

An assessment of the effects of operational risk prevalence on food-aid distribution efficiency in Zimbabwe

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Abstract:

Background

The frequent occurrence of disasters and their disruptive impact, have been felt by communities throughout the world, forcing governments and other humanitarian stakeholders to distribute food aid to disaster victims to save lives. In the process of distributing food-aid humanitarian stakeholders, face operational risks, along the food-aid supply chain network, which this study seeks to assess and establish the effect of risks on food-aid distribution efficiency in Zimbabwe.

Objectives

This study intends to achieve the following objectives:

1. To establish the operational supply chain risks prevalent in food aid distribution in Zimbabwe?
2. To assess the impact of operational risks on food-aid distribution efficiency in Zimbabwe?

Methods

A mixed research method was adopted, in this study. Quantitative data and In-depth qualitative face to face structured and semi structured interviews were conducted from 80 government and civil society workers who implement and oversee food-aid distribution programmes in the seven drought prone districts of Zimbabwe. Quantitative data was analyzed using STATA Version 12 and presented in tables while qualitative research material was analyzed using NVivo and presented in vignettes.

Results

The results of this study revealed that operational risks significantly affected the efficiency of implementing humanitarian food- aid distribution operations.

Conclusion

Operational risks affect food aid distribution efficiency, by creating negative impacts on food aid flows resulting in the futility of efficient food aid distribution.

Keywords: Disaster, food-aid, supply chain management, supply chain risks, vulnerability.

I.INTRODUCTION

The ever-increasing rise in the occurrence of natural disasters, has globally heightened the demand for food - aid and other forms of relief to assist surviving victims. Several disasters that have occurred worldwide have displaced people and made them vulnerable to starvation, and national governments and well-wishers have to bear the brunt of providing humanitarian aid to the survivors, (Goldschmidt and Kumar,2016; Adiguzel,2019; Mushanyuri and Ngcamu, 2020; Chari, Ngcamu and Novukela, 2020). The following are examples of disasters that have struck the world, namely, Indian Ocean Tsunami (2004), Hurricane Katrina in the United States (2005) Pakistan earthquake (2005), Brazil landslides (2005), Nepal earthquake (2005) Haiti earthquake (2010), Cyclone Winston (2016) and Cyclone Idai in Mozambique and Zimbabwe (2019). Regionally Southern Africa and more especially Zimbabwe has not been spared but have had their share of disasters like droughts and cyclones, (Mushanyuri and Ngcamu,2020). During the 2015 and 2016 agricultural season, Zimbabwe experienced a serious drought, that resulted in almost four million Zimbabweans requiring food-aid (Zimbabwe Vulnerability Committee (ZIMVAC), ZIMVAC,2016; WFP, 2016). This corroborates with what Chari, Ngcamu and Novukela (2020), postulates about disaster occurrences in the Southern African region. Apart from droughts, Cyclones also attacked Southern Africa, and in particular Zimbabwe, namely Cyclone Eline in year 2000, Cyclone Japhet in year 2002,Cyclone Dineo in year 2017,Cyclone Idai in year 2019 and Cyclone Charlene in year 2021,(Mhlanga, Muzhingi and Mpambela,2019).

Occurrence of natural disasters—around the world have displaced people and destroyed their livelihoods making them vulnerable to poverty and starvation, resulting in most of them requiring food-aid, that national governments and humanitarian agencies provide (Ndiweni and Musarurwa, 2012;Fichette,2019).Distribution of humanitarian aid need to be planned for and coordinated. Goldschmidt and Kumar (2016),argue that it is the responsibility of the national governments to develop mechanisms for the preparation and coordination of disaster relief activities so as to protect masses from the impact of disasters. Lee, (2009),Chari et

al.,(2020) also assert that the responsibility of ensuring that citizens are protected from the ravages of disaster impacts emanates from the global frameworks ,such as the Sendai Framework, supported by national social protection policies and governments Constitutional provisions. Faced with disaster challenges, the government cannot tackle disasters alone, but are often assisted by well-wishers that include communities, private sector organisations, international governments, and non-governmental organisations, and the local population (Chatiza,2019). Chatiza (2019) reports that ,soon after the occurrence of Cyclone Idai in Chimanimani, Zimbabwe the local population was the first to offer help to disaster affected persons.

The process of delivering food-aid used by governments and humanitarian organisations such as UNWFP is full of supply chain risks that impede cost-effective distribution of food-aid to beneficiaries (Sodhi and Tang, 2014). Faced with such challenges, it is therefore imperative that governments prepare for a cost-effective humanitarian relief operations that can reach disaster impacted societies. This resonates well with one of the objectives. United Nations World Food Programme (UNWFP) and that of Food Aid Organization (FAO) to ensure that food aid reaches beneficiaries in the most efficient and cost-effective manner. It is against this background that this research seeks to investigate operational supply chain risks associated with food-aid distribution in Zimbabwe.

Further to the above, Bak (2018) and Oloruntoba (2010) as cited by Chari et al,(2020),postulate that most supply chain risk literature is located in Europe, the Americas, India, and the United Kingdom, with very flimsy or very little literature on developing countries in particular Zimbabwe. In addition to the above Goldschmidt and Kumar (2016) posit that soon after disaster occurrences, the media coverage has globally increased scrutiny to the operations of both governments and non-governmental organisations providing humanitarian relief. The above has created a gap that necessitates current study on understanding the operational risks from the insider or implementor perspective of humanitarian response implementor. In addition to the above, the research seeks to assess and evaluate the relationship between supply chain operational risks and food aid distribution efficiency in Zimbabwe.

This study is of significance as it documents supply chain operational risks associated with food aid distribution operations in Zimbabwe from an inside or implementer perspective, notably the government officers implementing food aid distribution in the troubled districts in Zimbabwe. Information gathered will contribute to the body of knowledge in humanitarian supply chain, for use by both local and international actors in humanitarian relief operations. Based on the above, these researchers' intent is to answer the following questions.

Q1. What are the operational risks prevalent in food aid distribution supply chain in Zimbabwe?

Q2. How do the operational risks affect food-aid distribution efficiency in Zimbabwe?

The above questions will be answered through literature review and the findings from the data collection.

II. LITERATURE REVIEW

The literature explored looks at the operational risks prevalent in food -aid distribution in Zimbabwe in the aftermath of disaster occurrence.

2.1 Disasters

The International Strategy for Disaster Reduction (ISDR, United Nations ,2000) defines a disaster as a” serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property, or environment, whether caused by accident, nature, or human activity, and whether developing suddenly because of complex long-term processes.” According to Van Wassenhove, (2006) disasters are known to physically disrupt and affect, systems and threaten societal priorities and goals. Chatiza (2019), Lunga and Musarurwa (2015), Chitongo (2013), Bola *et al.* (2014), Ndiweni and Musarurwa, (2014), Chari, Muzinda, Ngcamu, Novukela (2020) and Gadeffa (2020), have all written about natural disasters and their effects on the Zimbabwean population. The above researchers have also written about the government providing relief humanitarian aid to the disaster impacted populations. According to Goldschmidt and Kumar (2016), it is the disaster occurrence and impact that calls in governments to respond to disasters. In response to disaster, governments, non-governmental organisations, private sector, civil and military organisations, work together to provide the much-needed humanitarian relief to the affected victims, (Gadefa,2020; Balcik *et al.*, 2010; Vanany *et al.* 2009).

Mhlanga et al (2019) posit that natural disasters such as cyclones, droughts and floods have affected the social and economic environments globally and in some parts of Zimbabwe, subjecting communities to deaths, vulnerabilities, and starvation. The recent Asia Tsunami disaster, (2004,) Cyclone Idai, (2019), massive Brazil landslides (2005), floods in Malaysia (2009) are examples of disasters that have terribly destroyed infrastructure and made people vulnerable. Once a disaster has struck, a quick response to urgent needs and relief is of paramount importance (Sheu 2007, Goldschmidt and Kumar 2016, Gadeffa 2020, Mushanyuri and Ngcamu 2020). The above researchers all concur that disasters create negative impacts on the environment and society at large, forcing governments and humanitarian relief agents to provide humanitarian relief to disaster-impacted communities. In 2019, Cyclone Idai devastated some parts of Chipinge and Chimanimani districts in Zimbabwe, destroying livelihoods, killing people, and making survivors vulnerable to natural conditions forcing them to require humanitarian aid in form of shelter, food, clothing, and medicines, (Chari et al.,2020).

2.2 Food aid distribution

Disaster occurrences invite an overabundance of humanitarian aid agencies, private sector organisations, individuals and government agencies, both local and national to assist the disaster impacted communities, with food aid and other humanitarian needs (Goldschmidt and Kumar 2016, Rucha and Abdallah 2017, Chatiza 2019). Humanitarian relief comes in to provide relief to disaster victims in a bid to save human life from starvation. Humanitarian relief presents itself in various forms, namely, procurement, transportation, sourcing, warehousing, distribution, and consumption by the final beneficiary, which is often affected by a number of operational risks, (Kovacs and Spens, 2007, Reddy *et al.*, 2016). Balcik, Beamon, Krejci, Muramatsu and Ramirez (2010), Colicchia and Strozzi (2012), concur that distribution of food-aid is associated with operational risks along the food-aid supply chain. The operational risks along the supply chain include, drastic shortage of resources, delays in the movement of food-aid, and malpractices practised by humanitarian aid workers in moving food -aid. Existing literature has underscored operational risks in food-aid supply chain and categorised them as disruptions and coordination difficulties, uncertainty, and unpredictability of demand for resources, (Thomas, 2003; Cassidy, 2003; Long and Wood, 1995; Kovacs and Spens 2007).

2.3 Operational risks

Chopra and Sodhi (2004), Lin and Zhou (2011) describe operational risks as those risks found internally within an organisation, causing discomfort in the way the supply chain networks operate, and include, poor planning, resource shortages, delays in the delivery of goods and services, forecast errors, system breakdowns, flawed procurement, incapacity, theft, corruption, and poor workmanship. If not controlled the operational risks, will fail, or incapacitate the operations of the organisation.

2.3.1. Coordination risks

Chandes and Pache (2010) as cited by Goldschmidt and Kumar (2016) posit that governments use coordination as a strategy to manage humanitarian aid operations in country when faced with multiple agencies collaborating their efforts and resources to assist victims of disaster impacts. Collaboration amongst various agencies has always been a strong groundwork for managing disasters, (Sulaiman, She, Fernando, WeiChan, Roslan and Latih, 2019). In Zimbabwe the Zimbabwean government created the District Drought Relief Committee to coordinate and collaborate resources in humanitarian food -aid distribution, (MoPSLSW, 2009). This resonates well with actions taken by the United States Government in establishing FEMA, Malaysian Government in establishing Sarawak Disaster Management Committee to coordinate or manage disasters more effectively (Kovacs and Spens 2009; Sulaiman *et al.*, 2019).

Coordination amongst humanitarian organisations is often difficult when there are various stakeholder groups that

include government, military, and civil society involved in humanitarian aid operations. These often create confusion on its own unless strictly and strongly coordinated, (Balcik and Beamon 2008, Yadav and Barve 2016, Rucha and Abdallah (2017). Poor coordination of humanitarian response is common during disaster occurrences (Kovacs and Spens 2009, Rucha and Abdallah (2017). Often supply chain risks originate from conflicting roles, such as coordination, and friction different agencies with differing backgrounds amongst the parties to humanitarian relief. Uncoordinated distribution scheduling, higher costs of transportation, and unavailability of suitable trucks, constitute part of operational risks which often lead to delayed distributions (Tummala and Schoenherr 2009). Kovacs and Spens (2007) mention that poor coordination was prevalent in Ghana, Sulaiman *et al.* (2019) argue that lack of coordination leads to possible failure in implementing holistic food aid distribution, as well as cause in appropriate allocations of resources and delayed evacuations resulting in increased number of casualties. In addition to the above, Gadeffa (2020) mentions that Ethiopia suffered poor coordination of humanitarian relief operations ever since food aid distribution was implemented in the country. Literature has revealed the importance of coordination in humanitarian relief and the challenges brought about when coordination is lacking. During the 2007 and 2008 drought, Ghana experienced challenges in coordinating the distribution of food-aid to the drought disaster victims as some of the operating NGOs did not understand their mandates (Kovacs and Spens, 2009). The NGOs tried to fit everywhere in the disaster assistance framework such that their effort gathered no moss. Instead, organisations spend most of their time fighting for resources meant to feed the same communities. The Ghanaian National Disaster Management Office (NADMO) implemented a number of statutes to assist in operationalising the coordination function of food-aid distribution.

In addition to the existence of a variety of activities, the post disaster environment is usually chaotic, because of the large numbers of players involved in humanitarian relief involved in operationalising the food- aid distribution process, (Rucha and Abdallah 2017).

2.3.2 Information management

Pettit and Beresford (2005), Taniguchi, Thompson and Yamada (2012) Juliana, Idrose, Azmin and Saudi (2017) and Sulaiman *et al.* (2019) concur that the availability of good communication and information technology systems is an asset in the delivery of the right information to support sourcing and distribution of resources during a humanitarian crisis. In Malaysia after the government realised the importance of having uninterrupted communication system, it created a solid model of communication system that is not susceptible to any damage during disasters nor yield to telecommunication congestion, called the Government Integrated Radio Network (GIRN), (Juliana *et al.*, 2017). The availability of the Integrated Radio Network improved the

communication flow of information on the movement and operations of humanitarian food aid. Chari et al., (2020), argue that solid communication platforms like social media have also contributed to effective and immediate disaster response. Finua et al., (2018) as cited by Chari et al., (2020), highlights the effectiveness of social media in sharing information about Cyclone Winston before, during and after it struck Fiji in 2016.

Poor information documentation, information distortion, and insufficient reports on disaster impacts and food-aid requirement creates information gaps, in relation to humanitarian needs, their type and quantity for a given humanitarian intervention (Chopra and Sodhi 2004, Tummala and Schoenherr 2009, CADRI, 2017). This further exacerbates poor supply chain visibility and exaggerated demand and supply shortages, (Juliana et al.,2017). These risks often lead to shortages of supplies as the figures used to request food-aid would not be giving the correct information on the ground. Inaccurate figures falsify records that donors might also be willing to receive, for them to measure the exact value of their donations. CADRI (2017) concurs with the above and add that absence of proper registration and correct demographic information on the affected population would result in incorrect information reported about the number of affected people and their specific vulnerabilities.

2.3.3 Misappropriation of aid

Food-aid is often stolen along the distribution process resulting in the intended beneficiary not receiving the planned entitlement. Mbohwa(2010) and Transparency International,(TIZ,2020) report that food-aid is misappropriated through various ways in Zimbabwe. According to Transparency International(2020) ,some cases of corruption were revealed in Chimanimani where some government officer were arrested stealing food meant for the Cyclone Idai disaster victims. Food -aid is misappropriated in various ways, through food diversion, theft, and corruption resulting in food-aid shortages at the FDP . In some cases, if the warehouse dispatch has weak control systems food aid is also stolen when loaders connive with the transporter to steel bags of grains at the loading depot, and such grain would be sold some on the way before reaching the food delivery points, or during food-aid transit. These cases are common if transporters do not have vehicle and commodity tracking systems infrastructure to guard against commodity losses. The food-aid being delivered is also at times targeted by thieves, who steal with the intention of selling and profiting from the loot. Apart from steeling the food-aid thieves may also target to steal fuel from the vehicles delivering the food-aid. When this happens, there would be delays in delivering food-aid to the intended beneficiaries in time or in full as has been planned.

2.3.4 Shortage of resources

According to Rucha and Abdalla(2017) disasters create unpredictable demand for goods and services. The

unpredictability of demand for food aid and the chaotic nature of post-disaster relief often leads to shortage of food-aid resources for distribution to the disaster victims (Rucha and Abdallah 2017). Shortages of commodities, unpredictability of demand and poor planning are common operational risks in the aftermath of disasters, (Cassidy 2003; Murray 2005; Kovacs and Spens,2007). Kovac and Spens (2007),Gill (2012),Karanja,Mairura and Ombui (2015),Goldschmidt and Kumar (2016), and Sulaiman et al.(2019) concur that, apart from shortages of resources, lack of professional human resource base in food aid distribution has been cited Apart from coordination challenges, lack of knowledge on what to do and mandates to work on was another operational challenge that the Ghanaian food-aid distribution faced. Some organisations did not really know their mandates and therefore tried to do everything, and, at the end of the day, no area of speciality was seen. in a number of case studies, namely 2007 Ghana drought relief, Kenya and Malaysia (2009). Lack of professional human resources creates supply chain risks that include, poor implementation of programmes and poor estimation of requirements that may lead to shortfalls of requirements. To add insult to injury, it is has become common knowledge that supplies following a disaster often come in unsolicited and undesirable forms(Agbor 2019).

Murray (2005), as cited by Agbor (2019) posit that humanitarian aid agencies often receive a variety of unsolicited and sometimes even undesirable commodities amongst the donations thereby creating resource management risks for both NGOs and beneficiaries at large. When goods unsolicited resources are received, at times warehouse capacities to hold and store commodities are overwhelmed. Storage facilities need to be available to protect food-aid from weather conditions and also theft. Lack of adequate storage and handling facilities for food aid is also another operational risk regarded as an operational supply chain risk calling for increased storage facilities. Klibi et al. (2010) argue that increase food aid storage and handling facilities tends to increase the costs in the distribution of food aid in addition to management of excess capacity, handling, and transport costs.

2.3.5 Transport risks

Transport infrastructure is key in the distribution of food-aid. Its criticality is seen on the timeous delivery of the right quantity, and quality of the food-aid to the rightful and needy beneficiaries. Road network infrastructure remains a challenge when natural disasters strike. (Costa, Campos and Bandeira 2012, OCHA 2019). Damaged transport infrastructure causes delays in the movement of food-aid as it fails to reach the intended beneficiaries in time. Further other elements like, fuel prizes, cost of spares, capacity of warehouses and availability of suitable trucks dictate movement of food-aid, (Chari et al.,2020). In such instances, humanitarian agencies struggle to reach beneficiaries if transport infrastructure is inadequate or compromised, (Shuria, Linge and Kariri, 2014). When road network is damaged food -aid movement downstream to the beneficiaries often is often paralyzed,

leading to failed distribution (Mohamed and Youssef, 2017). Masaba (2015) notes that any slight disruption of transport infrastructure has a negative impact on the whole movement of food aid. Road accidents are also a common source of operational risks around the globe (Chikoto and Sadiq, 2012). Road accidents lead to losses in humanitarian cargo being delivered and damage of infrastructure and loss of lives as well as delay or lengthen the delivery lead times for effective food-aid delivery. Apart from movement delays, food stuff may be spoiled or contaminated by other products such as diesel fuel, chemicals, such that they become inedible, creating shortfalls on beneficiary planned rations, (Mbohwa 2010). In view of the fact that disturbances on aid transportation creates negative outcomes to disaster victims and the humanitarian stakeholders, (Masaba 2015) , Randrianalijaona, (2018) proposed use of technology like drones to distribute food-aid despite the fact that drones also need human intervention when food-aid is dropped in the response area.

2.4 Humanitarian Supply Chain Performance

Kovacs and Spens 2007, Balcik and Beamon 2008, and Abidi and Klomp 2014, as cited by Chari et al. (2020). Gadeffa (2020) argues that humanitarian supply chain performance is critical for measuring the success of any humanitarian intervention. In order for governments to build excellent humanitarian platforms and networks, performance metrics need to be established. Goldschmidt and Kumar (2016) concur with Gadeffa (2020) that the existence of effective performance measures are ideal for evaluating the success of the humanitarian intervention. In Ethiopia Gadeffa (2020) notes that the government of Ethiopia had to set performance measure to ensure that people in Borana Zone received adequate food aid resources in 2014. Examples performance metrics include the number of targeted or registered beneficiaries that have received food -aid, deliveries in time, without delays , minimum inventory holding costs per Final Distribution Point (FDP). Food aid inventory management costs is another metric of food-aid distribution efficiency. It presents costs that include, stock holding costs, such as food aid deterioration, pilferage of food aid, insurance costs, unsafe warehouse conditions are some of the costs associated with food aid distribution (Mbohwa 2010, Shuria et al, 2014, Rucha and Abdallah 2017, Shahbaz, Kazi, Bhatti Sunhil and Raja 2019).

III. METHODOLOGY

The study used a mixed research method to gather data from government Officials with oversight on the food aid distribution operations at district level in the seven districts in Zimbabwe. The officers included the District Administrators, District Social Welfare Officers, District Agricultural Extension Officers, and some other stakeholders constituting the District Drought Relief Committees. This was done to get first-hand information from the implementers who know their operational challenges and how the challenges have been impacting on food-aid distribution operations. A questionnaire

was used for quantitative data gathering whilst face to face interviews were used for qualitative data collection to fill in the gap left by the survey. The study was carried out in the seven districts of Zimbabwe namely, Chiredzi, Chivi, Masvingo, Mbire, Mwenezi, Muzarabani and Zaka Districts. These study sites were selected because they are perennial recipients of food aid due to floods or drought, in Zimbabwe (ZIMVAC, 2016, CADRI 2017). The targeted population was drawn from the constituent members of the district Drought Relief Committees drawn from government departments and NGOs operational in the districts under study. The respondents were selected based on their role and expertise in the management and of Food-aid distribution in the districts. Data was collected between January 2020 and September 2020.

3.1 Questionnaire

The major data collection tool was a questionnaire. Using Hair, Black , Balin and Underson (2010)'s recommendation , the target population was selected from people with vast knowledge of food-aid distribution and experience. A total of 80 respondents out of 105 government workers, civil society (NGO) workers dealing with food aid distribution from the seven (7) Districts to which this study was delimited to.

3.2 Interviews

As part of the exploratory design purposive, face to face in-depth interviews with 15 government officers who oversee the district food- aid distribution in the districts. These people were selected so that they would avail information on the challenges they encounter in operationalising food-aid distribution in the districts. Interviews further investigated operational risks prevalent in the implementation of food-aid distribution in Zimbabwe .The information gathered will also be used to find solutions to the current challenges faced by the implementors as well as complement the gaps left by the questionnaire.

3.3 Data Analysis

Quantitative data analysis of questionnaires was carried out using STATA (version 12). Descriptive and inferential statistics were used in analysing data. Ordinary Least Squares (OLS) regression was done, and the Tobit model was used to test the robustness of the models. Qualitative data collected from in-depth interviews with District Social Welfare Officers, The Zimbabwe Republic Police (ZRP), Humanitarian stakeholders and District Administrators was analysed according to various themes and patterns emerging from the objectives of this study using NVivo. These themes were as follows; supply chain risks prevalent in Zimbabwe, and impact of risk on efficiency of the food-aid supply chain.

3.4 Ethical Considerations

These researchers sought for permission, to carry out the study from the Ministry of Local Government as gatekeepers for humanitarian aid interventions in Zimbabwe. Ethical

clearance was also obtained from the University FREC Committee. In addition to the above informed consent was sought from participants so that they could choose freely whether to participate or not in this research (Walliman, 2011, Sekaran and Bougie, 2009). The information gathered from the participants was treated as confidentiality, to guard the privacy of the participants (Sekaran and Bougie, 2009).

IV.RESULTS

The following are the results of the study carried out in the 7 districts in Zimbabwe.

4.1 Operational risks prevalent in humanitarian food-aid supply chain distribution

The prevalence of operational risks is summarised in Table 1 below.

Table 1: Operational risks prevalent in humanitarian food-aid supply chain distribution

Variables	Mean	Standard deviation	Min	Max
Poor Coordination	4.65	0.986	1	5
Transportation risks	4.68	0.941	1	5
Pilferage/theft	4.59	0.874	1	5
Poor and inadequate Information	4.68	0.873	1	4
Shortage of warehouses	4.63	0.854	1	5
Contamination of food-aid	3.95	1.285	1	5

The most prevalent risk in this category was theft, followed by shortage of warehouses, poor coordination, poor and inadequate information, transportation risks and contamination of food. The variability in the responses was uniform, except for food-aid contamination which had the highest variance. Shortage of the following resources, namely, transport, warehouses, storage facilities and information resource constraints, render collaboration ineffective. The Social Welfare Department lamented the lack and shortage of transport-to-transport food-aid to the various distribution points across the country. One Principal Social Welfare Officer said in an interview that, “... transportation is a major challenge as it is difficult to get the required transport to service the dirt roads that have been severely damaged by disasters and also by lack of service due to shortages in resources. (Social welfare Officer, Male, Mbire)

This is in concurrence with the results of the studies in Darfur region ,where because of lack of resources, such as warehouses, transport et cetera, and knowledge on coordination and collaboration ,most government personnel did not have adequate skills and capacity to manage disaster relief, making it difficult for the government to implement humanitarian aid distribution and also prevented the implementation of effective engagements between government and NGOs in collaborative initiatives (Yagub 2014). This is further explained by Oloruntoba and Gray (2006) that “lack of planning in humanitarian supply chains

results in inefficiencies, such as poor pre-plan stocks, congestion at warehouses caused by unplanned deliveries, and poor information management and uncoordinated inter-organisational collaboration for information systems”. On issues of food-aid contamination , the information gathered from a number of logistics officers during the interview not that “...food-aid is contaminated normally on transit as at time if not properly checked by inspectors at food loading bays transport that has been used to ferry hazardous substances may also be used to carry food-aid there by putting the food-aid at risk of being contaminated, On several occasions trailers that have been assigned to ferry food-aid ,having been used to carry sulphur and other hazardous substances have been returned back from Beitbridge WFP warehouse so as to guard against contamination of food-aid...” (Logistics Officer, Male, Muzarabani)

Poor coordination of resources is a major component of operational risks that stems from lack or no planning for disaster events. The emergence of a disaster is normally followed by a mushrooming of various stakeholders to the disaster scene. In disaster settings as the number of parties increases, they also need to be coordinated. This resonates well with the assertions by Murray (2005) Long and Wood aver (1995) that “lack of coordination is a risk that often leads to confusion at the last mile distribution of humanitarian aid, because there are so many different agencies, suppliers and different actors with their own different ways of operations and structures in managing food-aid distributions (Kovacs and Spens 2009).

4.2. Food-aid distribution efficiency

Based on the occurrence of disasters, the research sought to establish whether supply chain risks and disasters had an impact on food-aid distribution efficiency. Descriptive statistics for food-aid distribution efficiency are summarised in Table 2 below.

Table 2: Food-aid distribution efficiency descriptive statistics

Variables	Mean	Standard Deviation	Min	Max
The right quantity of food-aid is distributed to the beneficiary	3.463	0.706	1	4
Right quality of food-aid is distributed to the beneficiary	3.463	0.804	1	5
Delays in Food-aid distribution are reduced	3.598	0.783	1	4
Availability of up-to-date beneficiary registers	3.646	0.961	1	5
Food-aid distributed to rightful beneficiaries	3.683	0.967	1	5
All Food Distribution points are accessible	3.692	0.916	1	4
Right type of transport is available to deliver food-aid	3.659	0.689	1	4
Government flexibility and ability to respond to variations in demand	3.878	0.961	1	5
Humanitarian agency's ability to respond to and accommodate variations in demand	3.768	0.920	1	5

Surveyed respondents agreed that the right quantity and quality of food-aid is distributed to the beneficiaries as shown by the lowest mean scores of 3.463. In addition, they affirmed that delays in food-aid distribution were reduced. One of the Senior Principal Social Welfare Officer lamented that

“...efficacy in the distribution of food-aid depended on many facets, namely, availability of food, aid, financial resources, motor vehicles, trained manpower et cetera. The department is understaffed and normally there is only one person to man the district, apart from carrying out Social Welfare activities, the same officer does the logistics of food-aid distribution. Secondly, the government only distributes grain, and no other supplies such that this makes the distribution inadequate. In as far as transport is concerned, the department does not have vehicles to transport grain to the beneficiaries and at times communities are asked to provide money or transport to ensure that their food-aid is delivered. “...there is in place a policy framework that guides the implementation of food-aid distribution exercise in all provinces and districts but lack of human and financial resources to implement the distribution hampers everything. Secondly there is no harmonised policy that forces government agencies to work together, and as such department or agencies seem to compartmentalise their programmes, say, Department of Agriculture, Department of Social Welfare and the Department of Community development in varying ministries seem to work on their ministry mandates although working on the same subject matter in the same district. This alludes to policy inadequateness creating governmental operational gaps.” (Social Welfare Officer, Female, Zaka)

There were higher levels of disagreement with the responsiveness of humanitarian agencies when there are variations in demand (mean score of 3.768). Respondents also disagreed that the government is flexible and able to respond to variations in demand (mean score of 3.878). The variability of respondents’ opinions ranged from 0.689 for the availability of the right transport for delivering food-aid to 0.967 for the distribution of food-aid to the rightful beneficiaries. Interviews from Programme Officers from NGOs doing food-aid distributions concurred that *“...New beneficiaries identified this month will receive their entitlement two or three months after being identified. This follows a proves of vetting and verification for eligibility as a beneficiary, thus following the registration process also causes delays and inflexibility in the process of determining supply chain efficiency.” (Programme Officer, Male, Masvingo)*

The Social Welfare Department lamented the lack and shortage of transport-to-transport food-aid to the various distribution points across the country. One Principal Social Welfare Officer said in an interview that,

“... transportation is a major challenge as it is difficult to get the required transport to service the dirt roads that have been severely damaged by disasters and also by lack of service due

to shortages in resources.” (Principal Social Welfare Officer, Male, Chiredzi)

This is in concurrence with the results of the studies in Darfur region ,where because of lack of resources, such as warehouses, transport et cetera, and knowledge on coordination and collaboration ,most government personnel did not have adequate skills and capacity to manage disaster relief, making it difficult for the government to implement humanitarian aid distribution and also prevented the implementation of effective engagements between government and NGOs in collaborative initiatives (Yagub 2014).This is further explained by Oloruntooba and Gray (2006) that “lack of planning in humanitarian supply chains results in inefficiencies, such as poor pre-plan stocks, congestion at warehouses caused by unplanned deliveries, and poor information management and uncoordinated inter-organisational collaboration for information systems”.

4.3 The relationship between operational risks and food-aid distribution efficiency in Zimbabwe

The Ordinary least squares and Tobit estimates are presented in Table 3 below.

Table 3: Ordinary least squares and Tobit estimates: The relationship between operational risk and food-aid distribution efficiency

Variables	OLS results	Tobit results
Operational risk	-0.027 (0.01) ***	-0.027 (0.009) ***
Gender	-0.042 (0.066)	-0.042 (0.06)
Age category		
36 - 40 years	-0.082 (0.09)	-0.082 (0.081)
>=41 years	0.284 (0.116) **	2.69 (0.009) ***
Educational level		
Degree or higher	0.042 (0.068)	0.062 (0.68)
Experience level		
6 - 10 years	-0.165 (0.101)	-0.165 (0.092) *
>=11 years	-0.14 (0.094)	-0.14 (0.085)
Area of operation		
Chivi	-0.051 (0.119)	-0.051 (0.108)
Masvingo	-0.228 (0.148)	-0.228 (0.134) *
Mbire	-0.315 (0.117) ***	-0.315 (0.106) ***
Muzarabani	-0.102 (0.12)	-0.102 (0.108)
Mwenezi	-0.031 (0.125)	-0.031 (0.113)
Zaka	-0.043 (0.116)	-0.043 (0.105)
Constant	2.607 (0.182)	2.607 (0.165)
Observations	78	78
R-squared	41	1.14

***, Significance level is 0.01; **, Significance level is 0.05; *, Significance level is 0.1

Robust standard errors are in parenthesis.

Ordinary Least Squares (OLS) regression was used to investigate the nature and magnitude of the relationship between food-aid distribution efficiency and supply chain operational risk factors. The study controlled for the effect of demographic variables on food-aid distribution efficiency in Zimbabwe. The demographic variables employed in the model are gender, age, education level, years of experience in food-aid and the study area. A Tobit regression model was also run in order to test the robustness of the OLS model. Results from Table 3 show the impact operational risks on food-aid distribution efficiency. According to Table 3, an increase in operational risks reduces food aid distribution efficiency by 0.027 points. The impact is statistically significant at 1% level of significance. This finding affirms the findings of earlier studies such as Beamon, (1999), Mbohwa (2010), Whybark et al., (2010) amongst others.

V. CONCLUSIONS

The study discussed operational supply chain risks prevalent in food-aid distribution operations in Zimbabwe. It was noted that the inadequacy of humanitarian relief was caused by scarce supplies, poor planning, misappropriation, and delays in the movement of relief aid. It further assessed the impact of the operational risks on food-aid distribution efficiency in Zimbabwe. The conclusion was that poor coordination, challenged Information and Technology infrastructure, lack of planning, shortage and lack of transport and logistical infrastructure have negative effects on food-aid supply chain delivery. Interms of communication, the study found out that there are other countries who have already established all weather communication networks that can survive any form of disaster.

VI. RECOMMENDATIONS

Based on the results of the current study, now that the government of Zimbabwe has implemented devolution of project to local authorities, it is suggested that districts should prioritise the rehabilitation of roads to make them accessible to all corners of the districts so that humanitarian aid ,especially food aid distribution is not delayed. Further the researcher suggests if this should be a priority on each districts' national development Strategy (NDS).Secondly in order to reduce dependence on schools, clinics and hospital ,district Councils should establish Ward Level Warehouses to accommodate humanitarian disaster relief stocks that would be used to store humanitarian aid buffer stocks before the arrival of more aid. In In addition to available disaster management resource distribution platforms, The Government of Zimbabwe is encouraged to expand the Social Welfare activity, employ a cadre with logistics qualifications to cover distribution of humanitarian aid to alleviate the current Social Welfare Officer from performing tasks they do not have experience in, especially logistical assignments. Due to losses encountered on humanitarian donations, accountability should

be improved, and all offenders misappropriating humanitarian donations must be arrested.

The Zimbabwe Government is recommended to set up Information and Communication all-weather base stations that can be used for implementing an improved communication network system similar to the one created by the Malaysian Government. The government is recommended to implement specialised logistics training for members of the District Drought Relief Committee so as to professionalise their oversight.

Implications of study

This study is of significance to a number of stakeholders as it documents food-aid distribution operations in Zimbabwe from the implementer perspective. Information gathered will contribute to the body of knowledge in the field of supply chain risk management in food and non-food aid distribution, for use by both local and international actors in humanitarian relief operations. In addition to the above, this study will help in the review and regeneration of policies, rules and regulations governing food-aid distribution in Zimbabwe.

Limitations of study

The study did not cover the whole of Zimbabwe due to financial and time constraints despite the fact that a comprehensive coverage of the whole country, would provide an accurate account of the impact of supply chain risk management in food-aid distribution in Zimbabwe. The study is delimited to, Chiredzi, Chivi, Masvingo, Mbire, Mwenezi, Muzarabani and Zaka Districts which serve as constant recipients of perennial food-aid distribution operations since 2002 (ZIMVAC,2016).

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