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USING MODELS TO DEAL WITH HAZARDS AND DISASTERS: A TRAJECTORY TOWARDS EFFECTIVE DISASTER MANAGEMENT IN ZIMBABWE

Ernest Dube
Department of Development Studies, Midlands State University, P.O B0x 9055, Gweru, Zimbabwe
ernestdubeh@yahoo.co.uk

Abstract

The contribution of models in the management of disasters has been less understood by some practitioners. As such, the use of models seems to have been ignored by policy-makers and practitioners when dealing with all forms of disasters in Zimbabwe. Various kinds of hazards and disasters in Zimbabwe, that include droughts, floods, cholera epidemics and veld fires have heavily impacted communities, resulting in the complexity of disaster management that calls for the use of models. This desktop study sought to analyze the contribution of models in managing hazards and disasters in Zimbabwe. The study was based on a qualitative literature survey and document analysis. Through literature and document analysis, the study found that models are crucial in disaster management as they can simplify practitioners' understanding of hazards and disasters. Models are also a useful and indispensable decision-making support tool as they can assist the practitioners to make appropriate decisions. The study further found that models that are common to the practitioners included the traditional model, expand-contract model, and the disaster crunch model. Furthermore, a close relationship exists between the disaster

management models. Most of the models are based on the disaster management phases of mitigation, preparedness, response and recovery. Since the models play a significant role in the management of hazards and disasters, the study concluded that they are an indispensable tool and a proper trajectory towards managing disaster events in Zimbabwe. Therefore, the study recommends the adoption of the models in the management of all forms of disasters. The significance of this study is in its potential to inform policy and practice. The future scope should focus on the nature of models applicable to selected disaster situations in Zimbabwe.

Keywords

Disaster, Disaster Management, Disaster Management Models, Hazards, Practitioners

1. Introduction

Zimbabwe, in addition to South Africa and Mozambique, is one of the countries in Southern Africa with a history of being affected by different kinds of disasters. Disasters in Zimbabwe have increased in intensity and frequency in recent times, with the country experiencing disasters such as floods, drought, veld fires, AIDS pandemic, cholera outbreaks and transport accidents (Dube, 2015; Sillah, 2015). Disaster statistics can reveal that between 1980 and 2010, 35 natural disasters mainly droughts, floods, cyclones and epidemics have been recorded in Zimbabwe, resulting in 6 448 deaths (Prevention Web 2012). The total number of deaths from these natural disasters translates to an average of 208 deaths per year, which is very high figure that should not be tolerated. Chaminuka and Dube (2017), note that the poor have been the most vulnerable to disasters in human societies. Although the disasters have been managed through various ways, the interventions employed by the Zimbabwe government through Civil Protection Unit, a body mandated with the management of all forms of disasters, have at times been ineffective owing to lack of use of disaster management models. The concept of disaster management models, as an aid to deal with hazards and disasters is a practice that originated some years ago. Some scholars and practitioners argue that models are needed in order to improve existing systems (Salazar, 2015).

According to Baird (2010), the need for the use of models in disaster management was first advocated by Kelly in 1998, and since then models have been used to describe, examine, and understand disasters. Models can as well be used to manage various forms of disasters in Zimbabwe in order to improve practitioners' efficiency. This is so because the concern of

governments, disaster managers and other like-minded practitioners has been that disasters have resulted in huge human, material, economic and environmental losses in the country. According to Das (2017) adverse shocks or threats to human development in societies can be attributed to natural disasters as well. Such losses can be averted if the disasters are properly managed. Globally disasters are occurring in larger scale, calling for policies and measures that analyze their causes and consequences in order to strengthen the resilience of individuals, communities and institutions (Hai & Smyth 2012). For example, China, Iran, Russia, Peru and Turkey are countries enlisted as having the highest number of people killed from earthquake disasters in the last 60 years (Akdag 2002). It was from such huge impact and massive losses from disasters, that disaster practitioners and scholars alike, saw it prudent to come up with models as an aid to managing disasters and other calamitous events.

The aim of disaster management is to reduce or avoid the potential losses from hazards, to ensure prompt and appropriate assistance to victims of disasters and to achieve rapid and effective recovery (Othman & Beydoun 2012). Asghar, Alahakoon and Churilov (2006) note that in 1998, Kelly advocated the need for theoretical models that would help simplify the complexity of the disaster management system, and possible minimize disaster impact. This was after the realization that disaster management may involve a large number of players, resulting in chaos, confusion and conflict if there is no proper model put in place. This is one of the reasons this study is supporting the adoption of models in the management of disasters in Zimbabwe. Because of the growing concern about the increasing disaster losses, a number of models for dealing with disasters have therefore, been added to academic literature, with the models being categorized into four types encompassing logical models, integrated models, causal models and models that do not fall under any of these categories (Asghar et al. 2006).

In order to analyze the contribution and usefulness of disaster management models in Zimbabwe, this study was based on the following three principal objectives:

- To discuss the purpose of models in the field of disaster management
- To establish the common types of models used in disaster management
- To analyze the contribution of models in the management of disaster events in Zimbabwe

It is from the above stated objectives, that the study later came up with its findings, recommendations and conclusions.

1.1 Statement of the Problem

Some scholars, policymakers and practitioners continue to ask themselves about the contribution of models in the management of disastrous events. The main source of concern being that despite the growing number of disasters, the contribution of models in disaster management seems to be less understood. In Zimbabwe while some practitioners seem to be skeptical about the contribution of models, they also seem to lack appropriate knowledge on the usefulness of the models. As such, this study argues that disaster management strategies in Zimbabwe, which are usually implemented though the Civil Protection Unit, have been less effective due to either none use of or little knowledge of the models. As a result, the communities have continued to lose property, human capital, and livelihoods due to poor disaster management approaches that are devoid of models use. Platt (2015) asserts that from his disaster management experience, models are little used by disaster managers. Fussel (2007) gives examples of the pressure-and-release model and the resilience approach model, which he feels have not been widely applied in the context of climate change.

In Zimbabwe, models have scarcely been used despite the continued occurrence of many disasters that have resulted in major human, material, economic and environmental losses. Even where models have been used, they have contributed little to the field of disaster management because they seem to be less understood by practitioners. However, Alexander (1997) noted that there is room for improvement in the use of models so that losses such as deaths resulting from disasters can be reduced. The use of some models has also ignored the gendered aspects of vulnerability and capacity in disaster management, leading to their contribution being (Hai & Smyth 2012). This study strongly argues that if models are not properly applied in the management of hazards and disasters in Zimbabwe, communities would continue to suffer huge losses. As such, the contribution of models when dealing with disasters in Zimbabwe needs to be improved. When effectively used, disaster management models may help in minimizing disaster impact and losses.

2. Literature on Disaster Management Models

Literature on the use of disaster management models has continued to grow as scholars try to navigate the disaster management terrain. As a desktop research, this study interrogated the body of literature in order to understand the contribution of models in the management of

disasters in general and in Zimbabwe in particular. As part of the literature study, document analysis of the most recent scholarly publications was done in order to understand the purpose of models; common types of models used in managing disasters; and the contribution of models in managing disasters. These are the principal objectives that this study sought to fulfill. The term model according to Klein and Romero (2007: 243) refers to 'a system of functions and conditions that yield formal results ...'. It is such a system, that this study envisages should exist in the management of various forms of disasters in Zimbabwe so that the results desired by practitioners can be achieved.

2.1 The Purpose of Models in Disaster Management

Models in disaster management can serve many purposes in shaping many lives in human societies. One such purpose is that models can simplify one's understanding of how things happen, for what purpose and how problems affecting people and their environment can be solved. Hussain (2013) notes that in the field of disaster management, models are based on the understanding that disasters are temporary interruptions to development processes, and that the job of disaster practitioners is to take appropriate action to quickly return to the normal the course of development. This suggests that models are there to be implemented and enforced by disaster practitioners, a situation that should be prevailing in a country like Zimbabwe. However if models are not properly enforced, even good models may turn out to be of little significance. Kelly (1998) has proffered four major reasons to demonstrate the purpose of models in disaster management. The reasons are as follows:

1. Models can be used to simplify complex events through distinguishing between critical elements. The usefulness of models is more realized when there is need to respond to disasters within a short possible time.
2. Comparing actual conditions with a theoretical model can lead to an improved understanding of the prevailing disaster situation, and thus facilitating the planning process and the effective implementation of plans related to disaster management.
3. The presence of a model for disaster management is also an essential element in quantifying disaster situations or events.

4. When documented, models help to establish a common understanding between various stakeholders involved in managing disasters. It also affords the smooth integration of disaster relief and recovery efforts.

By closely scrutinizing the four main conditions of models given by Kelly (1998), one is rightly tempted to conclude that the use of models in disaster management cannot be dispensed with. It is clear that good disaster management models can quantify disaster events in Zimbabwe through determining measurable losses from disasters. Disaster management models can therefore, play a significant role in Zimbabwe if they are properly implemented.

2.2 The Most Common types of Models used to Manage Disasters

Various models have been used by practitioners to manage hazards and disaster events in the field of disaster management. Through document analysis, this study identified and discussed four common types of disaster management models. These are the prominent models that have been used regularly in the field. The four models identified by the study are the traditional model or disaster management continuum model (ADPC 2000), the expand-contract model (Marcus 2005), the disaster crunch model (Blaikie et al. 1994), and the Kimberly model (Kimberly 2003).

2.2.1 The Traditional Model

The traditional disaster management continuum model is the earliest model to be used in the field of disaster management. The model (Figure 1) views the management of disasters as a continuous process rather than a static event. According to ADPC (2000), the traditional continuum model comprises the four distinct phases of mitigation, preparedness, response and recovery.

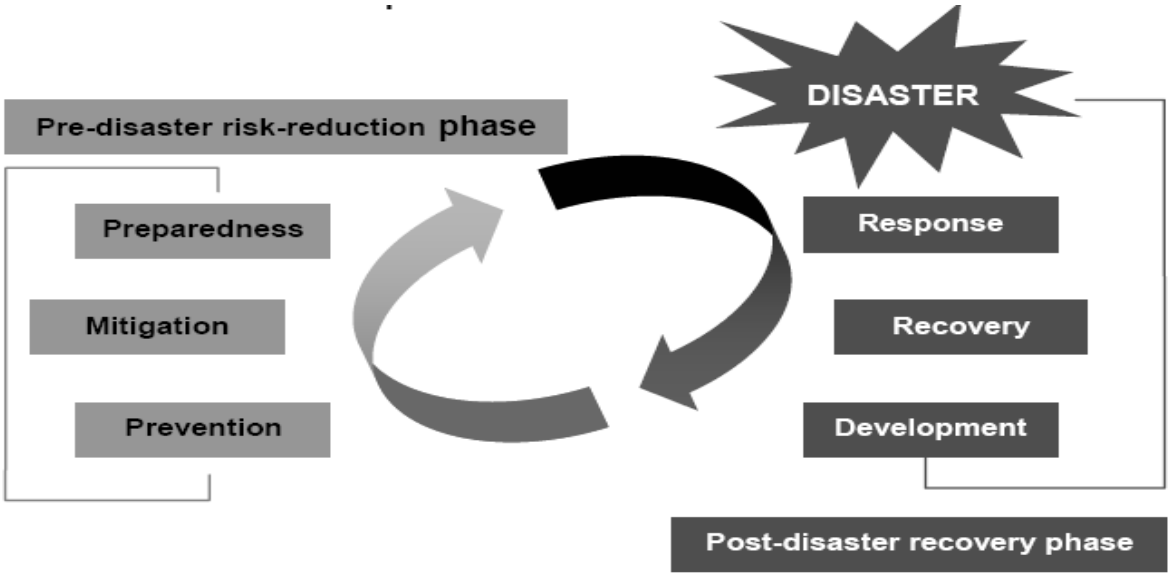

Figure 1: *The Traditional Continuum Model*

Source: Coburn, A.W., Spence, R.J.S. & Pomonis, A. (1994). Disaster mitigation, 2nd edn. Cambridge Architectural Research: Cambridge.

The traditional model (Figure 1) assumes that hazards and disasters can be managed through a sequence of activities in each of the main four phases of mitigation, preparedness, response and recovery. According to the traditional model, activities which are aimed at reducing the negative effects of potential disaster are carried out during the first stages of the model. This model can be applied in the management of disasters in Zimbabwe because it is easy to understand and implement. The model also makes it easy to understand and appreciate disaster events. The traditional model is simple to follow and puts mitigation and preparedness phases before occurrence of disaster, whilst response and recovery phases come after disaster impact.

The mitigation phase entails eliminating or reducing the threats as possible and appropriate (Manitoba 2000). It is worthwhile to note that mitigation also encompasses some elements of the preparedness phase, for example, the provision of early warming, public education and resource mobilization. The preparedness phase on the other hand, consists of putting in place systems which can handle any possible disaster. For instance, response mechanisms, vulnerability assessment and setting up an institutional framework. Sillah (2015) adds that the preparedness phase involves putting in place measures that allow people to react in the face of disaster. However, this phase does not nullify occurrence of any possible disaster. The response stage follows soon after disaster occurrence, with its major aim being to provide

essential emergency services to the disaster affected populations. This phase entails activities such as search and rescue, distribution of food items, and provision of medication. After the response phase comes recovery, which is the last stage of the traditional model. Recovery entails long term actions taken after disaster impact with, a view to restoring infrastructure and services (Baas, Ramasamy, DePryck & Battista 2008). For example, it entails amongst other programs, the construction of permanent infrastructure such as houses, dams, roads, and railways.

Critics of the traditional model have however argued that the model seems to focus a lot on activities for mitigation, preparedness, response and recovery. As such, the model seems to overlook a proper analysis of disaster risks and vulnerabilities in communities. It is further argued that the model also seems to ignore how to deal with the distribution of resources to the affected populations. The traditional model can however, be used as a form of intervention towards managing disasters in Zimbabwe because of its usefulness. The next subsection discusses the expand-contract model (Figure 2), which some scholars argue was created to cover some weaknesses of the traditional model.

2.2.2 The Expand-Contract Model

The expand-contract model (Figure 2) challenges the sequential structure of activities proposed in the traditional model, while advocating for community involvement in disaster management. Therefore, the model is a community-based disaster management tool, as it assumes that disasters occur when a hazard overwhelms a vulnerable community.

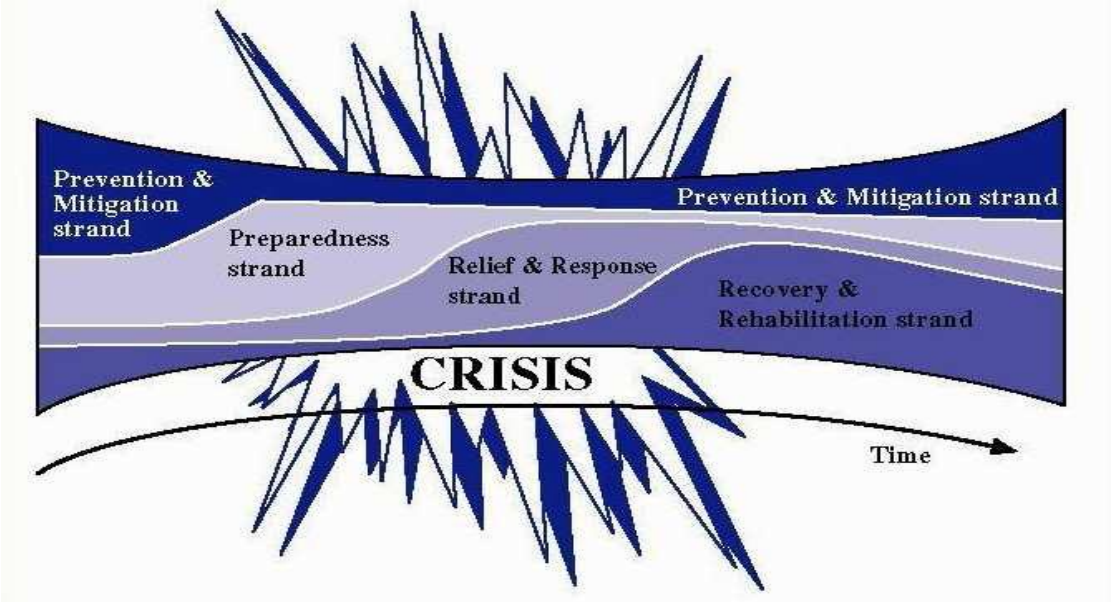

Figure 2: *The Expand-Contract Model*

Source: Atmanand, R. (2003). Insurance and disaster management: The Indian context. Disaster Prevention and Management, 12(4):286–304. http://dx.doi.org/10.1108/0965356 0310493105

According to DPLG-2 (1998), activities in the expand-contract model (Figure 2) can occur simultaneously, and also continue side by side, expanding or contracting as needed. Each strand of the model varies, depending on the existing relationship between the hazard and the community's conditions of vulnerability. This therefore, suggests that many activities for disaster interventions can be carried out at the same time when dealing with various disasters in Zimbabwe. During disasters situations, the expand-contract model highlights that vulnerabilities of communities are more pronounced than the capacities that the communities possess (Kieft & Nur 2001). According to Dube (2015), a notable feature of the expand-contract model is that it overcomes the major weaknesses of the traditional model, which views disasters as managed in a phased sequence.

However, just like any model the expand-contract model is not without criticism. One notable limitation of the model is that it explains the parallel nature of activities, without explaining the cause and effect relationship. Furthermore, the expand-contract model does not explain the available disaster risks. The weaknesses of the cause and effect perspective that the expand-contract model ignores, can be addressed by the strengths of the disaster crunch model (Figure 3). However, despite its weaknesses, the expand-contract model can still be useful in analyzing disasters in the Zimbabwean context.

2.2.3 The Disaster Crunch Model

The disaster crunch model (Figure 3) has been viewed as a framework of understanding and analyzing the causes of disasters (ADPC 2000; Heijmans, 2001; Caymaz, 2004). This is one aspect that the expand-contract model ignores.

Figure 3: *The Disaster Crunch Model*

Source: Blaikie, P., Cannon, T., Davis, I. & Wisner, B. (1994). At risk: natural hazards, people's vulnerability and disasters. Routledge: London.

According to Blaikie et al (1994), the crunch model (Figure 3) adopts a cause and effect perspective because of its focus on the causes and impact of disaster. The model is also understood to analyze vulnerabilities and coping capacities of disaster affected communities.

According to the crunch model (Figure 3), the progression of vulnerability of a community is revealed. Furthermore, the underlying causes that fail to satisfy the demands of the people are identified (Asghar et. al 2006). This model goes further to estimate the dynamic pressures and unsafe conditions (Figure 3). The model is important as it can help practitioners to understand and react to people's vulnerability to disasters (Hai & Smyth 2012). It therefore, explains the relationship between natural hazards and vulnerabilities of communities, making the model applicable in Zimbabwe disaster situations. Hai and Smyth (2012) assert that the crunch model helps practitioners to understand and react to disaster vulnerabilities facing people. According to this model, a disaster happens only when a hazard affects vulnerable people (Hai & Smyth 2012). Cyr (2005) notes that pressure can be released on those communities vulnerable to risk by decreasing or eliminating the various root causes, dynamic forces, and/or unsafe conditions available.

However, the disaster crunch model has also not been spared from criticism of scholars and practitioners. Turner et al. (2003) have argued that the crunch model lacks the feedback in the system. Cutter et al. (2008) noted that the model tracks the progression of vulnerability from the root causes, through to dynamic pressures, and to unsafe conditions, but fails to adequately address the coupled human–environment system associated with the proximity hazards. Despite its weaknesses, the advantages of crunch model can be employed to study and understand hazards and disasters in Zimbabwe.

2.2.3 Kimberly's Model for Managing Complex Disaster Events

Kimberly (2003) also came up with a model, which he also condensed to the four phases of mitigation, preparation, response and recovery (Figure 4).

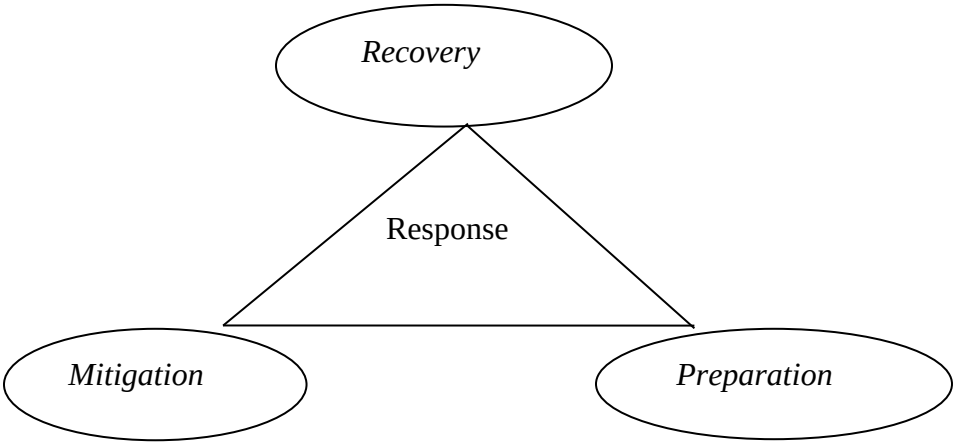

Figure 4: *The Kimberly Model*

Source: Kimberly (2003). Disaster preparedness in Virginia Hospital Center-Arlington after Sept 11, 2001. Disaster Management and Response, 1(3): 80-86.

According to the Kimberly model (Figure 4), mitigation and preparation stages of disaster management are located at the bottom level, whilst the recovery stage is situated at the top. The model also shows the response phase as the largest, longest and most visible stage of disaster management (Albtoush, Dobrescu & Ionescou, 2011). However, this study argues that the recovery stage is largest and longest phase of disaster management. However, the model still remains suitable for managing complexity in disasters in the Zimbabwean set up. By situating the stages of mitigation and preparation at the same bottom level of the model (Figure 4), the model suggests that the two phases are the driving force for successful disaster response. The recovery stage is at the top of the model, as it illustrates what remains after the response stage. In

addition, this study argues that the recovery stage is at the summit to emphasize it as the longest and costly period of disaster management.

One weakness of the Kimberly model is that it can be used only in specific disaster situations, as it requires suitably trained employees in order to effectively deal with all the stages of disaster management. The model also has a bias towards the management of disasters occurring in health institutions, than in any other contexts (Albtoush *et al*., 2011). Because of the bias towards the health sector, the model may suffer a limited scope in the management of disasters in Zimbabwe as disasters in the country are usually managed through a multi-sectoral approach. Further, the Kimberly model requires high budget for well trained and skilled employees. This may be a challenge in Zimbabwe considering that the CPU, which manages all forms of disasters, is usually ill-resourced financially. As such, the model may not always be suitable as a disaster intervention in Zimbabwe.

2.3 Are Models really Useful in Disaster Management?

Previous research has shown that the usefulness of the models as a tool for effective disaster management cannot be overemphasized. By comparing actual conditions with a theoretical model can improve an understanding of disasters, thereby facilitating better planning and appropriate action. In some situations where disaster management models have been applied, it has been noted that the models have proved to be relevant and very useful. For instance, Oxfam has used disaster models as a framework for situation analysis in its guidelines for Participatory Capacity and Vulnerability Assessment (PCVA) (Hai & Smyth 2012). Models have also been used in dealing with disasters of high magnitude too. For example, the model of disaster recovery was applied to deal with the 2010 Maule earthquake and tsunami in Chile, and the 2011 Van earthquake in Turkey (Platt 2015). This type of model helped the disaster responders to adopt appropriate decisions in order to effectively and efficiently deal with the phenomena. Patterson, Weil and Patel (2009) argue that decision-making in a disaster situation is unique and has great implications for individuals and communities, therefore, models are a good aid in coming up with good decisions. Such decisions may encompass Meta decisions which are taken by politicians and policy makers, operational decisions which are made by disaster managers, and planning decisions which are made by planners (Platt 2015). The above decisions are also applicable in Zimbabwe when dealing with disasters because politicians, disaster practitioners and planners all get involved in disaster situations. Therefore, models may be an aid

to assess resilience and preparedness of communities at risk of disasters in Zimbabwe. Another example of a major disaster that demonstrated the need for sound models in planning, swift execution and efficient accountability was Hurricane Katrina in 2005 (Anderson-Berry 2003). Following Hurricane Katrina occurrence, Paul and Batta (2011) offered a model for optimal relocation of hospital facilities in order to improve hurricane disaster preparedness. This move demonstrated the applicability of models in developing disaster plans such as hospital capacity and ambulance reallocation, through a case study on New Orleans, after Hurricane Katrina. Anderskov (2004) also observes that the Mozambique flood in Mutara District was analyzed through the Pressure and Release Model (PAR), which helped practitioners to identify past, existing and potential hazards and vulnerabilities.

It can be as well argued that the use of models can also effectively contribute to the management of human-induced disasters. For example, lessons learnt from the Bhopal disaster, the Tylenol poisoning, and the explosion of space shuttle challenger indicated that disaster models were useful (Shrivastava 1992). In the aftermaths of these events, Shrivastava (1992) proposed a model for dealing with industrial crisis through a comparison of the three disaster events. Shrivastava's model can also be used in the management of related industrial disasters in Zimbabwe, so as to minimize associated losses. It is important to prevent previous mistakes by presenting an efficient disaster model at the strategic level in order to cope with all kinds of disasters (Caymaz, Akyon & Erenel 2013). In such cases, the coordinating agency in Zimbabwe, which is the Department of Civil Protection, should be in a position to understand roles to be played by different stakeholders. Whatever the disaster model is chosen, coordinating agents need to allow government agencies and organizations with specific experience in a certain sector or areas, to assume the responsibility for response efforts in those sectors or areas (Moore, Trujillo, Stearns, Basurtodávila & Evans 2007). This scenario currently prevails in the Zimbabwean context and it is a step towards the right trajectory.

However, a major criticism that applies to all disaster management models was given by Stetler (2001, 2010), who argued that all disaster management models tend to be more prescriptive, specific and with a narrow scope. It is for this reason that some policymakers, agencies and practitioners have seemingly, doubted the contribution of models in disaster management. However, this author still argues that models in the management of disasters remain useful.

3. Research Methodology Employed

This study was based on desktop research. It was based on literature survey and document analysis, with the researcher analyzing the body of literature from publications in order to understand the contribution of models in managing disasters in Zimbabwe. The publications studied included recent journal articles, books, conference presentations and other useful related documents. Through survey of the literature and document analysis, the researcher came up with the findings, from which recommendations and conclusions were drawn.

4. Data presentation and Discussion

This part of the study presents and discusses the findings of the study. The findings were derived from a thorough analysis of the relevant literature and documents. Through the analysis of literature, the study came up with thematic areas which emerged as follows: Purpose of models in the field of disaster management; four common types of disaster management models; the contribution of models in managing disasters in Zimbabwe; and, the relationship between the disaster management models.

4.1 Purpose of Models in the Field of Disaster Management

Models can serve many purposes in the field of disaster management. From literature data analysis, this study found that models can simplify an understanding of disaster events in Zimbabwe. This means that all disasters in Zimbabwe can be managed through the use of suitable models. Another major finding was that models can be implemented and enforced by those with a mandate to deal with disasters, especially disaster managers or practitioners. In the Zimbabwean context, the CPU too can rely on models to deal with disaster events. These findings support Kelly (1998), who summed up the purpose of models by stating that models can be used to simplify complex events through distinguishing between critical elements, and that comparing actual conditions with a theoretical model can lead to an improved understanding of the prevailing disaster situation, and thus facilitating the planning process and effective implementation of plans related to disaster management. It therefore means that models should not be taken for granted, as they are an indispensable tool for disaster management that cannot be overlooked.

4.2 Common Types of Disaster Management Models

This study discussed and analyzed four disaster management models. The study found that the four models that have been favored by practitioners in the management of hazards and disasters and included the traditional model, the expand-contract model, and the disaster crunch model. Of these models, the traditional model, the expand-contract model and the crunch model were found to be the most common types of the models. However, the study further found that more than one model, may be adopted to deal with hazards and disasters at a time. This is in line with Moore et al. (2007), who found that there is no single model for achieving good disaster response in disaster management.

Table 1 presents the models in the order in which they were found to be common in being used by disaster management practitioners. The table is the author's creation emanating from the literature and document analysis.

Table 1: *Common Models used by Disaster Practitioners*

Name of Model	**Description of the model**	**Major limitation of the model**
Traditional continuum model	Its stages are sequential. Focuses on activities for pre and post disaster occurrence.	Model overlooks an analysis of disaster risks and vulnerabilities
Expand-contract model	Its stages and activities occur simultaneous and in parallel. They are not sequential.	Ignores the cause-effect relationship
Disaster crunch model	Describes disaster as a point where hazard and vulnerability meet. It shows the cause and effect relationship of activities.	It fails to adequately address the coupled human–environment system associated with the proximity to a hazard.
Kimberly model	Gives more importance to the recovery stage, followed by response. It places recovery at the top of all the stages and puts preparedness and mitigation at the same level.	Has bias towards the management of disasters occurring in health institutions and requires suitably trained personnel.

Source: Author

As can be observed, the traditional model is the most common model to most scholars and practitioners, followed by the expand-contract model (Table 1). The disaster-crunch model is third, whilst the Kimberly model is the fourth and last common model. Each of the four models serves different purposes in the field of disaster management. This study found that each model is unique in its description and approach towards disasters. As such, the limitations associated

with each model are also reflected in the table (Table 1). The hierarchy of the arrangement shows the level of understanding in which most scholars and practitioners perceive and interpret the models in the field of disaster management.

Finally, the study found that the first three models can be easily applied to manage disasters in Zimbabwe, serve for the Kimberly that may be met with certain challenges as it requires special expertise and special funding.

4.3 The Contribution of Models in Managing Disasters in Zimbabwe

This study found that models are a useful and indispensable tool for effective disaster management in Zimbabwe. They can be used to describe and understand disasters through simplifying them. These findings agree with the thinking of Platt (2015), who views a model as a decision-making support tool that can aid in adopting appropriate decisions for dealing with the disasters effectively. The findings further advance the work of Wada, Wakigawa, Yokomatsu and Takeya (2014), who found that it was important to develop decision-making supporting tools in the form of models in order to quantify the impact of disasters. Another finding of the study was that models were also useful in dealing with past major disaster events. Previous events that were analyzed included the 2010 Maule earthquake and tsunami in Chile, the 2011 Van earthquake in Turkey, the 2005 Hurricane Katrina in New Orleans in the United States of America, the 2000 Mozambique flood in Mutara District, and the 1984 Bhopal disaster in India (Platt 2015). For these events to be dealt with more effectively, the models improved the understanding of the disaster events and different roles of the stakeholders involved, resulting in proper planning and implementation of appropriate decisions. This scenario also makes the use of models suitable for the Zimbabwean situation, in which the CPU allows different stakeholders to partake in the management of disasters. Therefore, models can make a unique and meaningful contribution to the management of disasters in Zimbabwe.

However, the study also found that although models are a useful tool for disaster risk management, good models may be of little significance if there are no meaningful efforts towards their implementation. For them to be more effective, models need to be properly used, including being combined so that weaknesses of one model can be outdone by the strengths of another.

4.4 The Relationship between the Disaster Management Models

Some relationship exists between the disaster management models that were analyzed in this study. This study found that although the traditional disaster model was the first model to be adopted for use in managing disasters, there are similarities between the studied disaster management models. One similarity is that each one of the models endeavors to correct the weaknesses of another. For example, the expand-contract model tries to challenge the sequence of stages in the traditional disaster management continuum, by running the stages in a parallel format. This finding echoes Dube (2015)'s view, who indicated that all the activities in the expend-contract model can take place simultaneously. Instead of carrying out activities in a sequence, the expand-contract model shows that they can also be done at the same time. Again, the study found that the models are closely related to each other in that most of them are based on the four main phases of mitigation, preparedness, response and recovery. The findings support the view of previous researchers, who found that the phases of mitigation, preparedness, response and recovery are the core of many disaster management models (Joyce et al. 2009). Of the studies models, only the crunch model overlooks these stages in its structures. Due to the fact that most models rely on the four main stages, the study found that this makes each of the studied models to easily address the weaknesses of another or other models. Another major finding was that all disaster management models have one major aim – that of acting as a disaster management decision-making support tool, thereby improving approach to hazards and disasters affecting communities. Therefore, in order to effectively implement the disaster models in Zimbabwe, their relationship should be highly considered.

5. Study Recommendations

The following are the recommendations emanating from the findings. The study recommends that governments, policy-makers, disaster planners and practitioners in Zimbabwe adopt and effectively use models in managing disasters. It is further recommended that scholars and practitioners continue to come up with new and improved models that are capable of addressing contemporary disaster management issues. For them to be more effective, this study recommends the combined use of disaster management models to address more complex situations. This study has a potential to inform policy and practice as it may benefit governments, policy-makers, disaster practitioners and the academe.

6. Research Conclusions

Conclusions may be drawn from this research based on the findings of the study. One such conclusion is that models can play a significant role in the field of disaster management. They act as a decision-making support tool before, during and after disaster events. As such their role cannot be ignored by stakeholders in Zimbabwe. Major decisions, such as Meta decisions by policy-makers, planning decisions by disaster planners and operational decisions by disaster managers can be effectively influenced by the use of models. The study further concluded that the Kimberly model may not be ideal in less developed countries like Zimbabwe, because of its heavy reliance on huge budgets, high level of expertise and its bias towards health institutions. The Zimbabwean situation, which is characterized by different kinds of disasters, needs models that are relevant to all forms of disasters. This study also concluded that a close relationship exists between the various models of disaster management. For instance, all the models aim to help in minimizing disaster impact. Furthermore, the models are similar as many of them are based on the main phases of mitigation, preparedness, response and recovery. Again, each model for disaster management is crafted in such a way that it endeavors to correct the shortcomings of earlier model or models. As such, one other major conclusion of the study was that new models in the field of disaster management are a panacea and should continue to be proposed. The strengths of new models would help to make up for weaknesses of older r models. However, no matter how good a model for disaster management may be, the study concluded that models may not serve their purpose unless there is commitment towards their implementation. This study therefore, strongly concludes that the use of models to manage disasters is a step towards the right trajectory for disaster management practitioners.

7. Competing Interests

The author declares that he has no financial or personal relationship which may have inappropriately influenced him in writing this article.

8. Disclaimer

The author declares that the paper in whole has not been previously published and is not under consideration elsewhere.

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