



NATURAL DISASTER PREPAREDNESS AND SUSTAINABLE DEVELOPMENT IN RUTSIRO DISTRICT, REPUBLIC OF RWANDA

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ABSTRACT

The study investigated natural disaster preparedness and sustainable development in Rutsiro District, Republic of Rwanda. Specific objectives were to assess natural disaster preparedness strategies used; identify effects of natural disasters on sustainable development; evaluate strength of natural disaster strategies in place aimed at sustainable development; and lasting strategies on disaster preparedness management for sustainable development. A descriptive research design with quantitative and qualitative approaches was applied in the study. Target population was 324,654 from whom 133 mature and educated people were conveniently chosen from Rutsiro. Simple random sampling technique was used to select 100 respondents as the sample size. Data collection methods were questionnaire, interview guide and documents review. Data analysis applied descriptive statistic methods. Findings showed that natural disaster preparedness strategies through creating a community or national emergency operation plan were used as confirmed by more than 85% of respondents. Seventy-four percent (74%) confirmed that the effects of natural disasters on sustainable development of Rutsiro District exist. Eighty percent (80%) affirmed that strength of natural disaster strategies aimed at sustainable development were in place. Lasting strategies on disaster preparedness management for sustainable development were confirmed where measures to activate special installation such as mobile hospital facilities to help to reduce disaster risk were identified. Based on the findings, the study concluded that natural disaster preparedness boosts sustainable development and shields Rutsiro's citizens from being a high risk zone of disaster. The researcher recommended that natural disaster preparedness requires people to know and follow the methods of construction, use and combination of specific materials and ways of being resilient enough to disaster incidences.

Key Words: *Natural Disaster, Disaster Preparedness, Sustainable Development*

1. Introduction

One of the most common ways to study natural disaster preparedness levels is by characterizing these measures within the places where individuals spend most of their time, such as their homes (with their families) and their workplaces. These areas are representative not only of the types of preparedness measures adopted by the population, but also the areas that people recognize as sources of common and relevant

information for taking preparedness measures. Preparedness actions involve developing plans, stockpiling of supplies and performing exercises and drills, all aimed to reduce the impact of the disaster. These actions have been translated into recommendations, checklists and actions that organizations provide to households, communities and workplace in order to be prepared in case of a disaster. Response organizations recommend to

frequently assess and evaluate whether these actions have been implemented (Komendantova, *et al.*, 2014).

In developing countries of Africa, natural disasters have massive human and economic costs, where people tend to live in cheap and dangerous locations due to economic pressures, where they are highly susceptible to natural disasters hence the poor suffer disproportionately when a disaster strikes they are more exposed, more vulnerable, and less able to recover. Natural disasters affect development, be it in terms of deaths, property damage and costs for recovery, and also the lack of development itself contributes to disaster impacts to a larger density where under developed areas are less resilient to disasters. Natural disaster preparedness requires for adaptation strategies, thus preparedness for the disasters, along with effective prevention and mitigation measures, is imperative for sustainable development of a country (Simpson, *et al.*, 2014).

Natural disasters are recurrent, usually unpredictable events that require integrated policies and the combined efforts of a variety of groups at local, national and international levels. By integrating preparedness programs and working locally with existing development projects, vulnerabilities to disaster and the subsequent dependence on external assistance can be greatly reduced (Vye, 2007). In the process of making sense of the events that occur in our environment, different civilizations have looked for answers in religion and folklore. The myths are the non-scientific interpretations as to why certain events occur (Pedro Mendia-Landa, 2013).

In Rwanda, they have witnessed a number of natural and man-induced disasters that culminate sometimes into the loss of lives, and property and also the displacement of people. Natural disasters in Rwanda are categorized as hydro meteorological, such as floods, landslides, and thunder strike. Other disasters are geological, including earthquakes and volcanic eruptions (MIDIMAR , 2012, p. 23). Rwanda is highly vulnerable to a range of natural hazards. Over the last decade, the frequency and intensity of natural hazard-induced disasters, particularly floods and droughts, have significantly increased, raising the toll of human casualties as well as economic and environmental losses. Potential consequences of climate change are likely to further exacerbate Rwanda's vulnerability to disasters and the magnitude of their impacts (UNEP, 2011).

On 17th September 2017, at around 15:30 local time, the districts of Rusizi, Nyamasheke, Huye and Bugesera, Gicumbi, Ngoma, Kirehe, Rubavu and Nyabihu experienced heavy rainfall associated with heavy storms, which resulted in destruction of houses and community farm lands. The affected areas are mostly in five districts; two located in western province (Rusizi and Nyamasheke), two located in Eastern province (Ngoma and Bugesera), and one in the Southern Province (Huye) (New Times, 2017). Natural disasters are as a result of increased urbanization, including growing concentrations of people in unplanned and unsafe urban settlements, an inadequate attention to changing risk patterns (UN, 2015). However, this study intends to investigate on

natural disaster preparedness and sustainable development in Rutsiro district, republic of Rwanda.

2. Statement of the Problem

Rwanda is prone to a wide range of natural hazards with lack of adequate information that is essential for effective disaster preparedness that could effectively lead to sustainable development. Even though, Rwanda's economy and by extension, its population can be classified as vulnerable to natural and man-made disasters, the country does not have a comprehensive disaster management framework and strategies guided by appropriate policy and legislative provisions. Past disasters were managed on an ad-hoc basis without clear coordination mechanisms (MIDIMAR , 2012, p. 6).

Given that natural disaster readiness is a cross-cutting issue, there should be a model to identify and prioritize disaster prone areas, during planning and programming for development activities. This can focus on various sectors such as transport, health, and education, urban and rural land use planning. It can also focus in the development of building codes by viewing these along the timeline beginning with preparedness and ending with recovery as a necessity for developing a meaningful strategy for reducing future losses, as events of natural disasters reoccur. It may further increase focus on pre-disaster initiatives and a long term thinking of response and recovery not omitting rehabilitation of the most risky inhabiting populations. Scarce studies on Rwanda about natural disaster preparedness and sustainable development have been done and therefore, this study attempted to cover the gap by investigating how natural

disaster preparedness affects the sustainable development of Rutsiro District, Rwanda.

3. Objectives of the Study

The purpose of this study was to analyze to which extent the government of Rwanda is prepared for natural disasters to achieve sustainable development. This research verified four specific objectives:

- i. To assess the natural disaster preparedness strategies used in the district.
- ii. To identify the effects of natural disasters on sustainable development of the district.
- iii. To evaluate the strength of natural disaster strategies in place aimed at sustainable development.
- iv. To establish lasting strategies on disaster preparedness management for sustainable development.

4. Literature Review

In order to create an academic context for the study, the researcher identified theory for guidance, and this study used social capital theory. Disasters can cause both physical damage and losses incurred by social units and the disruption of the unit's routine functioning and within its network of other social units. Whenever there is a natural and man-made disaster, people help one another before they are supported or replaced by government entities. It emphasizes the importance of being there for one another as people in order to work and help one another, even during disaster. This sense of moral responsibility produces collective action in times of threat to the community (Schellong, 2007:2).

Schellong (2007:2) indicates that if there are problems or dissatisfaction among residents, they would not be able to help each other during

emergencies. He uses an example that during the Kobe earthquake in 1995, many people had weak links with the larger community and that had enormous influence on the speed of recovery.

According to Schellong (2007:4) social capital lowers the transaction costs of information acquisition. He adds that, one means by which information can be acquired is by use of social relations that are maintained for other purposes. The social networking services such as Facebook, Twitter and others are used to gather information on users' social contacts, their interests, construct interconnected social networks and reveal to users how they are connected in the network (Schellong 2007:3). Three types of social capital theory are:

- Bonding social capital theory involves connections between people with similar characteristics and interests and tends to reinforce homogeneity and exclusivity (McGonigal *et al.*, 2005:1).
- Bridging social capital theory involves connections between people from diverse contexts and is seen as inclusive (McGonigal *et al.*, 2005:1).
- Linking social capital theory concerns relationships among people with different powers and allows access to resources, ideas, information and knowledge within a community or groups (McGonigal *et al.*, 2005:1).

This study is influenced by the first and third types which are more relevant to the main aim to assess the state of public awareness of the prevalence of hazards. The study seeks to look at the way in which public awareness builds connections amongst the residents since they are exposed to hazards as

described by type one above. It is believed that social systems allow the residents to share information and learn from each other. The study further focuses on how the local authority forges relationship with the community by sharing of information, ideas and knowledge concerning their safety.

4.1 Theoretical Framework

Natural Disaster

Impacts from natural disasters vary from developed nations to developing countries. Natural disasters impact developed nations and underdeveloped countries differently. According to the World Bank, Japan and the United States have two of the strongest economies in the world, however both have fallen victim to major natural disasters. Natural disasters can hamper the pace of investment in basic infrastructure, with implications for long-term growth electric power interruptions, transport bottlenecks, limitations of port facilities, and so, forth are well-known difficulties. Disasters furthermore undermine sustainable development (Benson, Charlotte, 2016).

Causes of Natural Disasters

Certain factors present in poverty environments turn a natural hazard into a disaster: Poorly constructed buildings, Poor sanitation, Rapid population growth/high density population, Limited resources for disaster response and rebuilding, Lack of economic safety nets. The availability of good-quality, trustworthy data is a necessary condition for effective management of natural disaster risk. Strengthening of information systems and the application of information in risk management have

reduced the economic and human suffering inflicted by extreme events (UNEP, 2011).

Natural Disasters Preparedness

All the countries of the United Nations Economic Commission for Europe (UNECE) region, including the most developed, are vulnerable to disasters. As disasters such these know no borders, effective response requires Trans boundary or regional coordination and cooperation. The plan calls on the United Nations system, both as individual organizations and collectively, to “make disaster risk reduction a priority”. UNECE plays a crucial role in disaster preparedness in its region and through its recommendations, treaties and best practice well beyond its boundaries, particularly in the following areas: Standards and regulatory frameworks; Housing and Land Management; The Water Convention; Industrial Accidents Convention; Human Rights; Measurements and Forests (UNDP, 2013).

Sustainable development is the outcome of comprehensive planning that incorporates considerations of reducing hazards and vulnerability as well as strategies designed to protect the environment and to improve economic growth, levels of education, and living conditions of the entire population (WHO, 2019).

Natural Disasters in Rwanda

With its geographical location in the East African Rift Valley near the Nyiragongo volcanoes and the effect of the Inter Tropical Convergence Zone (ITCZ) on the continent, Rwanda is vulnerable to natural disasters emanating from climatic or seismic disturbances. Some of these disasters include drought, torrential rains, floods, landslides,

earthquakes, volcanic eruptions and epidemics. In the past 10 years, these disasters have practically occurred throughout the country.

Natural disasters awareness in Rwanda

Natural disaster preparedness require that people know the methods of construction, use and combination of specific materials, resilient enough to disaster. Environmental and agricultural knowledge, historical knowledge are essential in the groups of people and institutions in disaster awareness (Dekens, 2007). A critical component of disaster preparedness is the knowledge of available local resources information, and how to respond at the time of disaster. Impacts of natural disasters can be reduced through pre-disaster activities for mitigating risks, and such activities are among the most crucial aspects of disaster reduction to consider, in forming a coordinated strategy or plan of dealing with disaster before they occur, by raising awareness of disasters to all components.

Sustainable Development

Relevance of disasters to sustainable development: disasters undermine sustainable development. They result in loss of life and cause injury, sometimes with life-changing consequences. Furthermore, they destroy homes, schools, health clinics, hospitals, utilities, roads, markets and other social and economic infrastructure as well as damaging the natural environment. These direct, physical losses have further indirect consequences, disrupting livelihoods, education, access to health care and so forth, together leading to adverse secondary impacts on social and economic aggregates such as GDP, the

balance of payments and budget deficits (Cabezon *et al.*, 2015).

4.2 Empirical Studies

Disaster preparedness requires a thorough understanding of the factors that influence performance or non-performance of disaster preparedness behaviors (DPB). The major aim of this research was to further our understanding of DPB based on the theory of planned behavior (TPB). Method, this was a cross-sectional study of factors determining of DPB in a representative sample of 1233 Tehran inhabitants. Measures derived from the TPB were obtained in the unprepared and prepared people. The results, consistent with the theory, intentions to do DPB could be predicted from attitudes, subjective norms, and perceived behavioural control with respect to DPB; and actually doing DPB was strongly related to intentions and perceptions of control assessed in the prepared people. Theoretical and practical implications of these findings are discussed. The conclusion, an effective intervention has not only to encourage people of the desirability of DPB, but also to provide them with the skills and means to do it. The more strongly they can be made to feel that they have control over DPB, the more likely they are to carry out their intentions. That is, heightened perceived control tends to strengthen people's motivation to do DPB (Mehdi Najafi, 2017).

Natural disaster preparedness in a multi-hazard environment: characterizing the socio-demographic profile of those better (worse) prepared. The growing multi-hazard environment to which millions of people in the world are exposed highlights the

importance of making sure that populations are increasingly better prepared. The objective of this study was to report the levels of preparedness of a community exposed to two natural hazards and identify the primary socio-demographic characteristics of groups with different preparedness levels. A survey was conducted on 476 participants from two localities of the Atacama Region in the north of Chile during the spring of 2015. Their level of preparedness at home and work was assessed to face two types of natural hazards: earthquakes and floods. The findings show that participants are significantly better prepared to face earthquakes than floods, which sends a serious warning to local authorities, given that floods have caused the greatest human and material losses in the region's recent history of natural disasters. Men claimed to be more prepared than women to face floods, something that the authors attribute to the particular characteristics of the main employment sectors for men and women in the region. The potential contribution of large companies on preparedness levels of communities in the areas in which they operate is discussed. The socio-demographic profile of individuals with the highest levels of preparedness in an environment with multiple natural hazards are people between 30 and 59 years of age, living with their partner and school-age children. The implications of the results pertaining to institutions responsible for developing disaster risk reduction plans, policies and programs in a multi-hazard environment are discussed (Nicolás C. Bronfman, 2019).

5. Methodological Framework

This study uses quantitative approach in order to show the natural disaster preparedness strategies used in Rutsiro District, effects of natural disasters on sustainable development, the natural disaster strategies in place aimed at sustainable development and lasting strategies on disaster preparedness management for sustainable development. The study employed statistical package for social sciences (SPSS) version 20.0 to analyze data. Target

population was 324,654 from whom 133 mature, and educated people were conveniently chosen from Rutsiro who the researcher thought knew well natural disasters, their effects and how preparedness and sustainable development could be managed to benefit the population.

Sample size and Sampling procedure

This study applied the simple random sampling technique to select 100 respondents from selected mature and educated people in Rutsiro district.

Table 0. Sampling procedure

Population	Sample	Sampling Design	Data Collection Methods
324,654 (133) Mature and educated residents chosen conveniently	100	Simple random	Questionnaire
Local chiefs 5	5	Convenient	Interview

6. Results and Discussions

The researcher went to the field of study to distribute the questionnaire to respondents in Rutsiro District, where they were given four days of responding the questions. The interview also was addressed to three persons in the board. The findings indicated the participation rate of 100.0% in answering the questions. This helps the researcher to continue research with editing, coding, and tabulation in order to make statistical tables using SPSS IBM 21.0 version.

6.1 Profile of Respondents

This part identifies gender, age, education level, marital status, experiences of respondents who participated in this research at Rutsiro District. Table 1 illustrates data collected from field of research that explaining respondents profile involved in this study.

Table 1. Socio-Demographic characteristics of Respondents

Socio-demographic of Respondents		Frequency	Percent
Gender	Male	53	53.0
	Female	47	47.0
	Total	100	100.0
Age	Between 21 and 30 years	21	21.0
	Between 31 and 40 years	27	27.0
	Between 41 and 50 years	32	32.0
	51 years and Above	20	20.0
	Total	100	100.0
Marital Status	Single	50	50.0
	Married	50	50.0
	Total	100	100.0
Education Level	Masters and above	9	9.0
	Bachelor's degree	79	79.0
	Secondary level	12	12.0
	Total	100	100.0

Source: Primary data from field (August 2020)

During data collection, the results confirmed that there was gender in interview done with respondents in Rutsiro District where, 53.0% of respondents were males while 47.0% respondents were females. This means that there was a high role played by both females and males in natural disaster preparedness strategies and sustainable development. Concerning to ages, 21.0% among of participants' respondents were between 21 and 30 years. 27.0% of respondents were between 31 and 40 years. 32.0% respondents were between 41 and 50 years while only 20.0% respondents have age of 51 years and above. In terms of marital status, the participants of study included by 50.0% of respondents who were single, and 50.0% respondents married people. Their level of education is 9.0% respondents have masters

level, and above. 79.0% have bachelor's degree while only 12.0% respondents have secondary level. This is good things that helped us to obtain appropriate data for this study.

6.2 Natural Disaster Preparedness Strategies used in Rutsiro District

Literally, there are many presence of natural disasters affecting mainly life of majority people especially those who live in high risk zones in Rwanda. Rutsiro is one among the districts of Rwanda that presents high risk of natural disaster because of natural of land constituted by this district. Table 2 below shows the findings on natural disaster preparedness strategies used in Rutsiro District as detailed.

Table 2: Natural Disaster Preparedness Strategies used in Rutsiro District

Natural Disaster Preparedness Strategies	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
Rustiro district has planned for disasters by creating a community or national emergency operation plan.	41	41.0	44	44.0	11	11.0	1	1.0	3	3.0
There are elaborative and effective warning system, or messages available.	17	17.0	44	44.0	25	25.0	14	14.0	0	0.0
There are standards and regulatory frameworks for natural disaster preparedness.	41	41.0	34	34.0	12	12.0	7	7.0	6	6.0
There are established housing master plans and land management strategies.	38	38.0	51	51.0	11	11.0	0	0.0	0	0.0
There is an established water conservation system.	38	38.0	51	51.0	11	11.0	0	0.0	0	0.0
There is a consistent afforestation plan in place.	54	54.0	34	34.0	12	12.0	0	0.0	0	0.0

Source: *Primary Data from Field (August, 2020)*

Findings indicated on table 2 shows perceptions of respondents about natural disaster preparedness strategies adopted by Rutsiro District. More than 85.0% respondents included by 41.0% strongly agreed and 44.0% agreed that Rustiro District has planned for disasters by creating a community or national emergency operation plan. Over of 61.0% respondents including 17.0% respondents strongly agreed and 44.0% respondents agreed that there are elaborative and effective warning system, or messages available in Rutsiro District. Total of 86.0 % respondents included by 43.0% strongly agreed and 43.0% agreed that in Rutsiro District, there are standards and regulatory frameworks for natural disaster preparedness. 75.0% respondents included by 41.0% strongly agreed and agreed about establishment of housing master plans and land

management strategies in Rustiro District. There is an established water conservation system confirmed by 89.0% respondents included by 38.0% respondents strongly agreed and 51.0% respondents agreed that it is among of the natural disaster preparedness strategies used in Rutsiro district. More than 88.0% respondents constituted by 54.0% respondents who strongly agreed and 34.0% respondents agreed that there is a consistent afforestation plan in place at Rutsiro District.

6.3 Effect of natural disasters on sustainable development of Rutsiro District

Findings presented on table 3 show an overview on effect of natural disasters on sustainable development of Rutsiro District as follows.

Table 3: Effect of natural disasters on sustainable development of Rutsiro District

Natural disasters on sustainable development of Rutsiro District	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
There has been migration around the district due to natural disasters which affect sustainable development.	58	58.0	16	16.0	11	11.0	9	9.0	6	6.0
Health problems are some of the outcomes of natural disasters in Rutsiro district.	49	49.0	39	39.0	9	9.0	0	0.0	3	3.0
Health issues are one of the most pressing problems after any natural disaster.	39	39.0	42	42.0	12	12.0	7	7.0	0	0.0
Infrastructure and transportation systems have been disrupted due to natural disasters.	38	38.0	45	45.0	12	12.0	0	0.0	5	5.0
Natural disasters have destroyed the ecosystem; pollution and waste materials have interfered with sustainable development.	38	38.0	41	41.0	14	14.0	7	7.0	0	0.0
Communities that experienced a natural disaster must also absorb the impacts of these destructive events.	49	49.0	37	37.0	11	11.0	3	3.0	0	0.0

Source: *Primary Data from Field (August, 2020)*

Findings confirmed that more than 74.0% of respondents included by 58.0% respondents strongly agreed and 16.0% respondents who agreed that there has been migration around the district due to natural disasters which affect sustainable development in Rutsiro District. 88.0% respondents from 49.0% respondents who strongly agreed and 39.0% respondents agreed that health problems are some of the outcomes of natural disasters in Rutsiro district. While 81.0% respondents constituted by 39.0% who strongly agreed and 42.0% agreed that health issues are one of the most pressing problems after any natural disaster in Rutsiro District. Infrastructure and transportation systems have been disrupted due to natural disasters confirmed by 83.0% respondents included by 38.0% respondents who strongly agreed and 45.0% agreed about this activity in Rutsiro

District. Natural disasters have destroyed the ecosystem; pollution and waste materials have interfered with sustainable development, confirmed by 79.0% respondents in Rutsiro District. More than 86.0% respondents included by 49.0% respondents strongly agreed and 37.0% respondents agreed that Communities that experienced a natural disaster must also absorb the impacts of these destructive events in Rustiro District.

6.4. Strong measures were put in place for disasters in Rutsiro District

Table below presents perceptions of respondents about strengths of natural disaster strategies in place in Rutsiro District.

Table 4: The strengths of natural disaster strategies in place at Rutsiro District

	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
Natural disasters in place are measures supporting sustainable development	38	38.0	42	42.0	5	5.0	15	15.0	0	0.0
Setting Strong disaster strategies helps the district to the more resilient to disasters.	64	64.0	30	30.0	6	6.0	0	0.0	0	0.0
The education on disaster preparedness is a key strategy in containing natural disasters.	40	40.0	43	43.0	17	17.0	0	0.0	0	0.0
Disaster preparedness is to reduce (avoid, if possible) the potential losses from hazards.	49	49.0	39	39.0	12	12.0	0	0.0	0	0.0
Disaster management is to reduce (avoid, if possible) the potential losses from hazards.	43	43.0	41	41.0	5	5.0	11	11.0	0	0.0
Disaster management cycle uses three general phases of prevention and preparedness, emergency/disaster response and recovery for effective development.	24	24.0	56	56.0	20	20.0	0	0.0	0	0.0
Preparedness facilitates in proper planning, resource allocation, and training, including simulated disaster response exercises.	35	35.0	43	43.0	9	9.0	6	6.0	0	0.0

Source: *Primary Data from Field (2020)*

Natural disasters in place are measures supporting sustainable development, confirmed by 80.0% respondents. Setting Strong disaster strategies helps the district to the more resilient to disasters, confirmed by 94.0% respondents. The education on disaster preparedness is a key strategy in containing natural disasters, confirmed by 83.0% respondents. Disaster preparedness is to reduce (avoid, if possible) the potential losses from hazards, confirmed by 88.0% respondents. Disaster management is to reduce (avoid, if possible) the potential losses from hazards, confirmed by 84.0% respondents. Disaster management cycle uses three

general phases of prevention and preparedness, emergency/disaster response and recovery for effective development, confirmed by 80.0% respondents. Preparedness facilitates in proper planning, resource allocation, and training, including simulated disaster response exercises, confirmed by 78.0% respondents.

6.5 Lasting strategies on disaster preparedness management for sustainable development

The impacts of natural disasters can be reduced through pre-disaster activities for mitigating risks,

and such activities are among the most crucial aspects of disaster reduction to consider, in forming a coordinated strategy or plan of dealing with disaster before they occur, by raising awareness of

disasters to all components. Table 5 to 7 which illustrated that there various lasting strategies on disaster preparedness management for sustainable development as detailed on tables below.

Table 5: Installation management as among of lasting strategies on disaster preparedness management for sustainable development

Installation management	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
There are measures to activate special installation such as mobile hospital facilities help to reduce disaster risk.	47	47.0	38	38.0	9	9.0	6	6.0	0	0.0
There are urgent that activities can be done when natural disasters strike.	34	34.0	50	50.0	5	5.0	5	5.0	6	6.0
Preparation for emergency installation centers and shelters.	53	53.0	38	38.0	9	9.0	0	0.0	0	0.0

Source: Primary Data from Field (August, 2020)

There are measures to activate special installation such as mobile hospital facilities help to reduce disaster risk, confirmed by 85.0% respondents who strongly agreed and agreed. There are urgent that

activities can be done when natural disasters strike, confirmed by 84.0% respondents. Preparation for emergency installation centers and shelters, confirmed by 91.0% respondents.

Table 6: Equipment management is lasting strategies on disaster preparedness management for sustainable development

Equipment management	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
Preparation for storing or making arrangements for rapid response facilities	42	42.0	38	38.0	13	13.0	3	3.0	4	4.0
Procedures for activating emergency facilities for transport	44	44.0	43	43.0	7	7.0	6	6.0	0	0.0

Source: Primary Data from Field (2020)

The equipment management is lasting strategies on disaster preparedness management for sustainable development where 80.0% respondents confirmed that there is a preparation for storing or making

arrangements for rapid response facilities. 87.0% respondents confirmed that there are procedures for activating emergency facilities for transport.

Table 7: Personnel management as lasting strategies on disaster preparedness management for sustainable development

Personnel management	SA		A		N		D		SD	
	fi	%	fi	%	fi	%	fi	%	fi	%
The ways training ideas and personnel.	36	36.0	46	46.0	16	16.0	1	1.0	1	1.0
Developed evacuation procedure.	45	45.0	32	32.0	11	11.0	7	7.0	5	5.0
Disaster assessment teams.	48	48.0	38	38.0	9	9.0	3	3.0	2	2.0
Assessment process and information priorities for response.	38	38.0	46	46.0	8	8.0	5	5.0	3	3.0
Developed emergency preparation, plans processes and procedures.	38	38.0	44	44.0	14	14.0	1	1.0	3	3.0

Source: Primary Data from Field (August, 2020)

The ways training ideas and personnel, confirmed by 82.0% respondents. 77.0% respondents confirmed that they developed evacuation procedures. 86.0% respondents confirmed that there are disaster assessment teams. Assessment process and information priorities for response, confirmed by 84.0% respondents. 82.0% respondents confirmed that they developed emergency preparation, plans processes and procedures.

7. Conclusion and Recommendations

Conclusion

The findings show that the goal of natural disaster preparedness is to reduce the adverse effects of disasters. Disaster preparedness is an ongoing process of assessment, planning and training to prepare for a well-coordinated plan of action. The technical shortcomings, insufficient preparedness on how best to manage emergencies can potentially increase the impact of an incident. The planning process would produce both effective strategies and systems that are simple and flexible, with understandable designated roles and strong communication and networking between

stakeholders, including the community. Based to the findings on research problem was solved, research objectives were achieved, research questions were answered. And the researcher concluded that natural disaster preparedness affect positively sustainable development in Rutsiro district, republic of Rwanda.

Recommendations

Natural disaster preparedness require that people should know and follow the methods of construction, use and combination of specific materials, resilient enough to disaster. Should also know Environmental and agricultural knowledge, historical knowledge as essential in the groups of people and institutions in disaster awareness at this district. Rwanda Meteorological service does not have enough capacity to deliver sufficient data information and advisories due to lack of sufficient qualified personnel, inadequate observing station network and sufficient data processing equipment thus the meteorological stations that are currently operational are not representative enough to provide a true picture of climate variability for an enhanced awareness that will result to preparedness.

Government should prepare training about natural disasters in Rwanda.

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