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Disaster risk reduction management assessment of coastal communities of San Jose, Camarines Sur, Philippines

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Abstract

The study aims to identify the disasters affecting the coastal communities of San Jose Camarines Sur, Philippines and evaluate the extent of implementation of the disaster risk reduction management program before, during and after the occurrence of disaster. Findings revealed that the coastal communities of San Jose are at risks to disasters like landslide in Adiangao, flooding in Kinalansan, Dolo and Sabang and tsunami in Sabang, Dolo, Minoro, Kinalansan, Manzana, Telegrafo, Calalahan and Tagas. These coastal communities are also prone to storm surges which are experienced during typhoon. The provisions for disaster risk reduction management programs particularly on disaster prevention and mitigation, preparedness and rehabilitation and recovery have not been or poorly implemented while the provisions on disaster response were partially implemented. This places the lives and properties of the community still at high risk and vulnerability during the occurrence of disaster caused by climate change.

Keywords: Disaster; Risk Reduction Management; Assessment; Coastal Communities

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1. Introduction

The Philippines has long been vulnerable to extreme weather and the nation has long suffered from even more violent storms like Typhoon Haiyan (Typhoon Yolanda). Two factors that contribute to the country's threat to climate change are its geographical structure and sustainable development (Ecowatch, 2016). Located at the pacific coast area and a frequent visitor of typhoon and other calamities, the country is not free from the challenges caused by climate change. Likewise, the anthropological activities such as industrialization and use of fossil fuels contribute to the increase in the level of greenhouse gases in the atmosphere resulting to global warming. Based from the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAG-ASA, 2015), climate change is already happening and that these changes cannot be simply explained by natural variation. It is a complex event that everyone has to face with greater challenges and preparation to save lives and properties. The country is even more vulnerable to the consequences of climate change because of poverty, lack of knowledge, ability to protect itself and manage its own environment (Rappler, 2016). Other effects of climate change are the country's economic condition, food security and most specially the lives of the Filipino people (IFPRI, 2015). Enabling an institutional environmental protection and management such as the disaster risk reduction management plan is one of the solutions to address the adverse effects of climate change. And this plan should be extended to all the people living in the country to ensure their safety and protection against any form of disaster.

The country has then institutionalized the Disaster Risk Reduction Management (DRRM) to u*phold the people's constitutional rights to life and property by addressing the root causes of vulnerabilities to disaster, strengthening the country's constitutional capacity of disaster risk reduction and, management and building the resilience of local communities to disaster including climate change impacts. (*Republic Act 10121). Through this, the national disaster risk reduction and management framework has been provided and funded to enable the implementation of the plans and programs that deal with disaster.

Disaster is described as a combination of hazard and vulnerability. This means that the community is in danger whenever climate change such as typhoon, tsunami, flooding and similar calamities strikes. Exposure to these climatic events makes the community susceptible to conditions that would affect the normal activities of the community and hinders them to protect themselves against these hazardous events. Vulnerability means the inability of the person to cope or recover from the effects of climate change. Some contemporary studies suggest that hazards must have their origin in nature but these turn into disasters through societal process. (Hossain, 1973)

Throughout the recorded history of the Philippines, floods and storms have been the most frequently occurring hazards. This confirms the high level of exposure to hazards due to its geographical structure. The country being an archipelago that lies within the pacific ring of fire explains the prevalence of earthquake, tsunami and landslide. (NDDRMP2011-2028). Many times, the disaster risks are localized and these call for the need to strengthen the capacity of local government through the assistance of the national government. To gain better understanding on the impact of various disasters, the national government developed, promoted and implemented the comprehensive National Disaster Risk Reduction and Management Plan (NDRRMP). The plan was conceptualized to reduce the risks of disaster and to enhance disaster preparedness and response

capability. After years of implementing the project, evaluating the effectiveness of the project particularly in the community level is a worthwhile activity. This can provide information on the extent of success of the project. The evaluation of the implementation of the NDRRMP is relevant to ensure safety among the residents in moments of disaster as caused by climate change and to determine the strengths and weaknesses of the implementation of the plan to the community level.

The roles of local authorities in community-based disaster risk reduction management are significant in formulating necessary policies, plans and legal instruments, in providing financial and technical resources, in making coordination and linkages, in building up community capacity on early warning, preparedness, in providing relief, rescue, shelter management, first aid and damage assessments. This concept emphasizes the crucial role of local authorities in promoting good governance to provide better delivery and well-being and empowerment of the people before, during and after the impact of disaster. This defines their roles facilitator, enabler and resource provider in order to promote community level risk reduction and preparedness (Kafle and Murshed, 2006). Such function is clearly stated in RA 101021 and stresses that the Local Disaster Risk Reduction and Management Office (LDRRMO) shall be established *in every province, city and municipality, and a Barangay Disaster Risk Reduction and Management Committee (BDRRMC) in every barangay which shall be responsible for setting the direction, development, implementation and coordination of disaster risk management programs within their territorial jurisdiction.* Local officials through its barangay disaster risk reduction and management council are empowered to design program and coordinate disaster risk reduction and management activities consistent with the National Council's standards and guidelines. However, the local authorities alone may not be able to achieve greater success in disaster reduction, preparedness and response without the active involvement and participation of the vulnerable communities because effective disaster risks reduction requires action by all vulnerable individuals, families, communities and organizations. Proper implementation of disaster risk reduction management can help solve issues on poverty by reducing the impacts of disaster (World Bank 2005).

Good governance is an effective means of implementing programs and projects of the government including the disaster risk reduction management program. Mercene (2013) emphasized that the local government units should have plans and mark higher grounds or places where their residents could secure themselves in case of calamities. Likewise, Turnbull et al. (2013) stressed that good governance is also manifested when programs and projects are sustainable and were able to create an enabling environment and a community that is resilient from any form of calamity. Resiliency means the ability of the constituents to prepare themselves and respond to disaster positively. It also means the ability of the community to adapt to climatic changes with little or no intervention from the government. This of course, can only be realized when the constituents have been prepared, trained and equipped with the necessary skills and knowledge on how to deal with disaster. The local government can only do this if they can identify the barriers and constraints that lies within their community such as the political ideologies, culture, norms and traditions. The local government should be able to persuade its constituents to cooperate, support and participate in activities that deals with disaster. The implementation of the Local Disaster Reduction Management Plan (LDRRM) in the community is a good start to ensure safety and protection of the community in moments of disaster.

1.1. The study area

The Philippines is one of the countries in Asia Pacific that is exposed to all forms of disaster with tropical cyclone as the most prevalent resulting to heavy rains, strong winds, landslide and flooding. It is also high risk to volcanic eruption, earthquakes and tsunami. The municipality of San Jose, Camarines Sur, Philippines is bounded on the North by the municipality of Lagonoy, on the South by the municipalities of Tigaon and Sagñay, on the East by the Lagonoy Gulf, and on the West by the municipality of Goa. The municipality is composed of twenty-nine (29) villages locally known as barangays, of which six (6) are classified as urban and the remaining twenty-three (23) barangays are rural and 9 of them are coastal communities of Lagonoy Gulf..(MCLUP, 2000-2010).

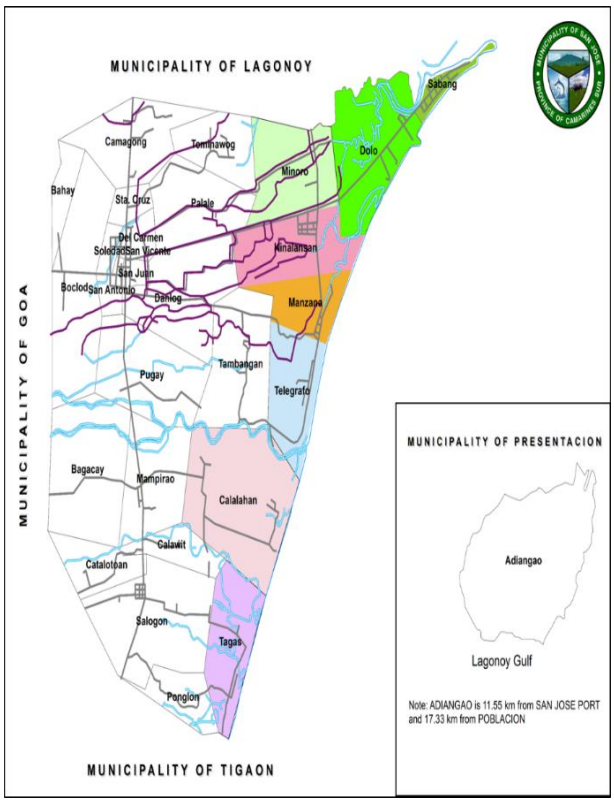

Figure 1. Map of San Jose, Camarines Sur, Philippines highlighting the coastal communities which includes Sabang, Dolo, Kinalansan, Manzana, Telegrapo, Calalahan, Tagas and Adiangao. Source: MPDO of San Jose, Camarines Sur

The coastal communities (Figure 1) of San Jose, Camarines Sur, Philippines is not exception to all forms of natural disaster and understanding of these different forms of disaster can help subside the impacts of climate change. These coastal communities share common vision of prosperity and environment sustainability and management. This means that each village or barangay has its own Disaster Risk Reduction Management program that serve as their guide whenever disaster strikes in their community.

These coastal communities are prone to disaster particularly during typhoon and heavy rainfall. The nine barangays which were the focus of the study are Calalahan (coded rose), Dolo (green), Kinalansan (pink), Manzanana (gold), Minoro (light green), Telegrafo (ice blue) and Tagas (lavender). The coordinate of the mainland San Jose are 13°43' longitude and 33°32' latitude while barangay Adiangao, which is separated from the mainland areas of San Jose and located along the coast of the Caramoan Peninsula bounded by barangays of municipality of Presentacion, has coordinates of 13°44' longitude and 33°41' latitude.

These coastal barangays are vulnerable to various kind of disaster and the researchers were motivated to evaluate the DRRM projects by looking at the level of implementation and preparedness of the residents and the local officials whenever the disaster hit the community.

2. Objectives of the study

The purpose of the study was to identify the disaster prone areas and the kind of disaster experienced by the communities along the coastal barangays of San Jose Camarines Sur. This also evaluated the extent of the implementation of the disaster risk reduction management program particularly on disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery.

3. Methodology

The study is generally descriptive making use of the available data from the Municipal Planning and Development Office (MPDO) of San Jose Camarines Sur in identifying the disaster prone areas of the municipalities. To determine the level of implementation of the DRRM in the communities, the researchers distributed questionnaires to the respondents composed of the residents and the local officials in the identified coastal barangay of the municipality. It also used an unstructured interview and observations to validate the primary data gathered. The respondents of the study were chosen using the purposive sampling representing the identified disaster prone areas. The respondents were chosen based on the distance of their residences in places identified as hazardous or danger zone during calamities as identified by the MPDO. The assessment of the disaster risk reduction management in the coastal communities was based on the level of implementation of the provisions in RA10121 before, during and after the occurrence of disaster. Data were processed using weighted mean and interpreted with a 4 point scale with 4 as highly implemented and 1 as not implemented.

4. Results and discussion

4.1. Disaster prone areas of San Jose Camarines Sur

As explicitly stated in the National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028, the percent completion timeline of conducting hazards mapping and assessment at town/city to barangay level

which start in the year of 2011 shall reach its fifty percent (50%) completion in the national level and thirty percent (30%) completion in the local level in the year 2013. To fast track the percent completion timeline, the Mines and Geosciences Bureau Region V (MGB V), assisted in the conduct of the risk reduction and management climate change adaptation assessment mapping, analysis and monitoring and they also prepared the geohazard assessment and mapping program leading to the development of hazard mapping and local risk map. The map in Figure 2 shows that Dolo, part of Kinalansan, and Manzana (coded light blue), are exposed to frequent flooding and Minoro (coded blue) experiences seasonal flooding. The rest of the coastal barangays, Tagas, Calalahan, Telegrafo and a portion of Manzana and Sabang are prone to coastal flooding and storm surges. Recently, the super typhoon Yolanda caused storm surges in the seashore of barangay Sabang and Tagas which cause disaster and damages in the house of the residents living near the coastline. Based on interview, 37 houses were washed away by storm surge in barangay Sabang.

Based from the data from the Municipal Comprehensive Land Use Plan (MCLUP) and Zoning Ordinance 2000-2010, approximately, 92.14 percent of the municipal area is free from flooding hazards. Slight seasonal flooding, however is observed in 78.54 hectares at barangay Minoro and the northern part of barangay Dolo. Flooding in the areas reaches a depth of less than 0.5 to 1.00 meter after heavy rains, which recedes within 12 hours to one (1) day. The average flooding depth in these areas is 0.75 to 1.50 meters which recedes within 2-3 days' time. The major causes of flooding in the area are the overflowing of creeks, rivers and the irrigation canals and from the adjacent Lagonoy River and Rangas River. Accumulated rainwater is the result of surface run-off from adjoining areas of the municipality. The estimated field reduction of crops caused by floods in the area is 10% to 50%.

Flooding in the area affects mobility and agriculture activities as it destroys crops and blocks roads with overflowing water. The effect of flood is not just physical or economical but also mental. Flooding according to Stanke et al. (2012) affects mental health and could serve as additional stressor to an individual. To avoid the adverse impacts of flooding, Doocey, et al. (2013) suggests that close monitoring of floods, improve mitigation measure and effective communication between local officials and the residents may be conducted. Thus, the local officials have key roles in mitigating the effect of flooding in their respective communities. Their leadership and motivational skills are necessary to help the residents ease up their discomforts when flooding occurs. Finding a means to mitigate the causes of flooding are also beneficial to the community. This requires political will and logistics to address the issues. Relocating the affected residents to a much safer zone may be conducted through local ordinances and resolutions.

Adiangao is the only coastal barangay of San Jose that is susceptible to landslide hazard (Figure 3). Generally, Adiangao is moderately susceptible to landslide but there are portions in the area that are highly susceptible (dark orange) and less susceptible (green colour). Areas that are considered highly susceptible means that the area is highly affected by landslide and that the landslide occurs more often than expected. Almost all of the barangay is vulnerable to landslide indicating that the residents could experience landslide anytime and is not safe for all of them. The effect of landslide can be aggravated by the fact that majority of the residents are living below the poverty threshold line (MPDC 2015). With this kind of social status, the residents are more vulnerable to disaster. of landslide is one of the remedies to protect the lives . Tsunami hazard map of San Jose, Camarines and properties of the community. This can be done by covering the land area by vegetation such as

planting more of their crops like abaca, coconuts and tiger grass. Vegetation prevents water runoff and slows down erosion. This will likewise improve their livelihood and make their economic life more sustainable. Local officials may also prepare an evacuation plan or propose ordinances preventing residents from living in areas that are highly susceptible to landslide. They can also adopt technology using soil nails and grillage to upgrade loosely filled slopes (Choi and Cheung (2013). Or they can use weather and climate information (Sidle, 2007) to prevent landslide occurrence. Currently the National Disaster Risk Reduction Management (NDRRM) uses the SMS messaging to provide hazard information to affected areas to warn people about the current weather conditions.

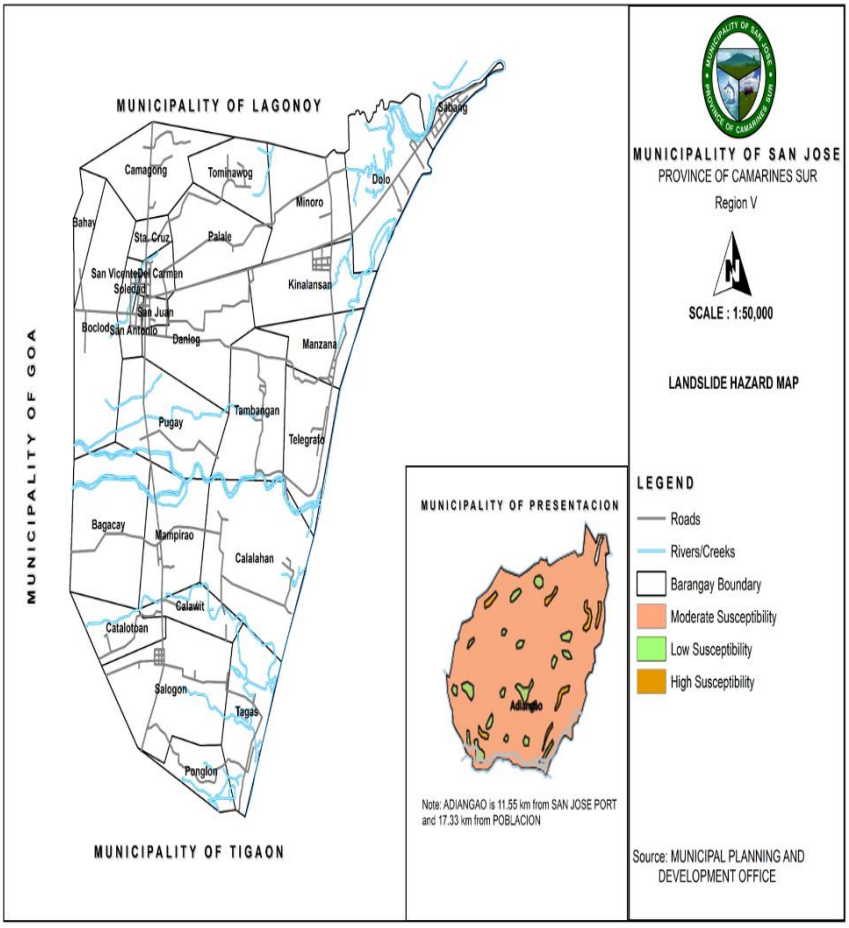

Figure 2. Fllod hazard map of San Jose, Camarines Sur. Source: MPDO, San Jose, Camarines Sur

The first ever tsunami alert that the community had experienced was during the 9.0 magnitude earthquake that shook north-eastern Japan, releasing a savage tsunami (Oskin, 2017). The tsunami alert included the coastal communities of San Jose that caused panic and confusion among residents because they were unprepared and do not know what to do. There was an exodus of people living in coastal areas to seek refuge in neighbouring municipalities. Schools and other government facilities became their evacuation centres but some went to their relatives and friends for temporary relief. The second tsunami alert received by the

residents was during the Chile earthquake of 8.5 magnitude. At this point, residents had been educated and gained better understanding about the tsunami and panic had been reduced. The tsunami from Chile did not really reach the country and PAG-ASA lifted the tsunami alert.

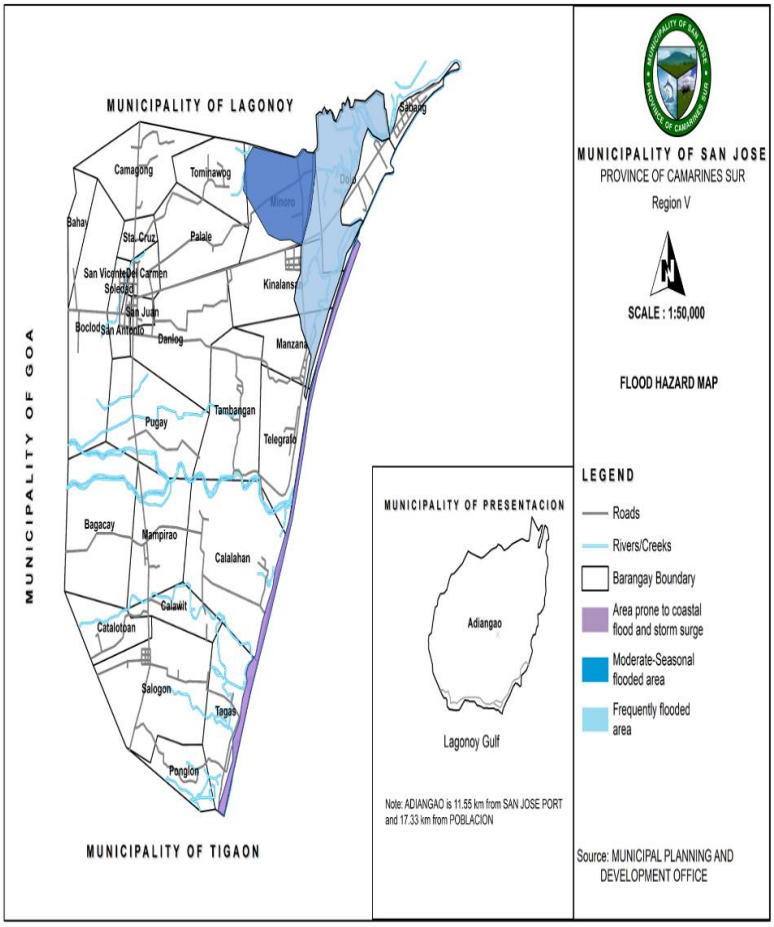

Figure 3. Landslide hazard map of San Jose, Camarines Sur.
Source: MPDO San Jose, Camarines Sur

Preparedness and understanding of the tsunami hazard has been useful for the coastal communities in coping with this kind disaster. Information and communication is likewise important to reduce the impact of disaster because people learned how to protect themselves and they know what to do. Based from the Tsunami Hazard Map of Camarines Sur (Philvolcs, 2007), the coastal communities of San Jose is part of Tsunami Hazard most especially that they are facing the Pacific Ocean. Looking into the details of the communities prone to tsunami hazard, Figure 4 shows that the barangays susceptible to tsunami hazard (coded brown) are the barangays of Sabang, Dolo and Tagas and a portion of Kinalansan, Calalahan, Manzana, Telegrafo, Salogon Ponglon, Calawit and Minoro. This means that should tsunami hit the country, these barangays are the most affected and residents of these areas should be more aware of tsunami through massive information dissemination, trainings and drills to equip them with the necessary skills and preparedness on tsunami hazard. From the above discussions, it showed that the coastal barangays of San Jose, Camarines Sur are prone to disasters such as landslide, flooding, storm surges and tsunami. While tsunami is imminent to all coastal

barangays, landslide is endemic only to Adiangao and flooding occurs only in the barangays of Minoro, Dolo and Kinalansan. These calamities destroy crops, properties and even lives.

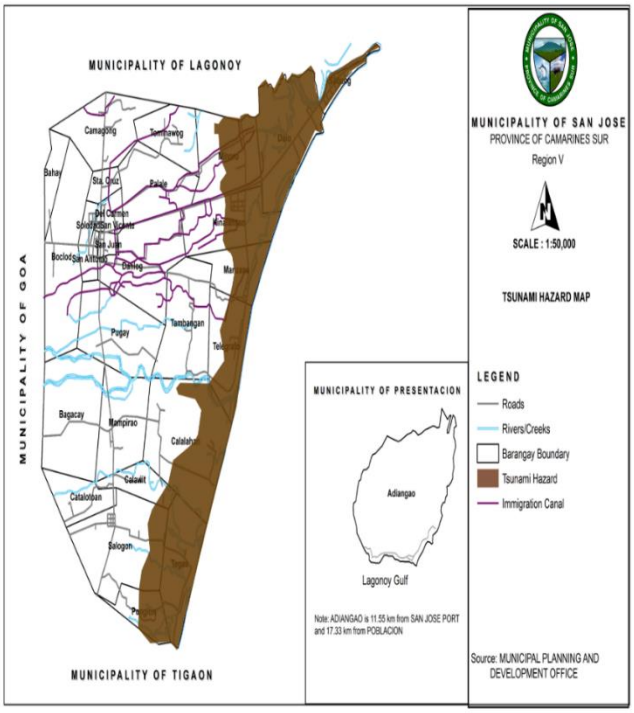

Figure 4. Tsunami hazard map of San Jose, Camarines Sur. Source: MPDO, San Jose, Camarines Sur.

To mitigate the occurrence of hazards caused by disasters in the coastal communities of San Jose, the local authorities may constantly coordinate with Mines and Geosciences Bureau to gather valid information and acquire updated hazard and risk mapping of the local area. Disaster teams comprising of barangay residents may be organized in anticipation to possible occurrences of hazards and disasters. Massive information dissemination drive may likewise be conducted in the identified areas in order to forewarn and prepare the residents. To provide a safer place to live in, local authorities may relocate people living in vulnerable areas or pass ordinances preventing people from living and constructing infrastructure in vulnerable areas. Prevention and preparedness are still the better strategies to reduce the risk of disasters. The implementation of the governments' Disaster Risk Reduction Management Program should be strictly observed, monitored and periodically evaluated from the national down to the local level.

4.2. level of implementation of the disaster risk reduction management program (DRRM)

DRRM is envisioned to provide a safer, adaptive and strong communities towards the realization of the country's sustainable development. Its program is subdivided into thematic areas which starts from prevention and mitigation, followed by disaster preparedness, disaster response and the last is disaster

monitoring and rehabilitation. The level of implementation of the provisions for each field was evaluated through a survey to local officials and respondents vulnerable to a disaster.

4.2.1. Implementation of the disaster prevention and mitigation program

Disaster prevention includes the activities such as the evaluation of the communities prone to hazardous events through the identification of hazard-prone areas and preparation of development plans they could prevent or reduce disaster. (NDRRMP, 2011-2028). It is a process of evaluating the kind of hazards residents experience, the causes and effect of these hazards and search for possible solutions. This program is being implemented to avoid disaster or to prevent disaster to occur in the locality. Table 1 shows the responses of the respondents on the level of implementation of the provisions in NDRRMP on disaster prevention and mitigation programs.

Table 1. Level of implementation of the disaster prevention and mitigation program at the costal barangay of San Jose, Camarines Sur

Disaster Prevention and Mitigation Programs	**Weighted Mean**	**Interpretation**
1. Implementation of the advocacy for the building code and use of green technology.	1.459	Not implemented
2. Conduct of inventory, vulnerability and risk assessment for critical facilities and infrastructures.	1.644	Not implemented
3. Development of the guidelines on the design, retro-fitting or operational modification of infrastructures.	1.425	Not implemented
4. Integration of the disaster risk reduction and management and climate change adaptation in building code and local ordinance.	1.550	Not implemented
5. Inclusion and availability of the hazard and risk assessments based on hazard data and vulnerability information and risk assessments for key sectors.	1.375	Not implemented
6. Positioning of the systems to monitor and disseminate data on key hazards and vulnerabilities.	2.013	Implemented
7. Establishment of full functioning knowledge management center to act as a repository of data, products and information from development partners.	1.613	Not implemented
8. Enhancement of capacity for local governments units and communities on vulnerability assessments, analysis and monitoring activities.	1.463	Not implemented
9. Conduct and improvement of community based and scientific disaster risk reduction and management and climate change adaptation assessment, mapping, analysis and monitoring.	1.700	Not implemented
10. Conduct of hazards mapping and assessments at town/city to barangay level.	1.488	Not implemented
11. Conduct of studies on disaster risk prevention and effects of climate change.	1.719	Not implemented
12. Procurement and establishment of equipment and facilities for early warning.	1.459	Not implemented
13. Installation of localized disaster early warning systems.	1.644	Not implemented
14. Establishment of community based early warning systems for various hazards	1.425	Not implemented

Legend: 3.26-4.00 - Highly Implemented *2.51-3.25- Moderately Implemented*
1.76-2.50 Implemented *1.00-1.75 Not Implemented*

Table 1 shows that from among the provisions on disaster prevention and mitigation program, the monitoring and dissemination of data on key hazards and vulnerabilities has only been implemented while the rest still awaits to be implemented. The poor of implementation of the program could be attributed to the lack of political will, trainings and logistics to perform the task. Some of the provisions are not really applicable to the local level such as the implementation of the building code and use of green technology since most houses are made of local materials and most of them are makeshifts or temporary housing. This brings the local community to high risk and vulnerability to disasters. This implies a not safe and disaster resilient community, low potential to reduce hazard impact and weak capacity of the community to anticipate disaster. Provision of experts to assist local officials implement programs and projects on disaster prevention and mitigation is of outmost importance. Similar reason is extended to the conduct of inventory and risk assessments for critical facilities and infrastructure and the development of guidelines on the or retrofitting of infrastructure. Some of the provisions need the services of an expert such as the disaster risk reduction management officer which the local communities do not have but they can do make coordination and seek assistance from the government agencies in charge of disaster management. While some provisions requires funding such as the procurement of early warning devices.

Alexander (2016) suggests that emergency planning can be used as an exploratory process of providing safety measures to manage unexpected events caused by hazards. This means that everyone should be well prepared and anticipate the effects of hazards caused by any form of disaster. Thus, prevention and mitigation should be given priority by the local officials to bring lives and properties to safety. It means that the implementation of all the provisions in RA 10121 for disaster prevention and mitigation should be prioritized. Capacity building through knowledge enhancement among constituents on disaster management can be beneficial.

4.2.2. Disaster preparedness of the local communities

Disaster preparedness indicators involves formation, designing and execution of community-based disaster risk reduction plan in harmony with the national, provincial, and town/city disaster risk reduction and management plan. It also encompasses the performance of local disaster risk saving drills and simulation, conception and production of brochure, booklet and pamphlets. From among the 11 provisions on disaster preparedness, only one was implemented and this is the preparation of the local disaster risk reduction and management plan (Table 2). Each barangay has their own disaster risk reduction management plan and this serve as their guide when an upcoming disaster hit their locality. Other aspects of disaster preparedness such as the formulation of training programs for disaster preparedness, trainings and simulation exercises, capacity building, climate change adaptation education, risk assessment and disaster preparedness, creation of DRRM centers and the organization of emergency response teams were not implemented as perceived by the respondents. When all these provisions are properly implemented in the coastal communities will ensure safety and security among residents. They will learn to become more independent in protecting themselves against disaster. However, implementation of the program can be difficult when the residents are not cooperative or supportive to the program.

Table 2. Level of implementation of the provisions on disaster preparedness of the local community

Disaster Preparedness Provisions	Weighted Mean	Interpretation
1. Formulation of the standard programs of instruction and training modules.	1.459	Not Implemented
2. Conduct of Trainings and simulation exercises on disaster preparedness and response.	1.644	Not Implemented
3. Customization of the capacity building activities for disaster risk managers and key decisions makers	1.425	Not Implemented
4. Conduct of disaster risk reduction and management and climate change adaptation education and training for the public and private sectors	1.550	Not Implemented
5. Integration of the disaster risk reduction and management and climate change adaptation in school curricula, textbooks, teacher's guides and manuals	1.375	Not Implemented
6. Development of local disaster risk reduction and management plan	2.013	Implemented
7. Conduct of risk assessments, contingency planning, knowledge management and training activities	1.613	Not Implemented
8. Conduct of inventory of resources.	1.463	Not Implemented
9. Conduct of stockpiling and prepositioning of resources.	1.700	Not Implemented
10. Establishment of the disaster risk reduction and management operations center	1.488	Not Implemented
11. Conduct and enhancement of the guidelines for emergency response teams	1.719	Not Implemented

Legend: 3.26-4.00 - Highly Implemented *2.51-3.25- Moderately Implemented*
1.76-2.50 Implemented *1.00-1.75 Not Implemented*

It is the Office of Civil Defense (OCD) that implements these indicators with the coordination of DILG as well as the assistance of other implementing partners including Local Government Units (LGUs). Possibly, the low assessment on the level of disaster preparedness in the disaster prone areas of the municipality of San Jose is due to the absence of coordination of the local authorities to sit with the key officials of the NDRRM in the local and national level. The implications of this is forwarded to the vulnerable community with poor capacity to anticipate, cope and recover from negative impacts of emergency occurrences of disasters which could result to heavy loss of lives and properties. Reviews conducted by Sutton and Kierney (2006) suggest that the development of broadly applicable preparedness metrics is quite feasible. At the same time, it is important to engage multiple stakeholder groups in formulating metrics that they consider most appropriate. And this should serve as the first step in the collaborative development of assessment strategies for household, community, and organizational preparedness. Bremer (2003) suggests that policies and agreements maybe integrated as part of disaster preparedness and help victims of disaster. Likewise, Khan (2008) finds the involvement of non-government organizations in the disaster preparedness program is beneficial to the community's sustainable development while Paton (2003) finds the use of social cognitive modelling approach as a development process for disaster preparedness. This process includes the identification of the factors that motivate preparedness, intentions and decisions towards preparedness.

Disaster preparedness is the key factor to save lives and properties and the first step that the local official should do is to implement the provisions set for disaster preparedness by the national government. The task is not that simple because before they can do it, they will have to submit themselves to in depth trainings and education on disaster risk reduction management. Every community will be in need of DRRM officers whose function is to monitor and evaluate the programs and projects of DRRM in the municipal and barangay level.

4.2.3. Disaster response

The disaster response indicators are concerned with lifesaving response in the course of physical disaster that includes the transport of host communities to higher and safer ground. It also includes search and rescue, evaluation of necessities and estimation of fatalities and losses. Table 3 shows the level of implementation of disaster response.

Table 3. Level of implementation of DRRM on disaster response at the coastal communities of San Jose

Disaster Response	Weighted Mean	Interpretation
1. On time evacuation of affected communities	2.288	Implemented
2. Integration and coordination of search, rescue and retrieval operations.	2.069	Implemented
3. Conduct of adequate and prompt assessment of needs and damages.	2.000	Implemented
4. Delivery of short-term needs or disaster relief; e.g. foods, water and medicines.	2.419	Implemented
5. Provisions of adequate temporary shelter needs.	1.700	Not Implemented
6. Conduct of tsunami and psychological stress debriefings especially to children.	1.319	Not Implemented
7. Establishment of the child-friendly spaces and temporary learning area in the evacuation center for the continuity of education.	1.331	Not Implemented
8. Provision of spaces for people's livestock, poultry and pets in the evacuation centers.	1.281	Not Implemented

Legend: 3.26-4.00 - Highly Implemented *2.51-3.25- Implemented*
1.76-2.50 Moderately Implemented *1.00-1.75 Not Implemented*

Table 3 indicates that the local officials are more active during the disaster. They are committed to provide on time evacuation services to affected communities, in search, rescue and retrieval operations, assessment of community needs and damages, delivers short term disaster needs particularly foods and water and some medicines. Normally, affected residents are evacuated in school buildings while some would come to their relatives for temporary shelter. But others prefer to remain in their homes to protect their properties. The conduct of tsunami and psychological stress debriefing has not been implemented because tsunami has never really hit the area although the coastal barangays of San Jose have been identified to be a tsunami prone area and tsunami alert has been declared twice during the March 2011 earthquake in Japan and the second was during the Chile quake in 2015 . There is really no provision for livestock space and other properties in the evacuation area and this is the reason why some residents would not like to leave their homes because they wanted to protect their belongings against looters. However, the local government of San Jose provides cash incentive of Php 30,000 as part of their temporary shelter assistance.

Seemingly, the provisions on disaster response is not fully implemented and an established system of information gathering is not evident. Reporting and dissemination of information and unorganized relief distribution mechanisms is likewise poorly implemented leading to low needs assessment in all affected areas and increased vulnerability to disaster among residents. This can lead to a disorganized relief distribution mechanisms. Disaster responses are complex activities that require coordination among organizations whose internal cultures, mandates, and procedures are not always aligned. Disaster response should focus on

preparedness, mitigation, recovery and relief because its goal is to decrease vulnerability and enhance the people's resiliency (Jauregui et al., 2011).

4.2.4. Disaster rehabilitation and recovery

The disaster rehabilitation and recovery indicators is the last step of disaster management. This include restoration of community means of living specifically transportation, livelihood, economy, and other government installation and mechanism. However, the indicators span not only to physical and material repair of devastated area but beyond that it also offers repair and formulation of constructive disposition among the local authorities on how they will strengthen and implement effectively their local disaster risk reduction and management plan in order if not to avoid disaster at least to lessen its impact to the society if befall again. Apparently, the poor implementation of the provisions in disaster rehabilitation and recovery is due to the lack of funds indicating that more external funding from the provincial and national government is needed to rehabilitate the damaged community.

Table 4. Level of implementation of the provisions of disaster rehabilitation and recovery

Disaster Rehabilitation and Recovery	**Weighted Mean**	**Action Taken**
Post-disaster needs assessments are conducted.	1.713	Not Implemented
Formulation of strategic plan for disaster affected areas is coordinated.	1.481	Not Implemented
Identification, formulation and implementation of the needed assistance and programs are identified	1.619	Not Implemented
Identification and provision of suitable relocation sites for affected population.	1.413	Not Implemented
Disaster resilient housing is design and constructed.	1.313	Not Implemented
Conduct of trainings for social preparation for host communities and those that will be relocated to reduce conflict	1.344	Not Implemented
Startup of the necessary rehabilitation or repairs of damaged infrastructures.	1.344	Not Implemented
Implementation of the building code and promotion of green technology	1.369	Not Implemented
Close monitoring and or tracking of approval of infrastructures projects and permits.	1.419	Not Implemented

Legend: 3.26-4.00 - Highly Implemented 2.51-3.25- Implemented
1.76-2.50 Moderately Implemented 1.00-1.75 Not Implemented

The overall implication of not implementing the provisions on disaster rehabilitation and recovery is the difficulty of restoring employment, livelihoods, business, infrastructures, installation and lifeline facilities that support the continuity of people's means of living. Most often the, victims are left on their own or with little assistance from the local government such as the provision of relief operation, evacuation centres,

4.2.5. Summary of NDRRM implementation

Table 5 shows the summary of the level of implementation of Republic Act 10121 in the disaster prone areas of the municipality of San Jose along disaster prevention and mitigation, disaster, preparedness, disaster response and disaster rehabilitation and recovery.

It was revealed that all the three (3) indicators namely; disaster prevention and mitigation, disaster preparedness and disaster rehabilitation and response, all of which had the weighted mean of less than 1.75 which is interpreted as not implemented, while, the disaster response is the only indicator garnered the weighted mean of 1.800 which is interpreted as implemented. This implies that the local officials are active only during the occurrence of disaster.

The average of the five thematic areas for disaster risk reduction and management gave a weighted mean of 1.59 indicating that the level of implementation of Republic Act 10121 to the disaster prone areas in the municipality of San Jose is poor and this means that in times of disaster, the municipality is not prepared to face its impact of any climatic events such as flooding, tsunami, landslide and storm surges. This implicates a not safe and disaster resilient community, low potential to reduce hazard impacts, weak.

Table 5. Summary of Implementation of Republic Act 10121 in terms of disaster prevention and mitigation, disaster preparedness, disaster response and disaster rehabilitation and recovery

Indicators	Weighted Mean	Interpretation
1. Disaster prevention and mitigation	1.53	Not Implemented
2. Disaster preparedness	1.59	Not Implemented
3. Disaster response	1.80	Implemented
4. Disaster rehabilitation and recovery	1.44	Not Implemented
Total average	1.59	Not Implemented

Legend: 3.26-4.00 - Highly Implemented (HI) 2.51-3.25 - Moderately Implemented (MI)
1.76-2.50 - Implemented (I) 1.00-1.75 - Not Implemented (NI)

capacities of the communities to anticipate, cope and recover from the negative impacts of emergency occurrences and disasters, hard to deliver life preservation services to meet the basic subsistence needs of affected communities and not restored and improve livelihood and living conditions after disaster is experienced. Mitigation, migration and settlement modifications is necessary to reduce the risk of disaster caused by climate change (Gordon, et al., 2007)

To ensure success in the implementation of the provisions of RA10121, the local authorities may integrate disaster risk reduction and management and climate change adaptation in their local ordinances and resolutions to orderly promote safer and adaptive disaster resilient communities. They may promote participatory disaster resilient development by encouraging the active involvement of the vulnerable communities to create an enabling environment and to strengthen effective disaster risk reduction management and action towards good governance and sustainable development of the community.

5. Conclusion

The coastal communities of San Jose, Camarines Sur, Philippines are vulnerable and at risk to disaster such as landslide, flooding and tsunamis. Adiangao, is prone to landslide hazards while Sabnag, Dolo , Kinalansan and

Minoro are susceptible to flooding. Whereas, Sabang, Dolo, Kinalansan, Manzana, Calalahan Tagas, Minoro and Telegrafo are prone to tsunami hazards and storm surges. The provisions of RA10121 known as the National Disaster Risk Reduction Management Plan have been poorly implemented in the coastal barangay particularly on disaster prevention and mitigation, disaster preparedness and disaster rehabilitation and recovery. Provisions on disaster response have been partially implemented during the occurrence of disaster. Generally, there was a poor implementation of the provisions set for disaster risk reduction and management program before, during and after the occurrence of disaster. The need to conduct in depth study on the root causes of the poor implementation of the provisions in RA1012 may be conducted and look into the political, socio-cultural, economics, financial and environmental issues as possible root causes of the poor implementation of RA10121 in the community level. Likewise, local officials may prioritize the implementation of provisions on disaster prevention and mitigation to ensure safety of the coastal communities of San Jose, Camarines Sur.

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