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Weathering Challenges: Women's Role in Climate-Induced Disaster

Management in Zambia

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Abstract

Women often suffer disproportionately during climate-induced disasters. In Zambia, specifically, women are more vulnerable in disasters due to their traditional roles and the frequency of floods and droughts. Zambia's 2015 National Disaster Management Policy outlines the country's current approach to disasters and includes gender provisions. The paper aims to better understand women's role in climate-induced disaster management in Zambia and identify potential areas for improvement to be included in future revisions of the NDMP. To research this topic, we conducted an extensive literature review focusing on both the Zambian and international disaster management context, in addition to seven structured interviews with experts. Through this process, we were able to determine four areas of potential improvement: (1) specific provisions, (2) female representation, (3) multilevel government involvement, and (4) data-driven decisions. In these themed sections, we synthesize our findings and offer suggestions to the NDMP that incorporate a gender perspective.

Acronyms

ccGAP - Climate Change Gender Action Plan

CDRRP - Coastal Disaster Risk Reduction Project

CIND - Climate-Induced Natural Disasters

DA - Department of Agriculture

DMMU - Disaster Management and Mitigation Unit

DRR - Disaster Risk Reduction

DRRMC - Disaster Risk Reduction and Management Council/Committee

DSWD - Department of Social Welfare and Development

DOLE - Department of Labour and Employment

GBV - Gender Based Violence

GFDRR - Global Facility for Disaster Reduction and Recovery

GII- Gender Inequality Index

MDGs - Millennium Development Goals

NCRMP - National Cyclone Risk Mitigation Project

NDMP - National Disaster Management Policy

PPCR - Pilot Program for Climate Resilience

SCRALA - Strengthening climate resilience of agricultural livelihoods in Agro-Ecological Regions I and II

SDG - Sustainable Development Goals

UN- United Nations

UNDP- United Nations Development Programme

UNDRR- United Nations Disaster Risk Reduction

Introduction

Zambia is a land-locked country located in Southern Africa. Its climate is highly variable and has a long history of managing CINDs. With much of the country being located within the Zambezi and Congo River Basin, most Zambians are familiar with the seasonal flooding that comes in the rainy months and droughts that accompany the dry season. In recent years, however, Zambia has experienced an increase in such disasters. These disasters are a byproduct of new weather patterns influenced by climate change and have had devastating effects on communities. These events have impacted individuals' livelihoods and have limited the country's development, as the cultivation of natural resources is a pillar of Zambia's economy. Notably, the variability in weather patterns has made it difficult for farmers to produce their necessary crop yields. With over half of the country's labor force employed in the agricultural sector and much of the rest dependent on its products, these natural disasters have negatively impacted factors such as food security, household income, and economic growth (*Zambia, 2021*). Climate change has also contributed to harmful effects on human and wildlife health, by extending the spread of diseases and limiting the availability of safe, uncontaminated food and water. It becomes even more critical to understand climate change's effects on the country's water supply when we consider that 93% of Zambia's energy is derived from hydroelectricity (*Zambia, 2021*). Because of the numerous consequences of droughts and floods on the country, the 2015 NDMP, amongst others, was proposed to establish a system to respond and prepare for these said disasters. This document is revised approximately every five years and is expected to be renewed in the coming year.

Despite the growing number of policies to aid in disaster mitigation techniques, one potential gap that was identified in the 2015 NDMP was the role and representation of women in these disaster management initiatives. Women are often disproportionately affected by natural disasters. They are especially vulnerable in areas where they are subject to discrimination and expect to fulfill traditional caretaking roles, as these factors often cause them to be the first to face housing insecurity and food/water shortage and contamination. According to the UNDP's 2018 Human Development Report, Zambia ranked 131st among countries in terms of the GII with a score of .540 (*Gender Inequality Index*, 2020). This indicator measures inequality of achievement between men and women in reproductive health, the labor market and empowerment with 0 being the most equitable and 1 being the least. For comparison, neighboring countries such as Zimbabwe and Angola received a score of 0.525 and 0.578 in the GII of 2018 (*Gender Inequality Index*, 2020). For these reasons, we believe it is imperative to study how women are affected by CINDs in the Zambian context.

In this paper, we aim to analyze the current situation of CINDs in Zambia, specifically assessing how women are involved in disaster management programs and policy-making initiatives. With this research, we hope to identify areas of actionable improvement for Zambian disaster response, in order to lessen the negative impacts of floods and droughts on both women and the local communities. Furthermore, we hope to make suggestions regarding increased female representation in such decisions, as women are often frontrunners in providing for the health and safety of their families. For our research, we have included a literature review focused on Zambia's climate-related challenges and policies, relevant international frameworks and theories, and case studies

for comparison. In addition, we analyzed qualitative data collected through virtual stakeholder interviews conducted during July 2021. By synthesizing current literature and expert interviews, we further hope to identify suggestions to address any gaps or weaknesses (specifically regarding gender roles) in the 2015 NDMP.

Methodology

The research for this paper was primarily conducted in two categories: a comprehensive literature review and stakeholder interviews.

The literature review was separated into three sections: Zambia-specific policy and disaster history, international framework and theory, and case studies of similarly situated countries. The Zambia-specific section reviewed sources regarding the impact of climate-induced disasters in Zambia, as well as the 2015 NDMP and other relevant policies. The international framework and theory section additionally reviewed several sources that evaluated the Sendai Framework for DRR. The final section of the literature review analyzed case studies from Sri Lanka, India, and the Philippines, and evaluated the gendered impact of natural disasters in these countries. These nations were chosen since their status as disaster-prone developing countries were comparable to that of Zambia.

The second portion of the research was conducted through an analysis of stakeholder interviews. A total of seven stakeholders were interviewed regarding their expertise and experience in either climate change, gender research, or disaster management and response. The following listed persons are those that were interviewed about their work: Dr. Douty Chibamba, Anna Brettman, Ngao Mubanga, Gatkuoth Kai, Jean Mukumwa, Dr. Mark Conostas, and Roland Seri. Following these interviews, a collective

analysis was conducted to determine the common themes and suggestions that were presented regarding the topic.

Literature Review

Zambia's Disaster Management Landscape:

Climate-induced Disasters in Zambia

In this section, we will discuss the prevalence of CINDs in Zambia and the specific impacts that they have on the agricultural and economic sectors. This will provide context for why CINDs are an urgent matter that need to be further addressed. Furthermore, we will also discuss recommendations that the Chronic Poverty Advisory Network has made to mitigate the poverty impacts that cause households to be more vulnerable during these disasters.

CINDs are extreme climatic hazards that can especially affect and marginalize poorer environments, both ecologically and economically. In Zambia, floods and droughts have become increasingly prevalent due to climate change and have been negatively affecting their communities' livelihoods and agricultural production. In Zambia's 2007 National Adaptation Programme of Action, it was shown that floods have affected 41 out of 72 of Zambia's districts, even reaching regions that have never experienced flooding before (Kalantary, 2010, p.91). Furthermore, it was shown in the same report that in 2007, Region I of Zambia's three agro-ecological regions, located in the south of the country, experienced the least amount of rainfall than it has in the past 30 years (Kalantary, 2010, p.92).

Kalantary claims that based on historical trends, projections at the time predicted that Region I and Region II, the middle section of Zambia, would experience a decrease in

average rainfalls in the future, which was accurately demonstrated by the severe droughts that followed in the next decade (Kalantary, 2010, p.92). To further demonstrate this claim, a UNDRR Country Report showed that there were five severe droughts and nineteen floods between the years of 1987 and 2019 which affected a combined population of over 9 million Zambians (UNDRR, p.11). Moreover, it was statistically shown that more than 4% of the population is constantly exposed to an immediate drought threat in the country (UNDRR, p.11). Thus, these reports depict the increasing frequency and impact of such disasters in the nation.

Since much of Zambia is affected by flooding and droughts, it is critical that these issues are addressed. CINDs, heightened by global warming, can have a grave impact on local occupations as well as crop production. According to a report by the Chronic Poverty Advisory Network, droughts had a significant impact on incomes in the agricultural and informal sector in 2016, 2018, and 2019, which contributed to the country's slowed economic growth and increased inflation (Shepherd et al., 2021, p.23). Specifically, in 2015, drought and food and/or input prices were listed to be the two main reasons for being economically worse off during that year. These were especially impactful on the two lowest household expenditure quintiles, as the two combined factors were analyzed to account for 43% of why households were financially poorer in 2015 as compared to 2014 (Shepherd et al., 2021, p.24).

Comparatively, it was also stated that "in 2018, floods submerged crops thus severely crippling agriculture in the area". (Shepherd et al., 2021, p.11). These natural disasters not only directly damaged agricultural production and food security, but

consequently, also financially endangered certain occupations. For example, due to the continuing decline of natural resource bases from “declining soil fertility, increasingly variable rainfall...[and] flooding”, local occupations such as fishing and farming were statistically more likely to live below the poverty line (Shepherd et al., 2021, p.10). Due to the likely negative impact of CINDs on the economic survival of poorer households, the Chronic Poverty Advisory Network made the following policy recommendations to combat poverty incidence in Zambia (note that only a few recommendations relevant to CINDs were listed):

- *Renewed focus on inclusive smallholder agricultural growth to address farming risks, including drought, flooding, input price inflation and delivery:* Aims to “expand and develop FSP, review/evaluate conservation farming and develop a greater range of feasible alternative risk-minimizing, yield maximizing soil and water conserving strategies.” (Shepherd et al., 2021, pp.33-34).

This first policy recommendation is important, as CINDs affect farmers’ livelihoods with the destruction of crops and other grown produce. By refocusing on smallholder inclusivity, farmers will be more informed on how to effectively prepare for and respond to disaster risks, which will in turn save them from financial losses and potential food insecurity during a disaster-affected season.

- *Rural nonfarm economy:* Advises to “intensify rural electrification” and “support...on-farm diversification and agro-processing”. (Shepherd et al., 2021, p.33).

This recommendation advocates for increased electrification and diversification, with the aim to minimize damage in the face of CINDs. Regarding electrification, due to Zambia's high reliance on hydropower, a dry season can have severe consequences on local businesses as well, as they may have to experience load shedding and temporarily limit business hours. It is also suggested to diversify agricultural processes, so that locals are not wholly dependent on the production of a single crop.

- *Review policies and programs to enhance resilience and prevent impoverishment:*

Advises to evaluate current and future drought and pandemic disaster management, and to “build on existing DMMU...for strong, politically independent future disaster responses” (Shepherd et al., 2021, p.34).

Researchers consider this suggestion too vague, as it does not suggest a specific plan of action to actually achieve these goals.

CINDs could cause significant harm to Zambia if unchecked. These disasters specifically threaten Zambia's agricultural and informal sectors, and further have negative impacts on the economy and overall communal well-being. Thus, these recommendations are important to consider because they address indirect causes that intensify the societal effects of natural disasters.

2015 National Disaster Management Policy

To continue our review of Zambia-specific literature regarding disaster management, we will discuss the 2015 NDMP, which is the nation's current attempt to provide a more centralized and preventive approach to addressing CINDs. This section of the review will

allow us to identify gaps in the policy that could be improved upon during future evaluations and modifications.

In Zambia, current initiatives that address disaster resilience and mitigation are outlined in the 2015 NDMP. Having expired in 2020, the policy is currently undergoing re-evaluation in preparation for the publication and application of an updated document for coming years. The 2015 policy highlights that Zambia's vulnerability to disaster is largely due to poverty and the challenges brought on by social economic management. Specifically, a review of the policy states the following regarding Zambian vulnerability to disasters:

“Some of the major causes of vulnerability in Zambia include negative beliefs, attitudes and practices (customs and norms), poor farming practices, degradation of the environment, lack of access to resources, disintegration of social safety nets such as extended family systems and weak institutional structures to promote social welfare.”. (*National Disaster Management Policy, 2015, p.7*)

It is important to note these major causes of vulnerability as they may point towards underlying areas that can be targeted for improvement. However, although this review does mention some of the prevalent contributors to disaster vulnerability, it is important to note that it fails to recognize factors that affect certain population subgroups more than others. It does not acknowledge how disaster vulnerability may be disproportional across different subsets. For example, this review does not cite gender as a contributing factor to Zambian disaster vulnerability.

Besides the identification of the causes of Zambian disaster vulnerability, some of the other key factors that are highlighted in the 2015 NDMP include the following:

- *Localization of disaster response:* Many sub-committees (i.e., Disaster District Management Committee, Satellite Disaster Management Committee) were created to implement various aspects of disaster management policies and programs at different governmental levels.
- *Paradigm shift from disaster management to DRR:* The original policy, developed in 2005, focused largely on disaster management, which took on more of a reactive approach. However, after a review of the Yokohama Conference that took place in 1994, a shift to DRR (with a more proactive and preventive approach) was endorsed (*National Disaster Management Policy, 2015, pp.1-2*).
- *Incorporation of gender concerns into committee activities/roles:* One of the key guiding principles of the 2015 policy states that “Disaster effects are selective, affecting mostly women, children, the physically challenged and the elderly, hence specific consideration to these groups in disaster management shall be prominent at all levels” (*National Disaster Management Policy, 2015, p.10*). Furthermore, another section states that efforts would be made to “ensure equal representation of men and women in committees at all levels” (*National Disaster Management Policy, 2015, p.28*). However, the only tangible requirement for gender representation is in Section 64 of the policy, where it specifies that the Satellite Disaster Management Committee must comprise at least one woman from the local community in a committee of a maximum of ten members (*National Disaster Management Policy, 2015, p.27*).

These provisions are important to consider because the 2015 NDMP is Zambia's only national-level policy outlining disaster response. Due to its high regard at the national governmental level, it can serve as a guiding principle for other, more local provisions. Furthermore, because it sets the standard for other divisional policies, it is important to note the presence (or absence) of any gender specific details, as the same strides for gender representation will likely take place on other levels as well.

Other Zambian Plans and Policies:

In addition to the NDMP, there are other policies and plans put forth by different aspects of the Zambian government that discuss disaster management. Some of these plans, such as the Seventh National Development Plan, focus on broad topics, while others take a narrow approach, as the case with the Climate Change Gender Action Plan (ccGAP). It is important to acknowledge that while the NDMP is the leading document in terms of disaster management, it does share intersections with others in terms of gender, climate change and development.

- *ccGAP*: Formulated by the Ministry of Gender but put forward as a tool for all relevant actors, the ccGAP aims to ensure that Zambia's climate change policy takes into consideration gender issues. The plan identifies several priority areas— including sustainable agriculture, infrastructure, and disaster risk reduction, preparedness, and resilience— and identifies potential objectives, actions, indicators, and partners for each area. In its section about DRR, Preparedness, and Resilience, it proposes the following four objectives: (1) “Build capacity of Meteorological Department and Disaster Management Unit on gender to enhance strategies, plans

and data collections" (2) "Enhance meteorological information collection and dissemination, especially empowering women and women's organizations" (3) "Increase information to and awareness of communities on gender, climate change, disasters, and DRRR" (4) "Increase media awareness and attention to gender, climate change, disasters and DRRR" (*Zambia Climate Change Gender Action Plan*, 2017, pp. 97-98). It further identifies actions to further these goals such as training women in the collection of meteorological information, supporting the disseminating of sex-disaggregated data, developing awareness tools, and organizing orientation meetings with relevant stakeholders (*Zambia Climate Change Gender Action Plan*, 2017, pp. 97-98).

- *Seventh National Development Plan*: This document outlines Zambia's plans and goals for development from 2017 to 2021. Recognizing the interrelated nature of sustainable development, this plan diverges from its predecessors by developing integrated multi-sectoral strategies. It recognizes strategic areas of development, including improved water resources development and reducing developmental inequalities. It further addresses DRR, acknowledging the threat of climate change, the importance of food security, and the need to mainstream DRR in all sectors of the economy (*Zambia's 7th National Development Plan*, 2017, 47). It should be noted that while the document does include a strategy to reduce gender inequality, it does not address how that gender plays a role in disasters.
- *National Climate Change Response Strategy*: Published by the Ministry of Lands, Natural Resources, and Environmental Protection, this framework aims to coordinate Zambia's climate change response. One of its specific objectives was to

“To engender Climate Change programmes and activities in order to enhance gender equality and equity in the implementation of climate change programmes” (*National Policy on Climate Change*, 2016, p. 11). While the document does not acknowledge women’s vulnerability in disasters, it does support the implementation of gender-specific measures on climate change, the participation of women in related programs, and equal access to climate finances (*National Policy on Climate Change*, 2016, p. 15). Importantly, the document lists existing acts which guide different aspects of Zambia’s climate change response. They include the policy at the heart of this paper, the NDMP, but also the Environmental Management Act (2011), the Agriculture Lands Act, the Water Resource Management Act (2011).

Disasters are, by nature, intersectional. Countries can plan ways to stop them from worsening by focusing on sustainable development, make communities more resilient by planting crops that fare better in extreme conditions, and focus programs on vulnerable demographics like women. While the NDMP is the country’s principal document regarding disaster management, it is important to acknowledge that there are other policies that offer unique perspectives on both disaster management and gender. However, as iterated before, the NDMP was still chosen as the focus for this paper because it is Zambia’s most direct way of centralizing the nation’s disaster management strategy.

International Framework and Theory:

The Sendai Framework

While there is a noticeable gap in Zambia-specific disaster preparedness literature, researchers have extensively analyzed similar international documents through a gender

lens. The most notable of which is the Sendai Framework for Disaster Reduction (2015 - 2030). Agreed on by UN member states, including Zambia, this framework prioritizes the following areas for action within DRR: (1) Understanding disaster risk, (2) Strengthening risk governance to manage disaster risk, (3) Investing in risk reduction for resilience, and (4) Enhancing effective responses to aid in recovery. The topics the framework focuses on are important as they influence the development of countries' individual disaster management policies. This makes the document especially critical to understand as it represents prevailing global ideas about disaster preparedness and response and runs parallel to many national disaster plans. Thus, many of the criticisms of the document can be applied to specific national policies, such as Zambia's 2015 NDMP.

Notably, the framework addresses women's roles within its priority areas. It also emphasizes the importance of preventive disaster management, in contrast to retroactive, and argues for a people-centered approach to prevention (*Sendai Framework for Disaster Risk Reduction 2015-2030*, n.d., p. 21). This type of preventive approach sets out to engage relevant stakeholders in the community in the design and implementation of policy, plans, and standards. The framework specifically names women as one such stakeholder and further acknowledges that women are often disproportionately affected by disasters (*Sendai Framework for Disaster Risk Reduction 2015-2030*, n.d., p. 10). In Priority 4, regarding response and recovery, the framework states:

“Women and their participation are critical to effectively managing disaster risk and designing, resourcing, and implementing gender-sensitive DRR policies, plans and programs; and adequate capacity building measures need to be taken to empower women for preparedness as well as to build their capacity to secure alternate means

of livelihood in post-disaster situation. “(*Sendai Framework for Disaster Risk Reduction 2015-2030*, n.d., p. 23)

While this document addresses women’s roles in disaster management and reduction, several authors have criticized its contents.

Critiques and Suggestions

Multiple researchers have taken issue with the framework’s high-level focus on women. In a paper published in 2021, Zaidi and Fordham assert that the framework does not address fundamental gender-based issues. Specifically, they argue that women should not be put in a monolithic category in disaster reduction and should be recognized as a diverse group with different socioeconomic backgrounds (Zaidi & Fordham, 2021, p. 2). Similarly, this assertion is supported by Enarson, who notes that the variation between women’s experiences tends to be larger than that between women and men, due to differences in race and class (Enarson, 2012, p. 2). That being said, it is largely accepted that women, in general, have a distinct set of risk factors during disasters. Roder and Tarolli suggest that in traditional roles, women are largely restricted to the home and expected to care for the family, and it is these social constraints that predispose them to exposure to disasters (Roder & Tarolli, 2016). They further argue that such roles that make women vulnerable could also make them important sources when it comes to organizing community evacuations and education.

Furthermore, many researchers have criticized the framework and other disaster relief guidelines for using the term ‘gender’ to solely refer to women. Zaidi and Fordham note that the framework excludes how disasters can affect genders and sexual minorities

outside of women (Zaidi & Fordham, 2021, p. 3). While they acknowledge that many studies support the notion that women suffer disproportionately during and after disasters, they argue that this is an over-generalized assumption, as men have historically also borne the brunt of disasters, depending on the circumstance. They further assert that neglecting other gender groups could endanger their wellbeing during disasters by not recognizing their specific experiences (Zaidi & Fordham, 2021, p. 2).

Researchers further criticize the framework's ambiguity, specifically its lack of actionable suggestions and indicators regarding gender in disaster management. In a 2019 piece, Bondesson argued that without such specific priorities and indicators, the values outlined in the framework will not be able to meaningfully influence national policy (Bondesson, 2019, p. 51). They note that many policies, instead of focusing on intersectional programs that address factors that make groups more vulnerable, often call for the championing of female voices.

A common, and often lauded, approach to boost women's voices in disaster management is to increase the number of women involved in the decision-making process. As discussed in the prior section, Zambia's 2015 NDMP does reference the importance of female representation in decision-making. However, some authors caution against aspects of this approach. Bondesson, specifically, casts doubt on the notion that greater female representation always leads to gender-sensitive policy. She argues that a shallow focus on gender representation might lead to policymakers overlooking the underlying socioeconomic roots that cause disasters to be gendered experiences in the first place (Bondesson, 2019, p. 52).

However, Zaidi and Fordham still suggest the framework should acknowledge women's distinct sources of knowledge in risk reduction and additionally include actions to promote and monitor female participation in disaster management (Zaidi & Fordham, 2021, pp. 3–4). Sohrabizadeh, Tourani, and Khankeh point out that because of the lack of indicators and other monitoring tools, researchers do not have much information about the differences in the vulnerability and needs between men and women in disaster management cycles. They suggest developing gender analysis tools to assess vulnerability, creating gender-focused databases on both local and international levels, and focusing on community-based gender analysis overall (Sohrabizadeh et al., 2014). Currently, the 2015 NDMP does not include such acknowledgments or monitoring systems.

While the Sendai Framework is an international document, because of its parallels with the 2015 NDMP, discussions about the framework can be applied to the Zambian context. Both documents champion a preventative approach to disaster management and include high-level references to the importance of women in disaster situations. However, they both do not recognize gender as a socioeconomic factor that contribute to disaster vulnerability or how women can play roles to make disaster management more effective—two points of criticism many authors touch upon when reviewing the Sendai Framework.

Case Studies:

While international documents have been analyzed in the previous section because of the noticeable gap in Zambia-specific disaster preparedness literature, this research will also look at case studies of Sri Lanka, India, and the Philippines. The findings of these case studies will be utilized to better Zambia's disaster regulatory framework. These countries

have been selected because like Zambia, they are developing countries that are trying to create robust gender responsive disaster management frameworks. These case studies demonstrate that most countries mainstream gender into their laws and policies but still face challenges in adequately implementing them. This is discussed in a piece by Ginige who indicates that countries that are prone to CINDs face challenges in implementing a gender perspective in their disaster legislative framework. The term gender perspective entails looking at the impact of gender on people's opportunities, social roles, and interactions. Ginige opines that disasters are least likely to impact women if there is gender mainstream because this helps bring a woman's perspective into DRR in the built environment. Therefore, successful implementation of policy, program and project goals of international and national organizations is directly affected by the incorporation of gender (Ginige et al, 2014, pp 327-335).

Sri Lanka

In Sri Lanka, women's vulnerabilities were visible during and after the 2004 Indian Ocean tsunami. Statistics indicate that more than 35,000 people were killed and 21,000 were injured by the tsunami. Amongst the 35,000 that died, almost 80% of the fatalities were women (APWLD, 2005). This tsunami produced some very gender-specific aftershocks, ranging from women giving birth in unsafe conditions to increased cases of rape and abuse. The occurrence of the tsunami brought the gendered nature of the disaster impact into sharp focus, as it highlighted that women were more vulnerable than men in times of disasters. The tsunami brought to light the repercussions of not making gender disaggregated data available on the national level, and of not mainstreaming gender

responsive programs at all levels. This prompted the government to enact the Disaster Management Act No.13 of 2005 to provide a legal basis for a disaster risk management system in the country (Ginige et al., 2014, pp. 327–335).

In their study, Tanaka and Nonoguchi indicate that a gender perspective is integrated into Sri Lanka's legislation and institutions, including relevant laws, policies, plans, and operational structures at the national and local levels, to some extent. On the other hand, the authors opine that despite some progress in the recent past, there are gaps in addressing gender issues, especially at the implementation level. National organizations focused on promoting gender mainstreaming and equality do not necessarily take an active advocacy role in including gender specific provisions into those laws, policies, plans, and structures. Their commitment, institutional capacity, and influential power toward relevant governmental agencies are limited, and thus are severe drawbacks in the implementation of the regulatory framework in relation to DRR in the built environment (Tanaka & Nonoguchi, 2016).

Tanaka and Nonoguchi are of the view that the major issue that causes a rise in women's vulnerabilities during and after a disaster is the low participation of women in the pre and post disaster decision-making process at all levels in the Sri Lanka government. This leads to gender blindness in disaster management projects. For example, the National Policy on Disaster Management of Sri Lanka in section 13 stresses equality, diversity, and inclusion of disaster management. It states that disaster management should ensure gender equality and particularly the empowerment of women. However, there is no detailed description of the role of women in disaster management and how they become

empowered through the actual process. Furthermore, a gender perspective is not integrated in the Sri Lanka Disaster Management Act as it excluded the Ministry of Women and Child Affairs from membership on the Council. This exclusion made the Ministry invisible in terms of their role as national machinery for mainstreaming gender in DRR policies, plans, and programs (Tanaka & Nonoguchi, 2016, pp. 18–21).

Furthermore, De Silva and Jayathilaka indicate the importance of gender in DRR by bringing out the significance of gender planning for development activity in Sri Lanka. An example that arose was in relation to the proposal on the flood risk reduction project in a local district in Sri Lanka. Like the aforementioned study, De Silva and Jayathilaka observed that although gender was an item specified in the proposal, the project failed to identify gender aspects related to disaster vulnerabilities, disaster resilience and perceptions of the men and women. This was because the project planners and implementers lacked gender sensitivity as they were concentrated only on the technical aspects of the flood risk reduction project. However, the authors opine that if gender planning was undertaken, the impact would have been less, as gender gaps and imbalances could have been identified, and necessary strategies could have been adopted to bridge the gender gap and reduce these imbalances (De Silva & Jayathilaka, 2014, pp. 873–881).

In one other study, Enarson and Chakrabarti suggest that activism by women's organizations and community-based groups is instrumental to the response to violence against women in the aftermath of natural disasters and other gendered impacts of disasters. From the very first days of the 2004 tsunami crisis, the women's movement in Sri Lanka was at the forefront of highlighting the threat of violence against women and gender

bias within the relief and reconstruction process. Without women's groups voicing inadequacies and securing a greater role in post-disaster recovery, the needs of women and other marginalized groups would have been further neglected. Women's groups showed considerable energy and dedication to rebuilding communities in a way that was responsive to the inequalities on which women's vulnerabilities were based (Enarson and Chakrabarti, 2009, p. 243).

This case study suggests that incorporating women's perspective into DRR by bringing more women on board when making policies and plans minimizes the disaster vulnerability of other women. The case study highlights some similarities with Zambia. To start with, both countries are developing countries prone to disasters that see women being more vulnerable than men. In response, both countries have implemented laws and policies to ensure disaster management and mitigation, in which Zambia's NDMP has similar gender provisions with that of Sri Lanka. For example, Zambia's policy provides for guiding, yet vague, principles that take into account consideration for vulnerable groups such as women in disaster management at all levels. The lesson Zambia can learn from this case study is that to ensure protection of women from vulnerabilities arising from disasters, not only should the laws and policies be gender sensitive but also women should be able to participate in decision making. The Zambian government must take an active role to ensure that women are involved in disaster management programs and policy making initiatives. According to the case study above, participation of women in decision making leads to inclusivity of female vulnerabilities pre and post disaster. If women are frontrunners in matters that highly affect them then it is easier for them to provide solutions for their health and safety.

Therefore, if Zambia is able to incorporate these pertinent findings from the case study of Sri Lanka into its own laws, policies, programs and structures and ensure that women are able to participate and be frontrunners in decision making, then arguably women will be better responded to prior to and after a disaster.

India

Disaster management in India became a serious concern at the administrative and practical level in the 21st century. In the country's 2009 National Policy on Disaster Management, women were considered an important vulnerable group. The guidelines also suggested inclusion of women within the State Disaster Response Force to ensure that female survivors could be attended to. In community-based disaster preparedness guidelines, the participation of women in the decision-making process is encouraged as government departments and other disaster intervention agencies should facilitate recovery for women from the grassroots level. The National Policy on Disaster Management in India focuses on linking recovery with safe development and on women as a target group to encourage social, economic, and infrastructural development. According to Bhadra, women are also being prioritized for livelihood restoration efforts (Bhadra, 2017, pp. 196–207).

In one study, Sinha and Srivastava state that female leadership and contributions in DRR and community resilience are overlooked both in India and globally. This is reflected in the lack of a platform for women in formal disaster management organizations to share their needs, experiences, and priorities. Gender difference is again tilted towards men to assume greater responsibilities as per social expectations. Geographical and socio-cultural

diversity of India also gives different dimensions to these gender-based vulnerabilities of females. (Sinha & Srivastava, n.d., pp. 599–602).

To scale up DRR efforts, the GFDRR and the World Bank have supported the NCRMP and CDRRP. Together, these projects reduce the population's vulnerability to climate and disaster risk by building their DRM capacity so as to ensure equal participation of women and men in disaster planning and response. These projects have brought gender considerations into capacity building, early warning systems and risk mitigation initiatives. Building on the lessons learnt from these two projects, the government of India is working with all the coastal states to replicate these models of community participation by simultaneously encouraging both women and men to actively participate in decision making and risk reduction planning. This not only enables gender-equitable disaster preparedness and plans but also provides a sense of collective responsibility for mitigating vulnerability and risk (GFDRR/World Bank, 2016).

The case study generally suggests that scaling up women's participation is key to sustainable disaster prevention and preparedness. Mainstream interventions for DRR should essentially build on existing resilience demonstrated amply by women. This case study further indicates the similarities in India and Zambia's disaster management framework. The case study indicates that both Zambia and India have put in place laws and policies on disaster management but struggle to adequately include a robust legal framework on roles women can play in ensuring they are not vulnerable during disasters. However, what Zambia can learn from the recommendations gathered from the Indian literature is that developing a robust model that integrates gender perspectives in a

disaster management plan through female inclusion in decision making will highlight the critical areas or problems faced by the women in disasters. The development of more gender sensitized disaster management laws and policies is important as it will ensure that gender issues and women's needs are adequately recognized.

Furthermore, to ensure that women are involved in disaster management solutions, the government of Zambia can learn from India by undertaking programs and projects that cater equally to both men and women. This means that both men and women should be on the decision board in overseeing risk reduction and disaster management. The government should be able to encourage both males and females at the grassroot level and national level to participate in the initiatives put in place. All this is beneficial in ensuring that females are able to participate and in turn facilitate recovery for other females affected by disasters.

Philippines

In the relevant policy of the Philippines, women are regarded as main actors who can utilize their indigenous knowledge for DRR. However, like Sri Lanka and India, national machineries for promoting gender mainstreaming and equality do not necessarily take an active advocacy role in mainstreaming gender into those laws, policies, plans, and structures. Researchers Marco and Parcon highlight that gender inequalities constrain the control of women over important decisions that affect their lives. The authors are of the opinion that existing cultural norms in the Philippines often limit the capacity and authority of women to decide on their own and contribute to society. Women could utilize

their skills, enhance their potential and contribute to the DRR process, but traditional gender norms hinder them from doing so (Marco and Parcon, 2017, p. 1).

A gender perspective is partially integrated in the Philippines DRR Act. The Act strengthens the Philippines implementation of actions and measures for direction and mitigation in catastrophes. It aims to provide for the development of policies and plans and the implementation of actions and measures pertaining to all aspects of disaster risk reduction and management, including risk assessment and early warning, knowledge building and awareness raising, reduction of underlying risk factors, and preparedness for effective response and early recovery. Section 2 of the Act provides that DRR and management measures should be gender-responsive, sensitive to indigenous knowledge, and respectful of human rights by focusing on the importance of the protection of women. The Act further provides that the early recovery and post-disaster needs assessment must undergo a gender analysis. In section 11, it is stated that the Head of Gender and Development (Gender Focal Point), who is appointed by the Local Government Unit, should be invited to the City/Municipality DRRMC as a member. Similarly, the Act states that 5% of the total budget for each city/municipality at the local level and Departments at the central level should be allocated and utilized for women (Tanaka & Nonoguchi, 2016, pp. 15–17).

On the other hand, the DSWD and DOLE, as implementing bodies, play crucial roles in DRR, considering a gender perspective. The DSWD appoints Gender and Development Officers (Gender Focal Points) at city/municipality level, who are supposed to join the DRRMC and take responsibility for GBV issues. To ensure the security of women living in the shelters and bunkhouses, policewomen also patrol around the shelter and bunk house

areas, particularly at night. The DOLE and the DA also support the women affected by a disaster to rebuild their livelihoods by distributing in-kind relief items, cash transfer, shelter, and community driven development to meet the multiple and changing needs of the affected. They also provide special support to disaster-affected women to recover from the adverse effects of a disaster in their livelihoods or businesses (Tanaka & Nonoguchi, 2016, pp. 15–17).

Marco and Parcon highlight that while the Philippines has various, multi-level gender mainstreaming policies and activities to promote women participation in the DRRM and post-disaster rehabilitation initiatives, the implementation of these strategies must be monitored constantly. Marco and Parcon suggest that a gender perspective must be incorporated in DRR because it will not only debunk traditional gender norms that are harmful to the development of women and the community, but will also recognize the different vulnerabilities and capacities of women, allowing for a more gender equal environment. To ensure this, the Philippine Congressional Oversight Committee on DRRM is currently conducting a review and evaluation of the aforementioned Act to further improve the mechanisms and principles that the law enshrines, and this is an opportunity to dialogue with legislators on the gender aspects of DRRM (Marco and Parcon, 2017, p.2).

The case study generally suggests that it is important for women to be capacitated to respond after the onslaught of a disaster and also to be integrated into the overall DRRM strategy by taking on key DRRM leadership roles. The case study is similar to the Zambian context in that, like Zambia's NDMP, the Philippines established the national disaster relief trust fund, which is used for the provision of essential commodities to victims of any

disaster, hazard or emergency. The Philippine trust fund is also used for the restoration, reconstruction and rehabilitation of areas affected by any disaster, hazard, or emergency. A lesson point for Zambia from this case study is that the Disaster Act of the Philippines is expressive on issues of gender sensitivity in matters of disasters. Zambia's government should ensure that its NDMP is rigorously expressive on matters of gender and women's roles.

Furthermore, in line with the aims and objectives of this research, a lesson point for Zambia is that encouraging female participation even in rural areas is essential in ensuring that vulnerable women are protected from disasters.

Case Study Comparison

The above case studies generally indicate that the governments of Sri Lanka, India and the Philippines have created basic institutional arrangements for disaster management, including the development of relevant laws such as statutes on disaster management and risk reduction. These various governments have also developed disaster management laws, policies, plans as well as structures to be implemented from the national level down to the local level. However, it has been established that these legal frameworks in all three countries are not fully representative of vulnerabilities faced by females. Where women are mentioned, there is still a lack of available positions for females to represent others in decision making positions. This makes it difficult for the lawmakers to understand what vulnerabilities women undergo and the measures that can be put in place to ensure that they are not more affected than men during disasters. These are also the similar challenges Zambia faces. Thus, these case studies have assisted in identifying the positive measures

and lessons that Zambia can undertake to ensure that disaster effects on women are mitigated.

Findings and Discussion

We have outlined our findings from the literature review and stakeholder interviews into four themes, listed as follows: (1) specific provisions, (2) female representation, (3) multilevel government involvement, and (4) data driven decisions. For each of these themes, we will first recognize the main relevant points that were made, then identify specific areas of improvement that could be addressed for bettering disaster management and climate resilience in Zambia.

Specific Provisions:

As discussed in our literature review, disaster vulnerability relies on overlapping factors related to socioeconomic status and is largely context dependent. Zambia's 2015 NDMP acknowledges several causes of disaster vulnerability including poor farming practices and lack of political representation. While the policy does acknowledge that disasters tend to disproportionately affect certain demographics, such as women, it does not frame membership to such groups as a factor contributing to vulnerability.

Our interviews generally indicate that being a woman in Zambia is a risk factor in situations involving CINDs. This determination is based on accounts that describe Zambian women's unique experiences and responsibilities during disasters. Women in rural areas are often the nutritional providers in households, and thus

have an added burden during disasters that affect food production (N. Mubanga, personal communication, July 16, 2021). In flood conditions, water supplies are often polluted, making communities that draw from shallow wells at risk for diseases like cholera. In these situations, women are doubly affected, as they are expected to draw safe water and provide care if a family member becomes ill. (D. Chibamba, personal communication, July 2, 2021). Further, in certain communities where it is traditional for men to eat first, during times of scarcity, women are put at greater health risk due to malnourishment or weight loss (A. Brettman, personal communication, July 13, 2021). There are expectations for how and where women should spend their time, however, during disasters women often have to spend more of their time and labor to hold up these expectations (M. Constan, personal communication, July 26, 2021). These examples of different norms demonstrate that women's vulnerability generally increases with disasters, as they are expected to take on additional responsibilities for the sake of the household.

While these issues are related to gender, they are also connected to other issues, such as water access and climate-adaptive agriculture. Disaster vulnerability is intersectional, and thus, to decrease the burden on women, tangential programs need to be implemented. As referenced in our literature review, a common criticism of the Sendai Framework that can be applied to the 2015 NDMP is the lack of actionable items that reduce women's vulnerability. In line with this, one of our stakeholders indicated that communities benefit most from and need actual programs that can be implemented rather than theoretical support (A. Brettman, personal communication, July 13, 2021).

Intersectional programs can be directed at certain demographics and also help make entire communities more climate resilient. Programs such as the PPCR, led by the World Bank and Ministry of National Development Planning, or the SCRALA, run by the UNDP and the Zambian government, feature gender initiatives within their larger programs (N. Mubanga, personal communication, July 16, 2021). Such initiatives provide tangible ways for gender to be mainstreamed on a community level.

These programs further provide a way for Zambia to execute the goal of being proactive in disaster response, as outlined in both the 2015 NDMP and the Sendai Framework. Programs already embedded into communities prepare them to better handle disaster situations before they occur. This demonstrates a proactive approach to management rather than a responsive, retroactive approach (N. Mubanga, personal communication, July 16, 2021). These deliberate programs are especially useful, as sometimes when there is a disaster, there can be little government or third-party aid (A. Brettman, personal communication, July 13, 2021).

Areas of Improvement in Specific Provisions

To fill the lack of specific programming in the NDMP, we have put forth two suggestions. Firstly, we recommend that the policy include being female as a risk factor in disaster situations and additionally, detail how gender predisposes women to experiencing disasters disproportionately. These statements are important, as they recognize the experiences of many women in Zambia. Moreover, by citing examples of how gender affects

women in disasters specifically, these statements can further mainstream gender concerns in disaster management.

Secondly, we recommend that the document recognizes the need to create and collaborate on intersectional projects to address gender inequality. In order to give women immediate relief in disasters, there is a need for proactive community level projects that address everyday concerns. By detailing such projects in the NDMP, the government furthers those initiatives.

Female Representation:

As discussed in the literature review, the 2015 NDMP addresses disaster management in Zambia. The policy acknowledges that disaster effects are selective, affecting mostly women. In effect, the policy indicates that specific consideration to women in disaster management must be prominent at all levels. The policy further indicates that there must be mainstreaming of gender issues and planning in assessment of different vulnerabilities of both men and women to ensure that disaster response is equal. However, even with these provisions, the institutional arrangement for national disaster management barely has any seats exclusively reserved for females. The only mention of a gender specific role is found under the Satellite Disaster Management Committee, where one woman and one man from the local community must be part-time members on the committee.

Our interviews generally indicate that women tend to be more vulnerable than men when a disaster occurs due to a variety of factors. To start with, women are considered to have the most responsibility at home, so when a disaster occurs, the disasters find them taking care of their households whilst men are out in the field doing work (D. Chibamba,

personal communication, July 2, 2021). In some instances, women are most vulnerable because they are not taught how to swim due to cultural barriers. Other stakeholders have indicated that women have better coping capacities and mechanisms hence it is key that women highlight their vulnerabilities by being part of policy and law-making platforms (G. Kai, personal communication, July 19, 2021). As referenced in the literature on case studies, the major issue that causes a rise in women's vulnerabilities during and after a disaster is the low participation of women at all levels in the disaster management making process. There is a higher chance that lack of participation of women leads to gender blindness in decision making. The literature further indicates that laws and policies on disaster management can be actualized through the increased engagement of gender sensitive and female led organizations and communities to enhance disaster response.

As referenced in the literature, criticisms of the Sendai Framework can be utilized to better Zambia's disaster regulatory framework. The framework recognizes the fundamental role of women in DRR. It highlights that women and their participation are critical to effectively managing disaster risk and implementing gender sensitive DRR policies, plans and programs. These roles are however interpreted differently and applied in different contexts by countries. The Sendai Framework has been criticized for broadly championing the representation of women in disaster management, rather than specifying the need for women from vulnerable communities to be represented. It is broadly accepted that disaster vulnerability is an intersectional issue, and thus, women from underrepresented socioeconomic groups should be prioritized in disaster management decision making bodies in order to address their most pressing concerns.

Further interviewees highlighted that gender mainstreaming is key as women have a very important role to contribute to resilient building. When it comes to DRR, there are things women are better at doing that need to be documented. Hence policies, programs and plans need to be aligned with gender issues. Lawmakers need to take into account issues of indigenous knowledge of women. These key cutting issues are principles of better disaster risk management as gender inclusion is needed in every part of society (G. Kai, personal communication, July 19, 2021).

At the actual policy level, women's issues are often not prioritized. This is seen in the NDMP where the Ministry of Gender is absent (A. Brettman, personal communication, July 13, 2021). To ensure representation, gender and disaster risk management platforms can be integrated. It must be realized that women have important roles and need to be empowered. The goal of having such a platform is to ensure that more women are brought on board so that they can share their stories which will assist in enacting laws and policies that represent their needs. To ensure the documents on DRR are robust, countries must create knowledge sharing and empower women activists and scientists to document best practices among women and empower them to speak on their vulnerabilities (G. Kai, personal communication, July 19, 2021). Similarly, for women to be included in the decision making process, women empowerment programs must be established. These programs must take into account different aspects of tradition or customs that prevent women from taking up such major roles in society. These women empowerment programs should also focus on ways they can overcome these cultural barriers. The programs must also create a comfortable environment that encourages women to participate in disaster related matters (R. Seri, personal communications, July 27, 2021).

Further, gender mainstreaming cannot only be captured in national policies and international frameworks. As discussed in the previous section, there has to be another level of operational planning or projects that translate these issues into reality. Programs such as the PPCR have included a good deal of engagement of women in micro-project identification and implementation, providing valuable lessons for future interventions. The project is important because it seeks to strengthen the regulatory framework by providing assistance to the government and local levels to ensure that future climate related liabilities are identified and well managed. The PPCR has a huge gender focus, as in this project, women are considered as effective leaders within their communities when it comes to addressing the harmful effects of climate change. When it comes to decision-making and implementation towards building resilient communities in the face of climate change, the full and meaningful participation of women in these projects becomes essential. There is a deliberate move to have female representatives to create roles within their cooperatives so as to promote participation of other women (N. Mubanga, personal communication, July 16, 2021).

Areas of Improvement in Female Representation

We have made two suggestions to better prioritize female representation in the NDMP. Firstly, we recommend that one gender specific slot on each institutional committee on disaster management in the NDMP be reserved for a female. This is important because females taking part in implementing laws and policies will be able to capture the vulnerabilities of other females and create frameworks that protect women from being highly affected during disasters. These females on board must not only include educated

women, but also women from actual communities that are vulnerable to the disasters. Zambia's policy provides for guiding, yet vague, principles that take into consideration vulnerable groups such as women in disaster management at all levels.

The second suggestion is that projects and plans that are female-led must be put in place. This is important because only having policies is not sufficient to capture the vulnerabilities of females. There is a need for projects and plans that are able to assess different vulnerabilities and needs of women for better disaster response. These projects and plans should not only include gender as a focus but also female leaders who are able to capture the vulnerabilities of other women affected by disasters at both the local and national level. Having women as part of the decision making process is important as women play a central role in their communities and have greater insight into the needs of other vulnerable women. Like the case studies in the literature have suggested, scaling up women's participation is key to sustainable disaster prevention and preparedness.

Multilevel Government Involvement:

The third thematic finding from our research is the necessity of multilevel government involvement in Zambian disaster management and response. Because CINDs not only affect multiple areas of society, but also varying levels of government, it is important to ensure that there is a streamlining of information and involvement horizontally across different national ministries, but also vertically between the national and local divisions.

Regarding horizontal inclusion and the 2015 NDMP, some of our interviewees noted that certain, relevant divisions were not included in the drafting of the

document. For example, although the policy makes several nods towards the acknowledgment of high-level gendered issues, as mentioned before, it was found that the Ministry of Gender was not involved in the development of the policy (A. Brettman, personal communication, July 13, 2021). As discussed in our literature review, in 2017 the Ministry of Gender put forth its own document, the ccGAP, that specifically addresses women's role in DRR by creating different objectives, actions and indicators. While the ccGAP was published after the 2015 NDMP, it does demonstrate the Ministry of Gender's knowledge and commitment to women's role in disasters. It was also noted that the Zambia Meteorological Department was not a stakeholder involved in the drafting of the 2015 Policy, further outlining the disconnect between national governmental stakeholders. As demonstrated, the 2015 NDMP does not lean on many other ministries for support, and thus may have been created on an incomplete view of the situation.

Stakeholders also noted that there is an insufficient system of vertical information dissemination between the national and local divisions of government, specifically regarding Zambia meteorological data. Important information about disaster preparedness and prevalent weather patterns are generated at higher government levels through the Zambia Meteorological Department (N. Mubanga, personal communication, July 16, 2021). However, once this information is gathered, there is a gap of communication and relay between the larger, collecting bodies and the smaller, local units. This is especially true when preparing for natural disasters, as early warning systems are critical for disaster management and response, yet

difficult to utilize when high level weather predictions are inadequately translated to lower levels of government.

Linkages between higher and lower levels governments are not only important for meteorological data, but also for planning and implementing effective programs within communities. Zambia is a diverse country. Different communities are prone to different types of disasters, have various livelihoods and distinct social norms. Thus, for programs that promote climate resilience to be effective, they need to recognize communities' specific needs and vulnerabilities (M. Constatas, personal communication, July 26, 2021). In order to gather accurate information about communities, locals must be actively included in the drafting and prioritizations of larger initiatives.

The last key finding regarding Zambian multilevel involvement is that the 2015 NDMP does not detail how multinational organizations, such as the UNDP and African Union, can help support disaster management initiatives (G. Kai, personal communication, July 19, 2021). As discussed in previous sections, multinational organizations have established crucial programs that advise on disaster management and response in multiple African nations, including Zambia. They currently have active initiatives in various regions of the country to address different underlying issues of disaster vulnerability, yet the role of these non-governmental organizations are unnoticed in the NDMP.

Areas of Improvement in Multilevel Government Involvement

Based on these findings, we were able to make three recommendations to address the aspect of multilevel government involvement for disaster response: (1) include different, relevant ministries in policy development, (2) utilize communal and multinational networks to spread information and (3) actively involve local communities in decision making

The first area of improvement is to ensure the invitation of different ministries to advise on relevant policies that fall in their corresponding specialties. For example, with the 2015 NDMP, the Ministry of Gender should be consulted to address the aspect of female vulnerabilities and roles within the various committees. Furthermore, the Zambia Meteorological Department should also be consulted for matters on the collection and dissemination of important weather-related information.

To elaborate further on our suggestion with the Zambia Meteorological Department, our second identified area of improvement is to better the dissemination of collected data. They can do this by using their local networks and potentially also utilizing outside, multinational corporations to organize stronger ties in vertical levels of foreign and domestic governments. For example, increased utilization of cellphone-based technologies may be beneficial in disseminating information to regions and people where physical access and interaction may be limited (M. Conostas, personal communication, July 26, 2021).

Further, our third suggestion includes recognizing every community's unique set of circumstances and including local stakeholders in creating programs tailored to such circumstances. This suggestion is vital to the success of climate resilience initiatives, as it would better address the challenges of specific communities.

Data-Driven Decisions:

Our final thematic finding was the concept of data driven decisions. In the literature review, it was recognized that current policies and interventions don't explicitly establish systems for collecting data or measuring the success of these programs. This was identified to be a gap in current policies, as there was no clear acknowledgment of how these interventions were being measured, or moreover, how they were chosen for population-level execution in the first place. This concept was furthered through our findings from the stakeholder interviews.

Firstly, our interviews have indicated that there is a lack of available gender-disaggregated data. This refers to collected statistics that can be further separated or viewed by male vs. female, which allows for the measurement of their differences on various dimensions. On both the national and regional levels, it was stated that gender-disaggregated data is difficult to obtain, and furthermore, difficult to update (G. Kai, personal communication, July 19, 2021). The lack of gender-disaggregated data appears to be an obstacle in other disaster-prone countries as well, as the Sri Lanka case study also demonstrated a need for improved datasets in this area. Because of this lack of comprehensive data, it can be challenging to monitor and identify the specific problem and population subgroup that needs to be targeted. For example, if data explicitly shows that females are the ones suffering more from a certain type of disaster, policymakers should know that they need to enact contextually appropriate interventions to target this specific population (G. Kai, personal communication, July 19, 2021). Tying in with our findings from the literature review, data can also reveal further subsets of the female population that

particularly need intervention, such as those in certain socioeconomic or geographical divisions. A baseline is needed to determine how many women are likely to be affected, to what extent they are going to be affected, etc. This can allow leaders to better equip women to prepare and respond to these disasters (D. Chibamba, personal communication, July 2, 2021). However, it is acknowledged that an availability of disaggregated data may not necessarily translate to informative decision making on the governmental level, as policymakers may still fail to adequately utilize the available data.

Secondly, interviewees have also noted that there is a gap in the monitoring aspect of how well communities and policies are doing, as there is a general absence of disaster resilience indicators. As alluded to in the literature review, policies have largely failed to disclose how they actually measure the effectiveness of their programs and interventions. This may potentially be due to the fact that there is currently no uniform or established way to measure disaster resilience. Furthermore, it was noted that there is also a lack of indicators to evaluate the effect and extent of women's participation in CIND management. One of our interviewees suggests that some reasons for insufficient indicators may include limited physical access to the areas that need measurement, as well as the absence of enough funding and contextual understanding to implement adequate analytical tools (M. Conostas, personal communication, July 26, 2021). Regardless of the underlying causes, it was concurred that these measurements need to be made in order to collect information on whether the organizations are actually hitting their targets, whether it's the 2030 SDGs or other, country-specific goals (G. Kai, personal communication, July 19, 2021).

Because of the limited nature of investments, these indicators are necessary to ensure that funding is being used effectively to produce the desired results within a reasonable timeframe (M. Conostas, personal communication, July 26, 2021).

The final key point within this theme has to do with the dissemination and interpretation of this data to/by the local populations. This point overlaps with the previously mentioned idea from the Multilevel Government Involvement area, as it continues to address the importance of streamlining relevant information from upper to local levels. Locals, farmers, and women are arguably the ones who most need the access and knowledge about meteorological and other related data, since weather-related information primarily affects them (N. Mubanga, personal communication, July 16, 2021). Despite the importance for these populations to have access to this information, it is often difficult for them to obtain such data, since many may not have sources, such as telephone and radio, social media, or news outlets, where they can rapidly acquire it (G. Kai, personal communication, July 19, 2021). Existing systems have been known to be slow in disseminating information to relevant populations, as it often takes a few days for it to reach them (G. Kai, personal communication, July 19, 2021).

In relation to the interpretation of data by locals, it is important for there to be effective and culturally understandable communication of such figures. In the example of meteorological data, if scientific research demonstrates that it is going to rain x amount in the next year, what does this mean for the local farmer? Such information needs to be communicated in a way that allows locals to understand the

implications of the situation and allows them to subsequently adapt their farming and agricultural practices for the year.

Areas of Improvement in Data Driven Decisions

In the recognition of this gap in data driven decisions, we were able to pinpoint three areas of improvement based on the literature and stakeholder interviews. The specific areas of improvement within the theme of data driven decisions were identified to be the following: (1) increase female participation in data collection, (2) establish and monitor more disaster resilience indicators, and (3) improve data communication to locals.

Firstly, women should be more integrated in the data collection and dissemination process. Participation of women in this process is vital, as they are more likely able to easily collect accurate data from the communities (G. Kai, personal communication, July 19, 2021). Because women are usually more involved in the communities due to their traditional caretaking roles, they often have more personal connections with the other local women and would also be more able to provide relevant statistics about their households. Thus, it is important to ensure that women are involved in data systems and processes.

The second suggestion revolves around the expansion and utilization of disaster resilience indicators. As mentioned before, indicators are necessary to evaluate the effectiveness of current policies/interventions, and to assess potential steps or improvements moving forward. Standardized measurements should also be established to ensure the continual participation of women in these operations. Some possible indicators could include the regular collection of statistics, such as the attendance of women in

disaster management committees and local communities in general (J. Mukumwa, personal communication, July 22, 2021).

The final area of improvement in data driven decision making is to improve the communication of data to the local community. Not only should there be a greater distribution of data from the national to local level (as mentioned before), but this data should also be communicated in a way that is correctly interpretable by the affected population. This can be done through the involvement of locals in the data collection and dissemination process. By involving those from the target populations, there will be communication and representation that address the actual statistical needs and knowledge of the people. In relation to this final suggestion, it is also important to advocate for policymakers' increased utilization of these disseminated datasets, so that they're able to make data-informed decisions at all levels of government.

Conclusion

Climate-induced natural disasters have a significant impact on all aspects of society, including factors related to health, food security, and the economy. During such events, women are often disproportionately affected in Zambia, due to their traditional roles of providing and caring for the family. Gender is acknowledged in the 2015 NDMP; many of its details do not go far enough in their implementation on the ground.

In order to analyze CINDs in Zambia and assess how women are currently involved in disaster management programs, we conducted a three-pronged literature review focusing on the Zambian and international context, in addition to interviewing several experts. Through this research, we were able to identify four overarching themes for

improving disaster management and response in Zambia. These themes are the following: (1) specific provisions, (2) female representation, (3) multilevel government involvement, and (4) data-driven decisions. In our literature review, we analyzed Zambia's current management landscape, international disaster frameworks, and comparable case studies, the findings of which could be relied on to address the areas of improvement in the disaster management framework. We have also identified several actionable suggestions for the newest iteration of the NDMP to take into consideration. Because climate-induced disasters affect all members of a community, we have also collected a set of recommendations to address the social and economic repercussions that affect other locals, besides women as well.

To address the disproportionate effects of CINDs on women, it is imperative that policies like the NDMP actively prepare for such disasters. Moving forward, we suggest that the government make improvements in NDMP in four categories corresponding to the themes listed above: (1) To include more specific provisions, we suggest that the NDMP emphasize the importance of intersectional projects that address gender inequality and recognize being female as a risk factor in disasters. (2) Furthermore, local communities should work on ensuring equal female representation in disaster management decision-making bodies, in addition to capitalizing on women's unique skills to make communities more climate-resilient. (3) We further suggest the NDMP actively engage other government departments and local communities, such as the Ministry of Gender and Department of Meteorology, and intergovernmental bodies such as the World Bank and UNDP. (4) Lastly, we discuss and recommend that the NDMP pivot towards a more data-driven model, by putting disaster resilience indicators in place and involving women in both the

dissemination and collection of weather-related information. It is also important for the government to implement culturally and regionally sensitive interventions that address the livelihoods and day-to-day intricacies of the local populations, to shift to a more quotidian sense of disaster preparedness. As CINDs become more frequent in Zambia, the need to acknowledge women's experiences during disasters and empower interdisciplinary interventions only grows.

Limitations:

It is worth mentioning that there were a few challenges that were presented throughout this research process.

Firstly, due to the limitations of an online/virtual environment, it was difficult to find stakeholders to interview. Not only did this limitation present itself in terms of the lower quantity of interviewees, but also in the breadth of the type of people we were able to speak with. Although we were able to interview several people involved with actual program implementation and planning, we were not able to interview local people who were directly affected by the said disasters.

Secondly, our project focused specifically on the 2015 NDMP; however, it is acknowledged that there are other policies and plans in place that also discuss disaster relief in Zambia. These first two limitations may have prevented us from obtaining a fully comprehensive view of the situation.

Furthermore, in the literature review, we made the decision to attribute our Case Studies section to the disaster situation in other foreign countries that were relatively similar to the Zambian context. From this, we made assumptions about their best practices, although this may not fully translate to the context in Zambia.

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