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COMMUNITY DISASTER RESILIENCE: THE CASE OF TYPHOON KAREN (SARIKA) AFFECTED BARANGAYS IN SAN MIGUEL, BULACAN

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ABSTRACT

The study focuses on the Local Government Units (LGUs) and the community resiliency or preparedness response taken before and during the typhoon, and the activities undertaken in the aftermath of Typhoon Karen of the most affected barangays of San Miguel, Bulacan, namely: Poblacion, Salacot, and San Jose. Interviews and surveys were conducted in order to determine their actions before, during, and after the typhoon. The qualitative data were analyzed using content analysis, while the quantitative data underwent statistical analysis of frequency, percentage, and multiple responses. Based on the findings, the municipal government and the three barangay governments were prepared and conducted the proper emergency responses in the case of Typhoon Karen. All the three barangays have their own information drive as its information system and systematic strategies of preparedness during and after the typhoon. This shows how important the role of the state is for any given community. In the disaster preparedness of the communities, results show that the communities have a high degree of self-awareness in terms of the ongoing situation. During disasters, survival mechanisms performed by the community were primarily to protect life, secure the minimal provision of food and other basic needs, and procure the safety of their residence and valuables. In the aftermath of the typhoon, most of the strategies done by the local people were less dependent on external assistance that hastened the process of going back to normal life after flooding had receded. The activities and programs of the LGUs in relation to the mitigation on the occurrence of floods tend to be insufficient to the needs of the majority. Protection of the people and ensuring their safety and survival have always been the role of every state.

Keywords: resilience, disaster preparedness, response and relief, rehabilitation, Typhoon Karen/Sarika,

INTRODUCTION

The Philippines, being located within the Pacific Ring of Fire, has been classified among the top ten hazardous countries in the world on account of the numerous natural geo-meteorological hazards to which it is constantly exposed. The National Disaster Risk Reduction and Management Council has recorded 523 events from 1987 to 2000 with an average of 37 disasters annually (Office of Civil Defense, 2001).

The Philippines is described as not only lying within the earthquake-prone Pacific Ring of Fire, but also along the typhoons formed by the Western Pacific. The Philippines sits along the path of tropical storms that ravage the islands at the average rate of 20 typhoons and 5 super typhoons each year (Philippine Daily Inquirer, 2013).

Community involvement has become one of the chief priorities for establishing effective partnerships for disaster risk reduction according to the United Nations Office for Disaster Risk Reduction (UN-ISDR) Hyogo Framework for Action (2005-2015) (UN-ISDR, 2005). Regarding disasters, identifying risk factors and understanding the ways in which communities cope and adapt themselves to hazardous environments are considered important determinants for risk reduction and decision-making at local and municipal levels.

The municipality of San Miguel in the province of Bulacan, Philippines is frequently battered by typhoons. According to historical reports of the municipality on disasters, San Miguel, Bulacan experiences natural disasters throughout the year. During rainy seasons, they experience typhoons that cause floods. Those typhoons bring heavy rains that last a long time, causing damage to property and loss of crops (CDP, 1998).

With the characteristic of San Miguel, Bulacan as a flood-prone area, it is only apt to look into how the municipality prepares for calamities like typhoons that often visit the area and how the residents responded in the past calamities. Thus, the current study intends to investigate the resilience of San Miguel Local Government Units (LGUs) and the communities, particularly in the most flooded barangays of Poblacion, Salacot, and San Jose in handling the past Typhoon Karen as well as future typhoons that might occur. More specifically, the study aims to: (1) determine the disaster preparedness of the local government units of San Miguel, Bulacan and the communities of Barangay Poblacion, Salacot, and San Jose before the occurrence of Typhoon Karen; (2) define the actions taken by the LGUs and the local residents of the three most affected barangays during Typhoon Karen; (3) determine the actions done by the LGUs and the local communities of Barangay Poblacion, Salacot and San Jose in the aftermath of Typhoon Karen, and in preparation and mitigation for possible impacts of future typhoons and floods.

The conceptual paradigm (see Figure 1) shows the interconnection between the dependent and independent variables. The independent variables are: the government and community disaster prevention and mitigation with the primary role of avoiding hazards and mitigating their potential impacts by reducing vulnerabilities and exposure and enhancing capacities of communities; government and community preparedness that establishes and strengthens capacities of communities to anticipate the negative impacts of emergency occurrences and disasters; government and community

disaster response, that provides life preservation and meets the basic subsistence needs of affected populations based on acceptable standards during or immediately after a disaster; and government and community disaster rehabilitation and recovery that restores and improves facilities, livelihood, and living conditions and organizational capacities of affected communities and reduce disaster risks. The dependent variables are products of government and community interventions to become a safer, adaptive, and disaster-resilient community towards sustainable development.

MATERIALS AND METHODS

A qualitative and quantitative case study approach was used as the research design of the study. Different types of qualitative methods were used to gather data such as review of documents and interviews with key informants. The review of the documents and the information gathered from the interviews were used to determine the available information regarding disaster preparedness of the LGUs in relation to the preferred disaster risk reduction management plan of the municipality. The study used a survey to ask the residents of the flood-prone areas of Barangay Poblacion, Salacot, and San Jose to determine their preparedness and their activities during and after Typhoon Karen. The selection of the barangays was based on the recommendation of the Municipal Disaster Risk Reduction and Management Office (MDRRMO) head as well as the top flood-prone barangays that were affected by Typhoon Karen.

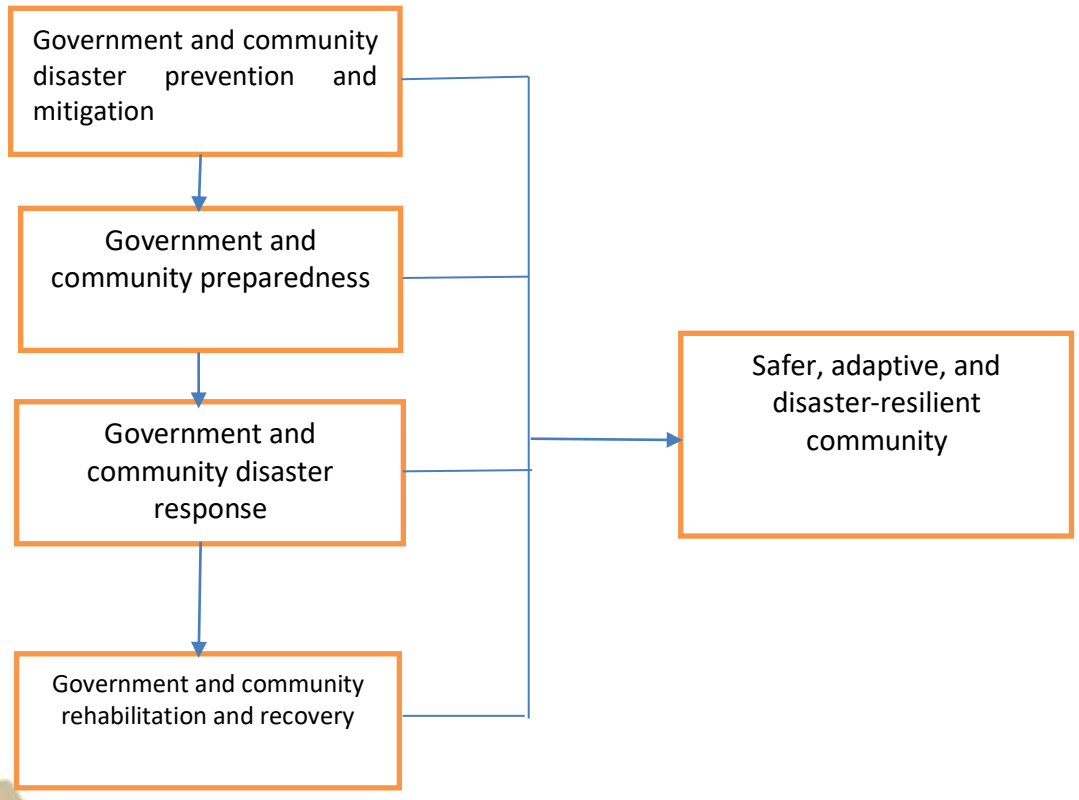

Figure 1. Conceptual Paradigm

The data sources of the study were composed of primary and secondary sources. The secondary sources were gathered from municipal and barangay offices' files and from various reports of research conducted on a similar or related topic. In this study, interviews with the head of MDRRMO, Municipal Planning and Development Office (MPDO), and Municipal Social Welfare and Development (MSWD), Municipal Agriculture Office (MAO), and the barangay officials of Poblacion, Salacot, and San Jose were conducted.

The residents of the Typhoon Karen affected barangays (Poblacion, Salacot, and San Jose) were randomly and purposively chosen as part of the respondents of the study being the most affected barangays of Typhoon Karen.

A qualitative and quantitative case study approach was used as the research design of the study. Semi-structured interviews with the heads of MDRRMO, Municipal Planning and Development Office (MPDO), and Municipal Social Welfare and Development (MSWD), Municipal Agriculture Office (MAO), barangay officials, and local residents of barangays Poblacion, Salacot, and San Jose were used as the respondents of the study. They were interviewed on the preparations done for the upcoming typhoon and actions during and after Typhoon Karen. The efforts of the LGUs in the preparation and mitigation for possible impacts of future typhoons and floods were also tackled. Primary data were taken with survey questionnaires which were distributed among the residents of the three barangays. A total of 30 respondents were chosen randomly and purposively in the designated point areas of the barangays. The observation method was also utilized to generate information on the locale of the study.

The quantitative data were subjected to descriptive statistics of frequency and percentage distribution. Multiple responses statistics were used to analyze the data on respondents' actions before, during, and after the typhoon.

RESULTS AND DISCUSSION

Municipal Officials' Disaster Preparedness Before the Onset of Typhoon Karen

Before the occurrence of the typhoon, the MDRRMO had already conducted disaster trainings on earthquake, fire, and flood with the local and barangay officials as participants. However, the municipality is still developing the municipality's Disaster Risk Management Plan. In terms of equipment that are in used in rescue missions, the LGU is well equipped with fiber boats, trucks, ropes, ladders, chain saws, axes, bolos, and bolt cutters. Different barangays were provided by the Provincial Risk and Reduction Management Office (PDRRMO) of Bulacan with equipment that can be used in rescue missions.

In the case of Typhoon Karen, municipal government officials conducted weather monitoring through their personal access to the Philippine Atmospheric and Geophysical Astronomical Services Administration (PAGASA) website on the level of the rain gauge located around the flood-prone areas of the municipality. After two hours of non-stop heavy rain, they warned the residents living along the riverside to evacuate. They also proposed the suspension of classes and offices to the municipal mayor and prepared the necessary equipment and evacuation centers. The MDRRMO conducted a pre-disaster risk assessment planning and meeting with the Philippine National Police-San Miguel, Bureau

of Fire Protection-San Miguel, Philippine Public Safety College 2nd Maneuver, First Scout Ranger Regiment, Army Reservist, 48th Infantry Battalion, and radio operator. A pre-disaster risk assessment meeting with the San Miguel League of Barangay Captains was also conducted (see Table 1).

Table 1. Disaster's Preparedness of the Municipal Officials Before the Onset of Typhoon Karen

	Activities
Preparations done before Typhoon Karen	• MDRRM Plan in process • disaster trainings • fully equipped in terms of rescue missions • weather monitoring • advised residents to evacuate • proposed class and work suspensions • prepared the necessary equipment and evacuation centers • conducted predisaster risk assessment planning and meeting

Barangay Officials' Disaster Preparedness Before the Onset of Typhoon Karen

Before the onslaught of Typhoon Karen, the governments of the three affected barangays have formulated their own Barangay Disaster Risk and Reduction Management (BDRRM) Plan last 2014. Barangay Disaster Risk and Reduction Committees were also present in the three barangays. All spearheaded by their respective barangay captains, the Committee involves the barangay officials and their respective *tanods*. In San Jose, non-government organizations (NGOs) such as the pastoral council of San Jose Parish Church, and people's organizations, such as cyclists, were also involved in their BDRRM Committee.

All three barangays have early warning systems, communication protocols, and evacuation procedures and rules for disasters caused by floods which are well discussed in their manuals. Seminars and meetings were conducted by the barangay governments in order to prepare their constituents on the occurrence of different types of calamities. In terms of the availability of the equipment that are needed in possible rescue operations, the three barangays were found to be poorly equipped mainly with life vests and ropes. An additional spine board was available in Barangay Poblacion. Only one fire truck that can be used as rescue vehicle is available in Barangay Salacot. On the other hand, a rescue vehicle and medicinal kit was present in Barangay San Jose. Officials and staff of the three barangays had undergone disaster trainings that focused on the floods.

Different approaches in terms of preparations were done by each barangay during Typhoon Karen. Barangay Poblacion warned their community through house-to-house dissemination, while Barangay Salacot used their fire truck that roamed around the barangay. Barangay San Jose warned their locals through their early warning system that is located in the barangay hall; they also went to the households dwelling in the flood-prone areas and convinced them to evacuate. All the three barangays conducted monitoring on the water levels in the rivers and creeks that are located within their vicinity.

Only Barangay Poblacion conducted meetings with BDRRM Committee and the Sangguniang Barangay for the possible effect of the typhoon on their barangay and the actions that must be done.

Table 2. Barangay Officials' Disaster Preparedness Before the Onset of Typhoon Karen

	Activities
Preparations done before Typhoon Karen	• presence of BDRRM Plan • existence of BDDRM Committee • Poorly equipped in terms of rescue missions • Seminars and meetings • early warning systems • monitoring on the weather and water levels • meeting with the BDRRM Committee (Poblacion)

Community Members' Preparedness Before the Onset of Typhoon Karen

Majority of the respondents prepared for the onset of Typhoon Karen through readying supplies (firewood for cooking, gas, drinking water, medicines, first-aid kits, flashlights, batteries, and ropes), with 86.67%, followed by 73.33% who stored food. Similarly 70% of the respondents were attentive by listening to the news and observing the changes in their surroundings. About 66.67% warned their relatives, friends, and neighbors about the typhoon, and 63.33% prepared their family for evacuation. Half of the respondents (50%) strengthened their houses. Trimming or cutting of trees that may be a cause of destruction was not much practiced by the communities with only 33.33%. Few residents or 3.33% stated that they turned off their electrical supply, and another family (3.33%) said that they did not do any preparations.

According to the locals of *Sitio Isla*, the main reason of the flooding in their area during Typhoon Karen originated from the water of Biak-na-Bato that goes down to the San Miguel River. The river's water level overflows rapidly in the middle of the night and flows inside the nearby *Sitio Isla*. Jasmine Quiambao, a resident of *Sitio Isla* confessed that they did not do any preparation upon the approach of Typhoon Karen due to the confidence that the waters will not reach their house because it is located in the higher area of the *purok*. They were surprised when they woke up in the morning with ankle-deep water inside their house. On the other hand, Ofelia Calderon, another resident of *Sitio Isla* said that her family was prepared when Typhoon Karen hit Central Luzon. She said that her family was attentive to any updates on the condition and location of Typhoon Karen in the news.

Preparedness at the household level is the first line of defense against disaster impact. The fact that flooding in the studied barangays coupled with warnings and community-based mechanisms for self-awareness, determines that these communities are highly aware of the ongoing situation. Once people are warned that a typhoon will strike near their area, they become conscious of their high vulnerability; several decisions start to be made and actions taken, particularly at the family level. Existing local knowledge is thus transformed into self-defense mechanisms that seek to avoid or lessen the direct impact of flooding (Peters *et al.,* 2009).

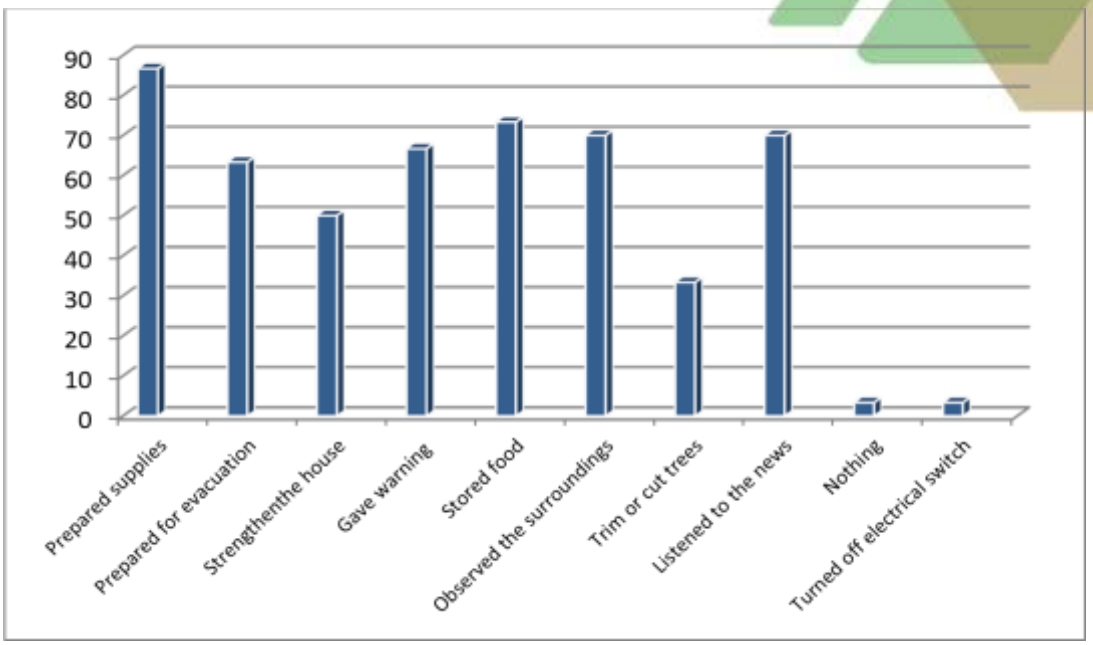

Figure 1. Preparations done by the three barangays before the onset of Typhoon Karen

Municipal and Barangay Officials' Disaster Preparedness on the Onset of Typhoon Karen

Even though the MDRRM Plan is still in progress, the MDRRMO prepared the town on the occurrence of the typhoon through disaster trainings, and the adequacy of equipment for disaster events. The municipal government of San Miguel prepared in the case of Typhoon Karen through weather monitoring, advising the residents in the flood-prone areas to evacuate, proposing work and class suspensions, preparing necessary equipment, and conducting a pre-disaster risk assessment planning and meeting with various organizations and barangay officials.

The barangay acted on the onset of the typhoon also by monitoring through the weather and the water levels in the rivers and creeks. The three barangays informed their constituents in the upcoming typhoon through their own early warning systems. Effective early warning systems can really make a difference between life and death. As they keep improving, they increasingly reduce disaster mortality rates worldwide (Rogers and Tsirkunov 2011). The fact that flooding in the studied barangays had occurred in the past, coupled with warnings and community-based mechanisms for self-awareness, determined that these communities were highly aware of the ongoing situation.

Table 3.Municipal, Barangay, and Communities Actions During Typhoon Karen

	Municipal Officials	Barangay Officials
Responses during Typhoon Karen	• monitoring of the water level on the rivers and creeks • evacuation missions to the families in the severely flooded areas	• monitoring on the water levels in the rivers • evacuation missions (Poblacion and San Jose) • feeding program on the evacuees (Poblacion and San Jose)

Community Response on the Onset of Typhoon Karen

Most of the residents of the three barangays respond to the typhoon through praying (90%), followed by 73.33% who prevented their kids from going out or playing in the midst of floodwaters. Majority of the respondents (63.33%) observed the changes in the water levels in the rivers, creeks, and irrigation canals.

Forty percent (40%) of the respondents stayed in their house during the Typhoon Karen, while 36.66% of the respondents performed evacuation. In terms of elevating their animals and things to higher places, 33.3% of the respondents elevated their things and animals in the time of typhoon. Thirty (30) respondents protected their houses by securing it to avoid water intrusion. In the case of temporary change in their current location, such as transferring to their second floor, roofs, and other safer places, 30% transferred locations.

Survival mechanisms in terms of disaster were performed by the community primarily to protect life, secure the minimal provision of food and other basic needs, procure the safety of their residence and valuables, and postpone evacuation until the last moment. These mechanisms helped people to feel that up to a certain point they can 'manage' the situation with their own resources. It was also shown that religion provides guidance in times of crisis. Moreover, religion also helps to understand and accept the things that are out of their own control, such as natural hazards (Ollet, 2008).

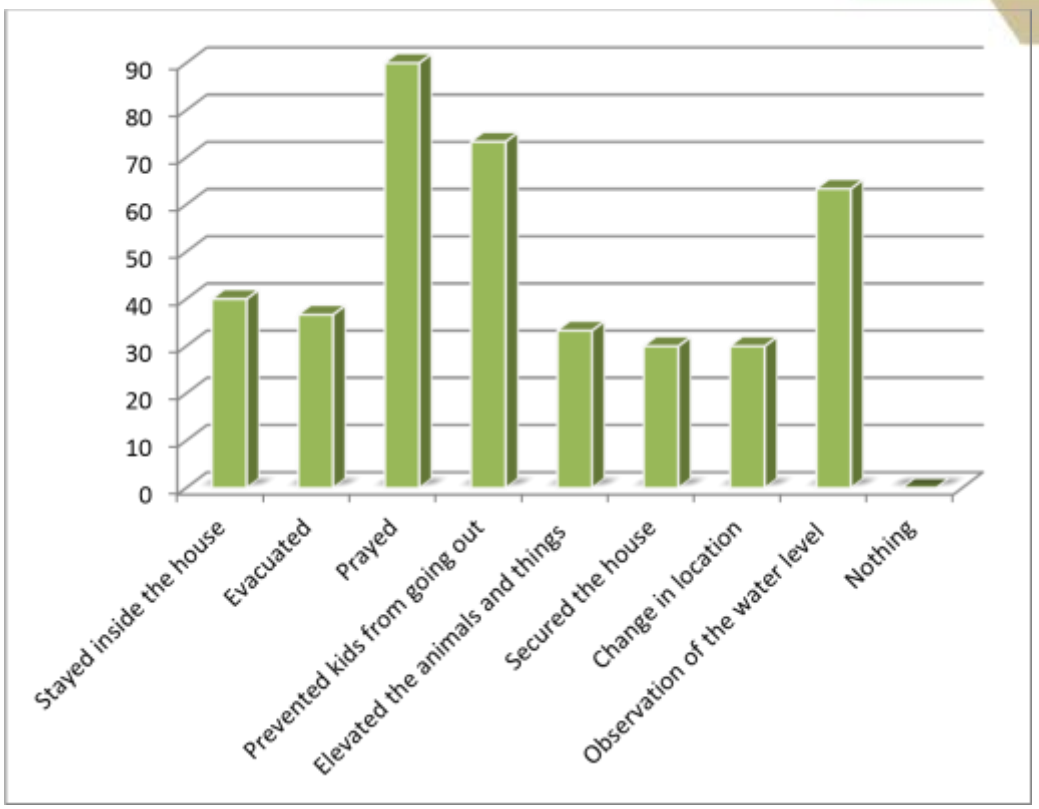

Figure 2. Community responses during Typhoon Karen

Actions of the LGUs, Barangay Officials, and Members of the Community After Typhoon Karen

After the disaster, the LGUs focused on rehabilitation. The MDRRMO acted in the aftermath of the typhoon through post-disaster risk assessment planning and meeting and in the assessment on the damages of every facility, while MAO provided rehabilitation programs to the affected farmers and fisherfolks. In the preparation of the municipality to the future impacts of typhoons that will occur, the MPDO proposed projects that were in line with adaptation and mitigation of floods.

In the immediate outcome of the typhoon, barangays Salacot and San Jose conducted relief operations. All the three barangays conducted cleaning operations and declogging of canals which they perceived as the primary reason for floods in their areas. Barangay San Jose conducted canal dredging, while Poblacion organized tree-planting activities. In the aftermath of natural disasters, government agencies usually lead in disaster recovery efforts.

Recovery after floods was considered another important indicator of coping with floods. Resilience is related to the degree to which households are capable of self-organization. The study showed that most of the strategies done by the local people were less dependent on external assistance and this sped

up the process of going back to normal life after flooding had receded, making the whole episode less traumatic.

Table 4..Municipal and Barangay Officials' Actions After Typhoon Karen

	Municipal Officials	**Barangay Officials**
Actions after Typhoon Karen	• assessment on the damage in every facility • post-disaster risk assessment planning and meeting • provide rehabilitation programs to the affected farmers and fishermen • proposal of projects in adaptation and mitigation of floods	• relief operations • clean-up drive • declogging of the canals • canal dredging (San Jose) • tree planting (Poblacion)

Community-Based Actions After the Typhoon

As for the actions of the residents taken after the incidence of Typhoon Karen, Figure 3 shows that almost all of the respondents (96.67%) conducted immediate cleaning of their houses and environment after the typhoon. This was followed by 70% of the respondents who dried out their things affected by the flood. Twenty respondents or 66.67% procured the safety of their houses by removing the floodwaters that entered their houses and repairing the damage done. Almost half (43.33%) of the respondents engaged in declogging the canals and waterways. Few of the respondents (16.67%) relied on external support by collecting relief goods and asking for financial assistance from their relatives, friends, moneylenders, and government loans.

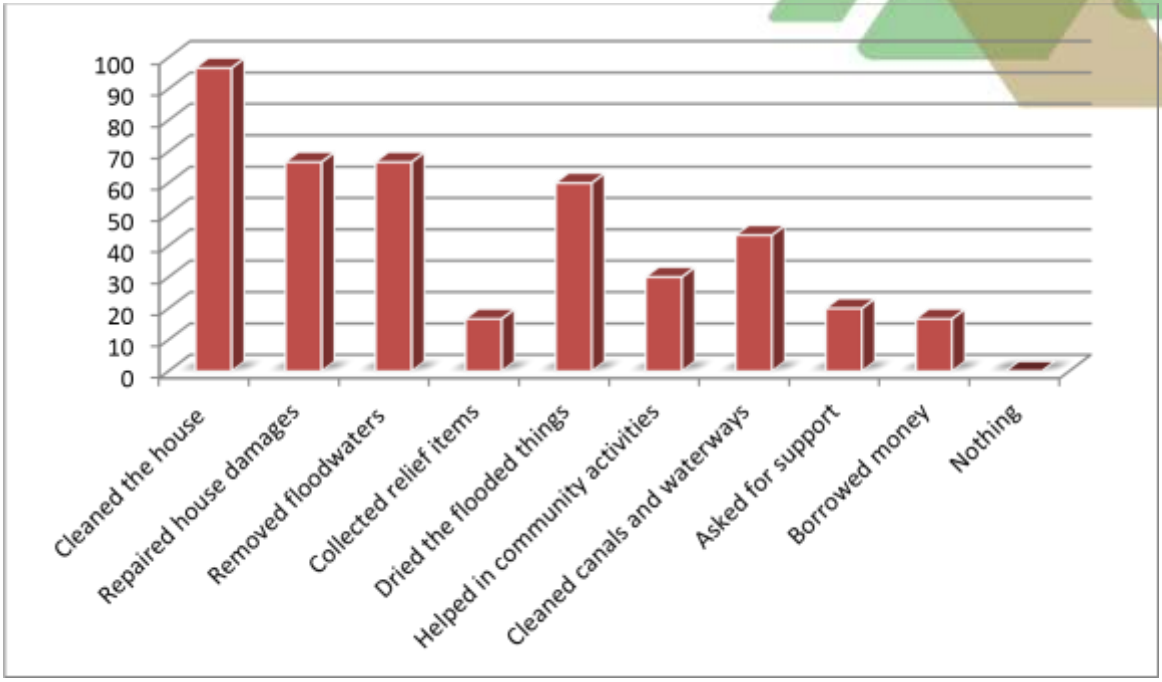

Figure 3. Actions done by the community of three barangays after Typhoon Karen

CONCLUSION

Based on the findings, barangay officials and members of the community in the three barangays were prepared and conducted the proper emergency responses in the case of Typhoon Karen. All the three barangays have their own information drive as its information system and systematic strategies of preparedness and actions during and after the typhoon. This shows the important role of barangay officials in any given community. Protecting the people and ensuring their safety and survival have always been the role of every community leader. However, the activities and programs of the LGUs in relation to the mitigation on the occurrence of floods tend to be insufficient to the needs of the majority.

The use of the perceptions developed with at-risk communities may help to broaden the general understanding of flood as a threat. In the preparedness of the communities in disasters, the study shows that the communities have a high degree of self-awareness in terms of the ongoing situation. It was observed that the threat embodied by flooding and typhoons were acknowledged mostly by the communities who were familiar with determining aspects such as water depth, duration, or velocity of the water and winds. It also involved understanding the role played by existing knowledge at community level; the awareness raised by barangay officials and community-based warning systems; and the efficacy of the social and economic coping strategies available at household, ward, and municipal levels. It is also discerned that the communities were less dependent on external assistance and mostly acted on their own.

RECOMMENDATIONS

In order to address the problem on activities and program insufficiency on mitigation on the occurrence of floods of the LGU, the following measures must be done:

1. A long-term development plan for flood control in affected communities must be initiated by the local executives seeking the support of the national government like National Economic Development Authority, National Risk Reduction Disaster and Management Office, Department of Public Works and Highways, and the Department of Budget and Management

2. The high level of awareness of the members of the community must be sustained by implementing a continuous information dissemination program on disaster risk reduction management.

3. Community active participation to disaster risk reduction management program and activities must always be encouraged.

4. Solid waste management program must be strictly implemented to avoid clogging of waterways /canal in the affected communities

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