daily and had over 36 700 refugee exceeding its carrying capacity of 20000. These studies illustrate the impending worsening impacts of climate change on migration. The study recognizes the four major migration mechanisms caused by the negative impacts of climate change, which are rise in sea level, increase in seasonal temperature, distortions of the hydrological cycle and severe weather.

A rise in sea level of more than a meter will displace more than 100 million people in countries like Egypt, Vietnam, India, Bangladesh, Mozambique and China (Newland, 2011). Internal migration will be more prevalent but many people will move to neighboring countries with higher ground, ultimately generating conflicts. More recent researchers indicate that the current average temperatures in most parts of the world are almost

exceeding the minimum temperatures tolerated by crops to give sustainable yields with the potential of plunging most populations into famine (Newland, 2011) increasing incidences of flooding and increased desertification (The Pew Centre, 2011). This will exacerbate migration.

In the same vein, Gabriele (2007) postulates that by 2020, agriculture yield in Africa will be reduced by up to 50%, which can lead to severe food insecurity and ultimately poverty. Economies of developing countries such as Zimbabwe that depend on agriculture will experience a negative growth. Dominic (2008) ascertained that in Europe, illegal migration by many people from Cote D'ivoire was declared a security threat. Extreme weather conditions such as increased incidences of heat waves and prolonged winters (IPCC, 2001) act as push factors that contribute to the increase in forced migration (Knutti, 2013).

The above migration mechanisms caused by the negative impacts of climate change affect the livelihoods of rural women, which is the focus of this paper. It is within this context that we consider such underlining factors as vulnerability, resilience and adaptation.

Climate Change induced migration in Mutare District:

In 2015, Mambondiani observed that the movement of people from drought prone areas was a source of conflict in Mutare district. He noted that Internally Displaced People, were settling in areas where rainfall was relatively reliable. Such areas as Mpudzi (about 900mm annual rainfall), experienced an influx of migrants from Marange (which is the study site), and Chitora (400mm annual rainfall). The new settlers were allegedly allocated land by traditional leaders on pasture land, close to water sources and river banks with consequences on the environment and local livelihoods. Farming activities in Mpudzi and Burma Valley where banana plantations were negatively affected as water flow was diverted upstream by migrants. Other neighboring districts such as Chimanimani, Vumba and Nyanga, experienced the destruction of over 30 000 hectares of forest and timber land. These consequences have resulted in conflicts between local people and migrants.

Global concerns over the potential threats of climate change have triggered a series of international conferences on Climate change and Migration. For

example the 2014 Migration and Policy Conference held at Durham University in the United Kingdom. The conference sets a tone for haste in the attempt to avert a global catastrophe that threatens people's health, politics, culture and religion. The conference's resolutions include regional cooperation, research and increasing political commitment to developing appropriate mitigatory and adaptation strategies (The Pew Centre, 2014).

Adaptation Strategies to Climate Change:

Knutti (2013) suggested relevant support to affected people in order to reduce their vulnerability, strengthen resilience, mitigation and adaptation. The 2013 UN Report argues that it is cheaper for the poor people to remain in their land of origin provided they can be guaranteed protection from future occurrences of climate change induced disasters. Newland (2011) proposes some ways of mitigating the effects of climate change to include flood protection and land reclamation to increase productivity. In Southern Africa, such varieties as small grains like rapoko and sorghum are known to increase food security (IOM, 2008). In the same vein, women can increase investments in agricultural technologies including water harvesting and biodiversity based organic farming to increase productivity (The Pew Centre, 2014).

The Research problem:

UNEP (2010) and Mambondiani (2015) showed that there was an upsurge in movement of people from Zimbabwe's dry regions into areas of high rainfall. However, the impact of climate change on women migration in areas such as Marange has largely been under researched. The extent of migration of women and the pattern of the distances they travel, their intended locations, annual volumes over the last 10 years remain unknown in Marange. Yet the social services department in the sending and receiving areas continue programming without this valuable information. This research seeks to look at this gap and contextualize the emerging implications for women and development in Marange. Valuable information will be useful for the social and economic planning of the area, district and province at large.

Objectives of the study:

The specific objectives of the study are to, determine the migration patterns of women by age, marital status and family size between 2006 and 2016, analyse the contributory factors to the

migration of women in Marange, Zimbabwe and evaluate the impact of climate change on women migration.

Significance of the study:

The emerging patterns emanating from the migration of women in Marange due to the phenomenon of climate change will be used by different social, economic and political stakeholders for planning purposes. It will also show where relevant issues and conflict zones could emerge and the associated implications. Ultimately, results will positively influence the perceptions and ways of dealing with such challenges in the Zimbabwe prefecture.

The Methodology:

The research used the correlational research design which is a form of a descriptive design. Some components of the research also used the Qualitative research design. Systematic deliberate convenience sampling was utilized to select a sample of 384 households (3832 women) in all the 19 wards from the total population of about 139,549 people. A total of 3832 questionnaires were administered, 5 focus group discussions and 11 key informant interviews were conducted. Ten research assistants were recruited, trained on the data collecting tools and conducted data collection in the field. Secondary data was collected from reports, scholarly articles, books and newspapers including from the internet. The main data analysis instrument was the SPSS version 12 software as well as thematic analysis for quantitative and qualitative data respectively. Document analysis was also performed on secondary data.

Theoretical framework:

The study was informed by Everett Lee's (1966) push and pull theory on migration. He formulated factors which lead to spatial mobility of people. These factors depend on the characteristics of the locations, which are either positive or negative. Lee's model describes push factors (e.g. poverty, political instability, religious intolerance and severe climatic conditions), which forcefully induce people to move out of their current location. He further describes pull factors (e.g. thriving economic environment, job opportunities or favorable climatic conditions) that induce people to move to new locations. The migration model explains how people make decisions on certain criteria to migrate. See also Knutti (2013). Looking at women in

Marange communal area, the study investigated the rationale for migration (push and pull factors) by women, areas they migrate to, and in particular the impact of climate change on their migration pattern.

Description of study area:

Marange is located 70kms south west of the city of Mutare, Zimbabwe. The area is largely dominated by people from the Marange Apostolic sect religion, who practice polygamy and encourages child marriages leading to big families. It is classified under Natural Ecological Region 5 of Zimbabwe, characterized by low rainfall (400mm), hot weather with summer temperatures reaching up to 33°C and cold winters with minimum of about 6°C (Mambondiani, 2015). The rearing of small livestock (goats) and the cultivation of short season small grain (sorghum, millet and rapoko), are the most viable agricultural production systems. Unemployment rate is approximately 80%, with most of those employed as civil servants in the nearby city of Mutare. In 2005, diamond was discovered in Marange and local people as well as those coming from different parts of the country resorted to illegal diamond mining. However, those residing in the diamond mine fields and nearby areas were relocated 24kms away from their place of origin to the Ada Transau area (Center for Natural Resource Governance, 2014).

The Results and Analysis:

This section presents the results of the study and discussion.

Changes in Number of Women in Marange Households (2006 – 2016):

In 2006, there were 1380 women in households with between 5 & 9 family members and 805 in 2016. 536 of the women were in families with between 3& 5 members in 2006, who dropped to 306 in 2016. Households with less than 3 family members constant decreased from 230 to 179 in 2006 and 2016 respectively.

Local Perceptions on the Impact of Climate Change:

Local perceptions were categorized under seasonal temperature changes, seasonal rainfall changes, and incidences of drought, variations in harvests as well as variation in the pattern and amount of water flow in local rivers. These are presented in the following sections.

Seasonal temperature changes in Marange (2006 – 2016):

80% of the respondents regarded summers as getting warmer. This was also confirmed by key informant interviews and focus groups. For 12% of the women, the summers were getting colder, while 7% regarded winter as getting colder. Only 1% viewed winters as getting warmer. A general consensus on changing weather patterns suggests an increase in temperature extremities. This is consistent to findings by Mambondiani (2015) and Newland (2011) that variations of temperature depicted by severe weather conditions were attributed to the impact of climate change.

Seasonal rainfall changes in Marange in the last ten years:

Table 1 below illustrates that most women (87%) noted a decline in rainfall in the area. Consistent to observations by Jayalakshmi (2015) a significant decline in the rainfall pattern exacerbates incidences of water scarcity. During interviews and discussions, respondents indicated that rainfall pattern has become erratic and the season shortened. 7% acknowledged that they were receiving more rain, while 4% did not notice any change in the rainfall pattern. Only 1%, expressed that flash floods in Marange were increasing. The general consensus suggests that the rainfall is decreasing over the years, which can be attributed to the changing climate in Marange. See also inferences by IPCC (2001) and UNFCCC (2018).

Table 1: Seasonal rainfall changes in Marange between 2006 and 2016

More rain now falling	Less rain now falling	Greater incidences of flash floods	Not much differences has been noted
7%	87%	1%	4%
268	3334	38	153

Incidences of drought in Marange area:

The majority of respondents (94%), observed that droughts were now prevalent. Respondents linked this to the reduced and unevenly spread precipitation levels being received and over a short period of time. They also noted a shift in the rainy season to a shorter duration, from November to mid-

March to January to mid-March. This shift seems not able to sustain local crop production. An increase in the frequency of drought and dry spells associated with negative impacts of climate change affects the critical crop reproductive stage leading to poor harvests (The Pew Center, 2014). Further, key informants pointed out that grazing was negatively affected resulting in the deterioration of large livestock (cattle) condition thus threatening local livelihoods. According to Lee (1966) this can act as a push factor. 3% of the respondents did not observe any changes in the rainfall pattern while 2% suggested that drought was less prevalent. The least number of respondents (1%) illustrated that there were no incidences of drought experienced in their area. See table 2 for details.

Table 2: Incidences of drought in Marange in the last ten years

Droughts are now less prevalent	Droughts are now more prevalent	No droughts have been experienced	No changes have been noted
2.00%	94.00%	1%	3.00%
77	3602	38	115

Views on the Variations in Harvests over the Last Ten Years:

The variation of harvest provided data for trend analysis of the impact of climate change. Figure 1, shows that 47% respondents noted that the harvests have dropped in the last ten years. Focus groups revealed that this resulted in food shortages, hunger, and deficiency related illnesses in children and sometimes death. 37% confessed that there was no meaningful harvest, while 14% perceived that harvests increased and (2%) opined that harvests remained constant. Thus, evidence from the study suggest that the harvests of the community have dropped over the years threatening household food security. The loss of agricultural production due to the negative impacts of climate change was also noted by The Pew Center (2014). Lee (1966) explains that such factors can act as push factor to women migration.

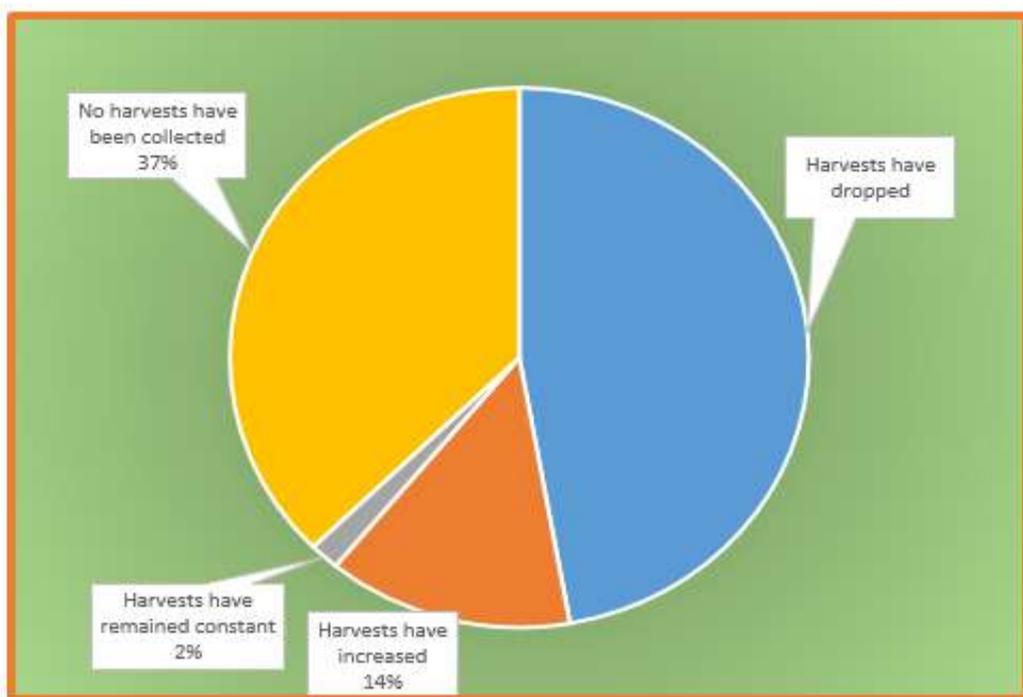


Figure 1: Incidences of drought in Marange (2006-2016):

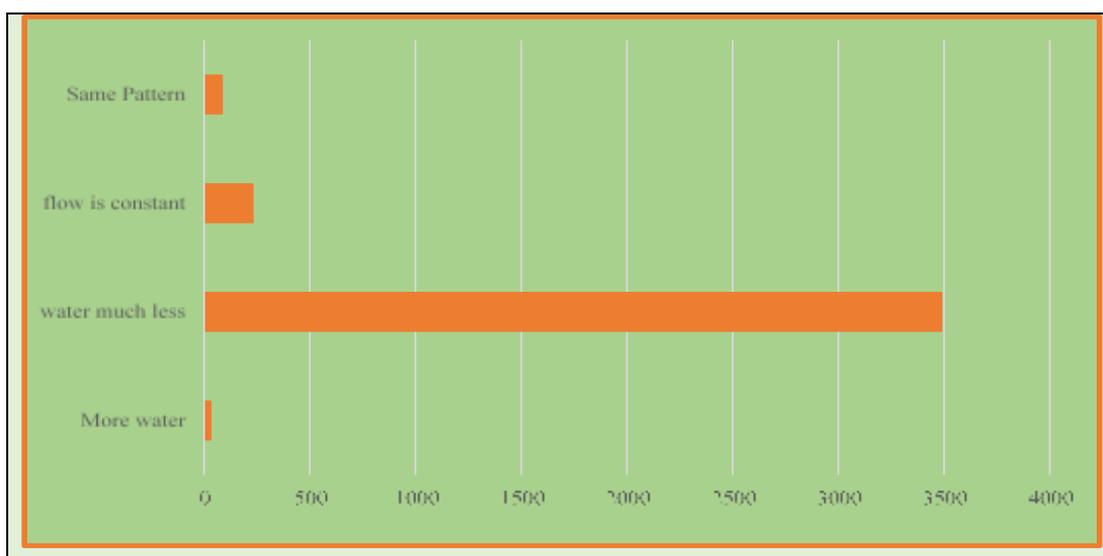


Figure 2: The views on the pattern and flow of rivers in Marange

Pattern and Amount of Water Flow in Local Rivers (2006 – 2016):

Local perceptions on variation of water flow in the rivers was used as a measure of the extent of the impact of climate change. This was compared against the migration of women from Marange and to ascertain the relationship. Figure 2 above summarises respondents’ views on variations in seasonal water flow. 91% respondents viewed the flow of water in the rivers to last for a short period and articulated this to the limited rains received. Focus group discussions, noted that a number of pools had vanished as a result of persistent siltation

while the remaining dried up well before the rainy season. The rate of siltation of rivers also contributed to the duration of water flow in the rivers. Similarly, as shown above, incidences of flash floods by 1% of the respondents validates the increased siltation of rivers.

The effects of water scarcity in Marange for agricultural, domestic purposes and for livestock, was that women were spending more time looking for water. 8.2% respondents suggested that there is no significant difference in the flow of the river and 0.8% that water now lasts longer in the rivers. Key

informants mentioned that deep wells and boreholes were now drying up before the rainy season. In concurrence, to these findings, the UN (2013) and OCHA (2015) articulated that the severity of the impacts of climate change will act as push factors to women migration in order to secure household food security. Such actions are best explanations of the push and pull theory by Marange women that provides an understanding of the lives of marginalized people who migrate as means of food insecurity reduction (Lee, 1966).

Reasons for migration from households in Marange:

Three quarters (75%) of women, related their migration to extreme weather conditions in Marange. 10% migrated for economic prosperity, 8% for other reasons and the least 7% for educational advancement (at tertiary level). The results demonstrated that extreme weather conditions were the major push factor for outward

migration of women. This is consistent with findings by Knutti (2013) and Fussell, Hunter and Gray (2014) who inferred that extreme weather conditions contributed towards the migration of people from their areas of residence. The findings of the study also resonate with explanations of Lee's (1966) theory that push factors trigger migration away from the area while pull factors attract the migrants.

General Pattern of Women Migration and Household Sizes in Marange:

A total of 805 (63%) women who migrated were from large families (more than 9 members) due to the negative impact of climate change. These were followed by 268 (21%) women from families with between 5 & 9 members. 166 (13%) women from households with members between 3 & 5 migrated during the same period while the least, 38(3%) were from families with less than 3 members. See figure 3.



Figure 3: General pattern of women who migrated between 2006 and 2016.

Impact of Climate Change on Migration of Married Women (2006 – 2016):

Almost half of married women (45%) from households with more than 9 members migrated between 2006 and 2016. For families of sizes 5&9 and 3&5 members had each 23% married women migrating. The least number (9%) was from households with less than 3 members. Married women from large families migrated more due to climate change.

Impact of Climate Change on Migration of Single Women (2006 – 2016):

The study revealed that 42% single women from households with family members between 3 & 5 migrated due to the negative impact of climate change. Those from households with more than 9 members constituted 37%, and 20% from families between 5 & 9 members. The least (1%) were from households with less than 3 members.

Seasonal Migration by Women and Household Sizes:

Results from interviews and focus groups showed that many women were involved in seasonal migration as they tried to adjust to the hardships caused by the negative impact of climate change. The figure 3 below illustrates that households with more than 9 family members constituted the majority of women 228 (43%), who migrated seasonally. Households with between 5 & 9 members accounted for 170 (33%) women. A total

of 111 (21%) women from families with between 3 & 5 members and those with less than 3 members were 16 (3%). It is clear that women irrespective of their marital status from large families migrate more on a seasonal basis than those from smaller families. Thus the larger the family size, the more migration potential by female members. Wondimagegnhu and Zeleke (2017), demonstrated that members of large families tended to migrate more than those from smaller family units.

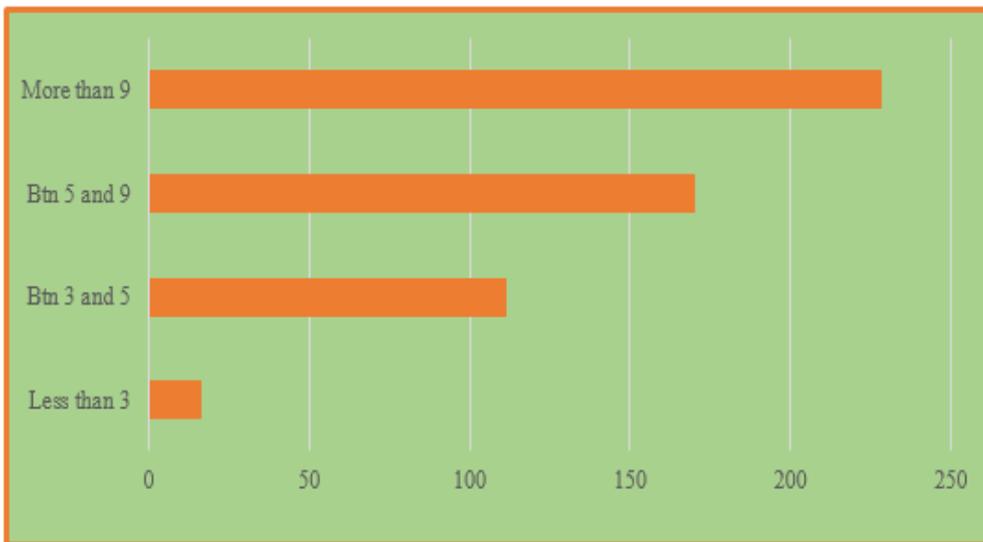


Figure 3: Seasonal Migration of Women by Household Sizes in Marange

Seasonal Migration by Single Women due to Climate Change (2006-2016):

Results showed that 148 (44.44%) single women from households with more than 9 members migrated between 2006 and 2016. These were

followed by 106 (31,83%), 69(20,72%) and 10(3%) single women from families with between 5 &9, 3 &5 and less than 3 members respectively. The results confirm the above discussion that more single women from large families migrated on a seasonal basis. See figure 5 for details.

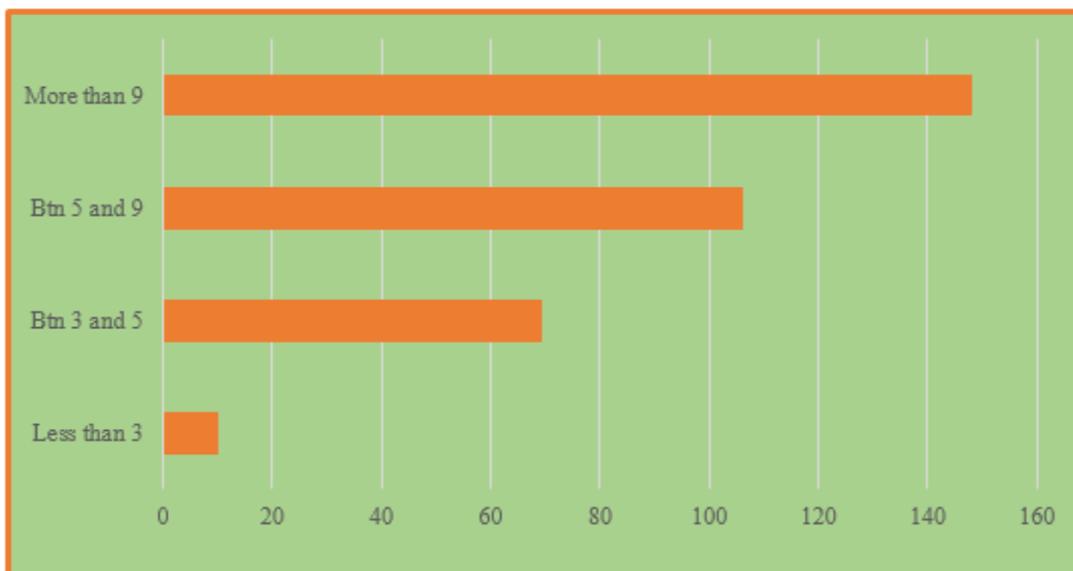


Figure 5: Seasonal Migration of Single Women due to Climate Change

Seasonal Migration of Married Women due to Climate Change:

The movement of married women from Marange was curtailed by the need to visit spouses, who were based in town and also secure household food security. Their migration mainly coincided with the movement of the whole family. The highest incidences of migration (41.67%) were from

families with more than 9 members. Those between 5 & 9 members constituted 33,33%, followed by 21,88% from families between 3 & 5. The lowest incidences (1,8%) were witnessed in families with less than 3 members. See details in table 3 below. The results were consistent to those by UNFCCC (2017) that the need to secure household food security triggers migration of women in dry regions.

Table 3: Seasonal Migration of Married Women in Marange

No of women in households	Household Size			
	Less than 3	Between 3 & 5	Between 5 & 9	More than 9
Number of women	6	42	64	80
Frequency	3.13%	21,88%	33,33%	41,67%

Destinations of Migrating Women from Marange:

Survey results in table 4 show that the largest number of migrating women (30%) went to the nearby town of Mutare and surrounding areas such as Mpudzi, Burma and Odzi. They settled at water sources, wetlands, river banks and pasture lands which are sources of local livelihoods (livestock grazing, water, vegetable gardens). A total of 28% women migrated outside Zimbabwe mainly to Mozambique, South Africa and Zambia. 22% migrated to major cities such as Harare, Bulawayo

and Gweru. These were followed by 15% who moved to other smaller cities and towns. The least number of women (5%) went to other areas that were not specified. Settlers were associated with unsustainable agricultural practices along river and stream banks. As discussed by Freeman (2017) conflict over natural resources arise from unplanned competition with new settlers with adverse effects on the social and political dynamics. During focus groups, participants highlighted that one would pay a bribe to local leaders in order to be offered a place to settle. A corrupt tendency by local leaders was therefore cultivated.

Table 4: Destinations of Women who Migrated out of Marange

Parameter	Destinations				
	Outside the country	Mutare and surrounding areas	Harare, Bulawayo and Gweru	Other cities and towns (specified)	Other places
% movement of all households	28%	30%	22%	15%	5%
Number of Respondents	358	383	281	193	64

Duration of Stay at Destinations by Migrating Women:

Survey results show that most of the migrating women (43,1%) stayed on a seasonal basis. However, some of the women migrated independently and others in the company of

families. 34,3% migrated permanently and 22,6% on temporarily basis. This includes going out to the farms to help out with harvesting and generate income to sustain the household. This is in tandem

with findings by the World Bank (2017) that women play a significant role in agriculture production as a means of survival due to the effects of climate change.

Challenges Faced by Migrants at Places of Host:

Conflicts emerged as migrants to local areas occupied spaces that are sources of local livelihoods. The presence of new settlers at these sites also posed as potential threats to sustainable management of natural resources making local people more vulnerable to the negative impact of climate change. Similarly, UNEP (2010) and Freeman (2017) observed that the influx and settling in of migrants generated socio-cultural, political and ecological conflicts with local people. This in turn can be a potential push factor for local people to also migrate, or migrants moving further out to new places. See also Lee (1966). The resultant movements might exacerbate environmental threats and social problems in the new receiving areas.

Conclusion:

The Marange case confirms that women are generally moving out seasonally due to the hardships induced by climate change. Both married and single women alike have attributed the major push factor for migration as the negative impact of climate change, particularly drought and increasing hot temperatures. The incessant drought conditions were increasing the levels of household food insecurity resulting in an increase of women migration in order to fend for their families. It can be deduced that access to sufficient and consistent food supply may reduce the incidences of seasonal migration of women in drought prone areas such as Marange.

A new notion on family size and incidence of women migration has emerged in Marange. This emanated from the observation that large families contributed greater numbers of migrants. The high incidences, however, could be attributed to the prominence of the religious belief system that promotes polygamous families. It can be concluded that the larger the family the higher the propensity to migrate due to the negative effects of climate change in Marange. In terms of marital status, single women also have a higher propensity to migrate compared to those married. The theoretical framework was adequate to explain both the push factors that forced women to migrate from Marange

and pull factors that seem to attract them to settle in new destinations.

Recommendations:

Infrastructural investment in dams that support irrigation schemes could reduce the movement of women from Marange. If some of the perennial rivers such as the Pungwe River could be diverted or pumped to Marange, would irrigate a large expanse of land improving local livelihoods. The women and the community need to be assisted with support on the exploration of sustainable disaster mitigation and adaptation strategies particularly on drought. Policy makers need to design a quarter system that allows able bodied Marange community members be employed in the diamond rich fields in the study area.

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