

# **Social Risk Management Strategies of Communities in the Agusan Marsh Landscape**

## **FINAL REPORT**

Tropical Institute for Climate Studies  
University Research Council  
Ateneo de Davao University

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## Executive Summary

The research on "*Social Risk Management Strategies of Communities in the Agusan Marsh Landscape*" focused on the proactive approaches and strategies to address and minimize the vulnerability of poor resource-deprived households facing risks from natural disasters brought about by the changing climate regime.

The study examined on the social risk management arrangements in Agusan Marsh communities, specifically in the two (2) *puroks* of Barangay San Marcos. San Marcos is one of the five barangays of the municipality of Bunawan, which is classified to be within the Agusan Marsh Wildlife Sanctuary along with barangays Consuelo, Mambalili, Nueva Era and Bunawan Poblacion.

Barangay San Marcos of Bunawan, Agusan del Sur has second type of climate in the traditional classification, which is characterized with no pronounced wet season with heavy precipitation from the month of December to early part of March. Portions of San Marcos (along with 2 other barangays are categorized to be severely flooded to very severely flooded. The phenomenon they experienced during the flood of 2012 could be attributed to other factors aside from high volume of rainfall. One factor that might be considered is the level of siltation in Simulao River and Agusan Rivers.

The two communities in Barangay San Marcos exhibit vulnerable situations to annual climate variability in the area. These are brought about by their dependency of water resources both for their livelihood and household needs. Change in the water levels directly affect their fishing method, which is the main source of livelihood for the residents. At some extreme conditions, this also poses danger to their lives. Both areas are susceptible to the climate changes, especially with the annual flooding because both are nearest to the Agusan Marsh.

The two communities' responses to the evident risks that they face regularly have a little variation. Both have utilized management instruments are inherent to them, like their indigenous knowledge systems and practices which they use for their daily survival and those that are made available to them through different institutional and governance systems. Informal coping strategies include: (1) *Dwelling structure modification/architectural adjustment*, (2) *Temporary migration*, (3) *Adjusted farming tempo*, (4) *Borrowing and selling of assets*, (5) *Tribal council assistance*, and (6) *Indigenous knowledge systems & practices*. The government provides assistance through the Barangay LGU relief assistance.

The mitigation strategies include: (1) *Investment in human capital*, (2) *Market-based: Loans/advances from traders*, (3) *Health insurance*, (4) *Market-based loans*, and (5) *the government Disaster risk management (DRM)*.

The social risk management instruments available in Barangay San Marcos, representing the communities along the Agusan Marsh are generally coping strategies and inherently survivalist in nature. These are the adaptive measures that come with their living or being located in an environment that is very susceptible to climate variations. This reality has never been more apparent than in *Purok Dinagat*. Their way of coping is not resisting what happens naturally. Their main strategy is conformity to a natural force that cannot be prevented and that comes regularly.

The household and community levels manage their risks through self-help, innovative strategies to cope with flooding by alterations, modifications of their houses and providing bamboo floaters to the houses and for their domestic animals. They have incorporated adjustability to their farming schedules, usually by waiting for the flood to fully subside before they start land preparation. They also rely on their IKSP to “predict” flood levels. The use of indigenous materials (e.g., bamboos, logs) is an indication that they utilize what is easily available in their immediate surroundings. Their close kinship and common ethnicity has forged a strong sense of reliance on their neighbors and relatives for needed cash during emergency situations.

The study recommends the following to further minimize the risk of marginalized communities to climate risks: (1) *Expanding the coverage of the 4Ps Program (time and coverage)*, (2) *Coordination of Philhealth at the barangay level*, (3) *Government micro-enterprises at the grassroots level*, and (4) *Comprehensive implementation of the barangay disaster risk management*

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## **1. Introduction**

The URC funded research entitled "*Social Risk Management Strategies of Communities in the Agusan Marsh Landscape*" focuses on the proactive approaches and strategies to address and minimize the vulnerability of poor resource-deprived households facing risks from natural disasters brought about by the changing climate regime.

The inquiry uses the social risk management (SRM) approach developed by Holzmann and Jorgensen (1999, 2000), Holzmann (2001), and World Bank (2001). The Strategies for SRM encompass prevention, mitigation, and coping measures. Prevention strategies reduce the probability of the risk occurring. Mitigation strategies aim to address the risk before it occurs. Whereas preventive strategies reduce the probability of the risk occurring, mitigation strategies help individuals reduce the impact of a future risk through pooling over assets, individuals, and over time. Coping strategies relieve the impact of the risk once it has occurred (Holzmann: 2001, Holzmann: 2003 and Kozel: 2008).

Addresses the risks brought about by natural calamities due to climate changes, shifts and variations, the study aims to:

- Describe the seasonal cycles and various environmental changes occurring in Agusan Marsh;
- Document the communities, household and men and women's risk reduction, risk mitigation and coping strategies;
- Document the available market-based social risk management arrangements in Agusan Marsh;
- Document the available government social risk programs in Agusan del Sur;
- Identify the measures the community and the households need to undertake to reduce their vulnerabilities and increase their capacities in the face of changing climate regime; and, to identify how these measures impact the existing multiple-burden of women in Agusan Marsh at present.

The study examines on the social risk management arrangements in Agusan Marsh<sup>1</sup> communities, specifically in the two (2) *puroks* of Barangay San Marcos. San Marcos is one of the five barangays of the municipality of Bunawan, which is classified to be

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<sup>1</sup> *The Agusan Marsh is an extensive wetland totaling 110,298 hectares supporting very complex and important ecosystems. It is the area of confluence of the different tributaries of the Agusan River, which drains the Diwata mountain ranges of the provinces of Surigao del Norte and Surigao del Sur in the east, the central mountain ranges of Bukidnon and the hills of Davao del Norte in the south. It is like a giant sponge where excess water is impounded at times of high flow and ensures adequate water flow during dry periods. Hence, it protects the settlements in the downstream basin including Butuan City from catastrophic floods.* Bunawan Municipal Comprehensive Development Plan, 2003-2007, page 30.

within the Agusan Marsh Wildlife Sanctuary along with barangays Consuelo, Mambalili, Nueva Era and Bunawan Poblacion.

The research was conducted from February 2012 to March 2013.

The principal investigator of the research is Ms. Perpy C. Tio.

## **2. The Study Area**

The study area for the research are two (2) *puroks* of Barangay San Marcos in the Municipality of Bunawan, Agusan del Sur (See Figure 1).

The municipality of Bunawan is located at the southeastern side of the landlocked province of Agusan del Sur. It is bounded in the north by the municipality of Rosario; in the east and south by the municipalities of Trento, Sta. Josefa and Veruela; and in the west by the municipalities of Loreto and La Paz. It is a 3<sup>rd</sup> class municipality composed of ten (10) barangays namely: 1.) San Loreto, 2.) Bunawan Brook, 3.) Consuelo, 4.) Imelda, 5.) Libertad, 6.) Mambalili, 7.) Nueva Era, 8.) San Andres, 9.) Bunawan Poblacion, and 10.) San Marcos. San Teodoro, which is the seat of government, is considered an urban barangay while the other nine are rural.<sup>2</sup>

Bunawan has three major river systems. These are the Agusan River, Simulao River and Bunawan River. Bunawan and Simulao Rivers are tributaries to the Agusan River. Other water resources are small rivers and creeks which are found in the following *barangays*<sup>3</sup>: Barangay Consuelo (Coo Creek), Barangay Imelda (Saugon and Lapinigan Creeks), Barangay Poblacion (Mandagao River), Barangay Nueva Era (Lucad and Magsagangsang Creeks), Barangay San Andres (Singanon and Baobo Creeks), Barangay San Teodoro (Mandog and Binahan Creeks).<sup>4</sup>

Barangay San Marcos is one of the five barangays of the municipality of Bunawan, which is classified to be within the Agusan Marsh Wildlife Sanctuary along with Barangays Consuelo, Mambalili, Nueva Era and Bunawan Poblacion. It has a total of seven (7) *puroks*<sup>5</sup>, three (3) are located within the lake (Purok 3/Mihaba, Purok 4 and Purok Kilubidan). In the latest population survey, it has a total population of 928 or 160 households.<sup>6</sup>

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<sup>2</sup> Municipality of Bunawan: Gateway to Agusan Marsh  
<http://www.bunawan.gov.ph/index.php/home/map-and-location.html>

<sup>3</sup> A *barangay* (village) is the smallest administrative unit. Several barangays comprise a municipality

<sup>4</sup> Municipal comprehensive development plan of Bunawan, Agusan del Sur, 2003-2007.

<sup>5</sup> *Purok* is smaller section/district of a barangay. It is a small community which usually consists of small clusters of households.

<sup>6</sup> 2005 Community-Based Monitoring System (CBMS). Barangay San Marcos Comprehensive Development Plan (2011-2013). Draft

Barangay San Marcos is an interior barangay of Bunawan and found along the Simulao River. It has a total land area of 4,942 hectares comprising 9.65 percent to the total municipal land area. Its lowest elevation level is only 13 meters above sea level while the highest is 15 meters (asl). It is one of the fishing grounds due to its lakes and marshes where freshwater fishes abundantly thrive.<sup>7</sup>

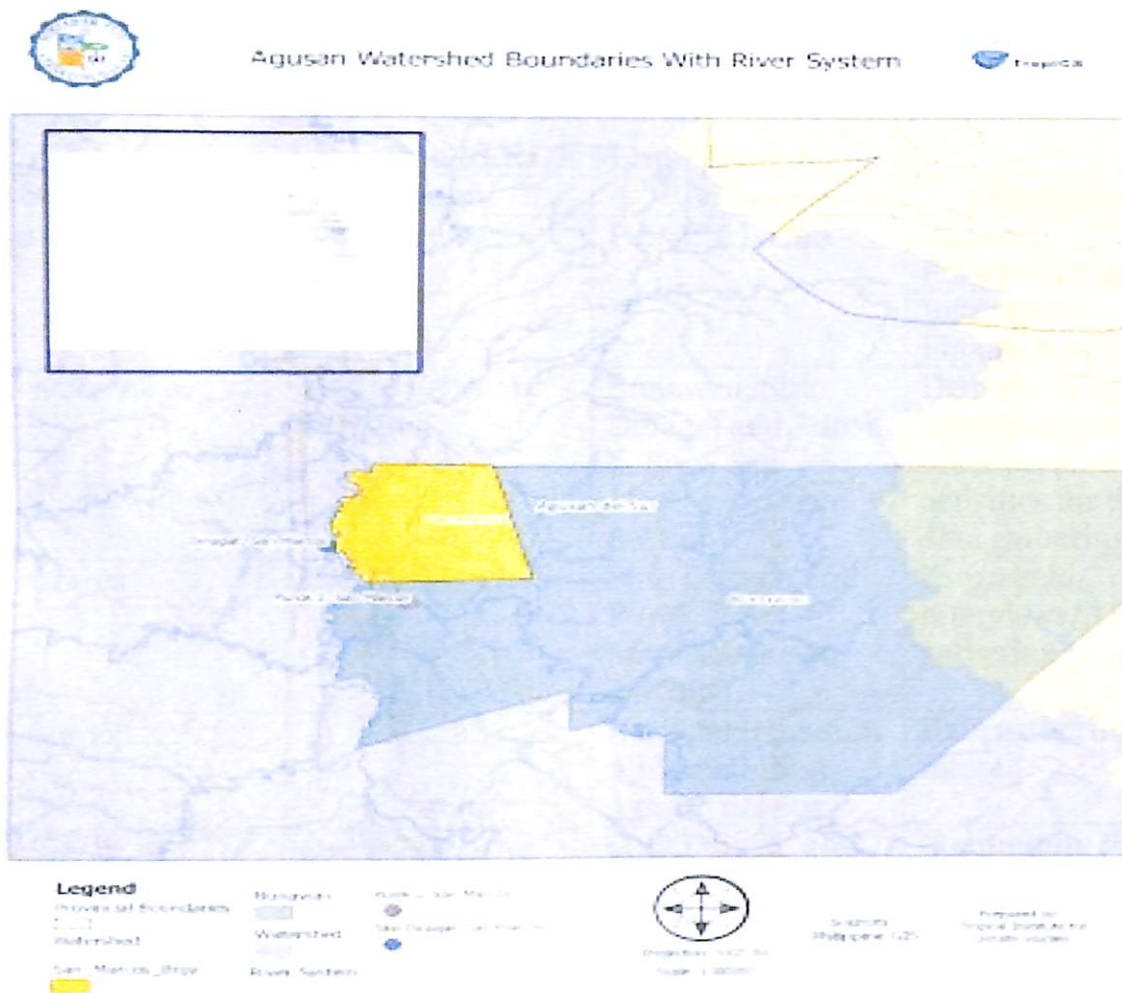


Figure 1. The Study Area

<sup>7</sup> Municipal comprehensive development plan of Bunawan, Agusan del Sur, 2003-2007.

### 3. Research Activities

Table 1 enumerates the different research activities undertaken for the study. There were three stages: (1) preparation phase (scoping and contact building), (2) data gathering (fieldwork) and (3) research findings presentations both in Agusan and in Ateneo de Davao University.

There are talks with Oxfam and TropICS for a follow up study on risk reduction in the whole province of Agusan del Sur.

Table 1. Social Risk Management Research Activities

<b>Social Risk Management</b>			
<b>Research Activities</b>	<b>When</b>	<b>Where</b>	<b>Outputs</b>
Research Scoping	3-4 February 2012	Paradise Island	Research Framework and Instrument Finalization
Contact building	End of February to March	Bunawan, Sitio Dinagat and Purok 2, Brgy. San Marcos, Agusan del Sur	Delivery of letters, networking and other preparatory activities for the data gathering
Fieldwork	2-8 April 2012	Sitio Dinagat and Purok 2, San Marcos, Agusan del Sur	Household interviews/ Data gathering
Fieldwork		National Irrigation Administration, Agusan del Sur	Data gathering-rainfall
Fieldwork	27-28 July 2012	Sitio Dinagat and Purok 2, San Marcos, Agusan del Sur	Community validation
Presentation	13 March 2013	Finster bldg., AdDU, Davao City	
Research next steps	11 August 2013	TropICS, AdDU, Davao City	Consultation, updates on the research

#### ***4. The Findings***

The following information and data were generated from the study: (1) climate hazards in Agusan del Sur, (2) the vulnerability of the people and the landscape, and (3) the coping and adaptive capacities of the marginalized communities.

##### ***4.1 Climate hazards in Agusan del Sur***

The following photo-documentation shows the climate hazards in the study area.



*Two-classroom elementary school run by a local PO in Sitio Dinagat  
Photo taken: 02 April 2012*



*Classes at the elementary schools during regular flooding  
Photo taken: 15 January 2013 courtesy of: PASAKK*



*Typical house on high stilts in Dinagat*



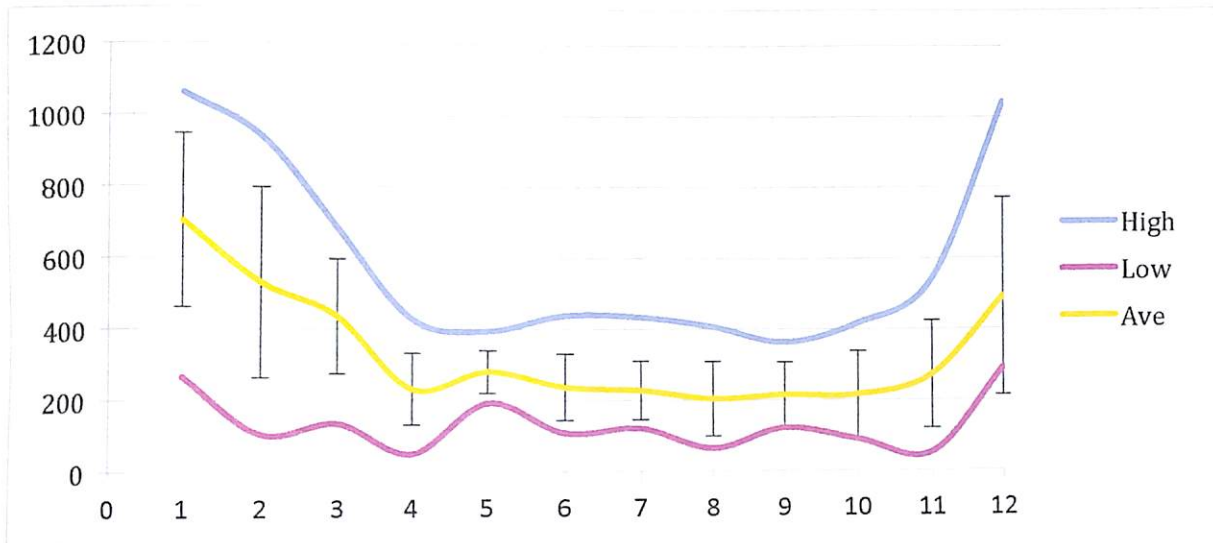
*House on bamboo floaters even during summer*



*House with log floaters*

Figures 2 and 3 provide an explanation of the climate hazards in the study area.

Figure 2: Average Monthly rainfall (mm) Agusan del Sur 1998-2012<sup>8</sup>



<sup>8</sup> Available data for CY 2012 is from January-July only.

Figure 3. Agusam Watershed Boundaries



Barangay San Marcos of Bunawan, Agusan del Sur has second type of climate in the traditional classification, which is characterized with no pronounced wet season with heavy precipitation from the month of December to early part of March.<sup>9</sup> Portions of San Marcos (along with 2 other barangays are categorized to be severely flooded to very severely flooded.<sup>10</sup>

Figure 1 shows the high points of the average monthly rainfall of Agusan del Sur for the 15-year period 1998-2012. These are most pronounced when they

<sup>9</sup> Climate and Rainfall Pattern. Barangay San Marcos Comprehensive Development Plan (2011-2013). Draft.

<sup>10</sup> Flooding Hazard Category. Bunawan Comprehensive Development Plan 2010-2013.

breached the 1000 (mm) units. These are the months of January 2000 (1,061 mm), December 2003 (1,041 mm) and January 2007 (1,008 mm). The month of February closely follows and in 1999, almost breached the 1000 mm mark with (831.9 mm), 2006 (941 mm) and 2009 (838 mm).

The average annual rainfall data (Annex 1) for the 15-year period also show that the year 1999 and 2000 had the highest precipitation at 5,163 mm and 4,719.5 mm respectively. This was closely followed by 2011 at 4,669 mm. The lowest precipitation was during 1998 at 2,831 mm. The Department of Environment and Natural Resources (DENR), pegged the average annual rainfall in the Agusan Marsh at 4,286<sup>11</sup> mm.

The phenomenon they experienced during the flood of 2012 could be attributed to other factors aside from high volume of rainfall. One factor that might be considered is the level of siltation in Simulao River and Agusan Rivers. The heavy siltation, which has also been pointed out by some residents is apparent by comparing the original height of the house stilts/posts in Dinagat and the current measurement of these stilts during the time of study. Flooding might have come heavily from upstream source going through Simulao River, which courses along Purok 2, a tributary to the Agusan River of Sitio Dinagat. Agusan Marsh, an area of confluence of the different tributaries of the Agusan River, holds the excess water.<sup>12</sup> The map below shows the marsh and its estimated 110 waterways.

#### ***4.2 Vulnerabilities in the Agusan Marsh communities.***

The two communities in Barangay San Marcos exhibit vulnerable situations to annual climate variability in the area. These are brought about by their dependency of water resources both for their livelihood and household needs. Change in the water levels directly affect their fishing method, which is the main source of livelihood for the residents. At some extreme conditions, this also poses danger to their lives. It is also acknowledged globally that the indigenous peoples belong to the most marginalized sectors in society. They have least access to educational and income opportunities and receive the least health benefits. These factors, as a result, exacerbate their sensitivity to climate changes.

Purok Dinagat and Purok 2 (also known as Purok Poblacion San Marcos) are interior barangay communities of the municipality of Bunawan. From the Poblacion, Purok 2, where the barangay officials hold office, can be reached by a one-hour motorboat ride through the Simulao River. Purok Dinagat on the other hand, is another 30-40 minutes away from Purok 2 entering the Agusan River.

Both areas are susceptible to the climate changes, especially with the annual flooding because both are nearest to the Agusan Marsh. The municipality of

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<sup>11</sup> [http://denrcaraga.site90.com/index.php?p=1\\_32](http://denrcaraga.site90.com/index.php?p=1_32). Meteorology and Climate. Agusan Marsh Wildlife Sanctuary.

<sup>12</sup> Map of Agusan River processed by Dr. Lourdes Simpol (TropICS)

Bunawan has an elevation range to a low of 13 meters above sea level (asl) to a high of 680 m asl. One of the 2 lowest barangays is San Marcos at 13 meters asl.

The marsh provides livelihood for the residents of the 2 *puroks* but Dinagat displays almost total dependency to the resources offered by the marsh. Fishing is the most common livelihood for the people of Brgy. San Marcos and is sourced out from the marsh and its river systems. Daily lives of the people orbit around the marshland and its surrounding river systems. Their survival is easily affected by its changes. It is a source of life for them and yet it also endangers them. Here we see two sites that show both reliance and vulnerability to the marsh.

Vulnerability is apparent with the geographical location of these two communities because of their relative distance from the Poblacion, where the support and government institutions are almost always located. Aside from their relative remoteness from the support groups, they are vulnerable due to flooding during rainy months because of their close proximity to the rivers and lakes.

This proximity to the river systems is not at all helped by the non-compliance of a DENR administrative order (AO-99-21)<sup>13</sup>, which mandates that:

*To be demarcated are public lands along the banks of rivers and streams and the shores of the seas and lakes throughout their entire length and within a zone of three (3) meters in urban areas, twenty (20) meters in agricultural areas and forty (40) meters in forest area, along their margins which are subject to the easement for public use in the interest of recreation, navigation, floatage, fishing and salvage.*

Both *puroks* have no bank easements from the edges of their respective rivers. These bank easements would have served as buffers of the residential areas during flooding.

### Sensitivity

#### *Ethnicity and kinship*

All households in Dinagat belong to the Manobo tribe of Agusan. There are only two households in which the spouses are not Manobos. Each household member can lay claim to kinship with his/her neighbors and the same holds true in Purok 2. The community members in Dinagat can trace close kinship with each other, whether by blood or by consanguinity. Most have been born in the place or as the younger generation of the original residents. These younger generations have already tried to live elsewhere but have returned to the area. There is very low migration from this *purok*. There is only one household, which moved out and

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<sup>13</sup> DENR Administrative Order No. 99-21 of June 11, 1999: (Superseding DAO No. 97-05 and Prescribing the Revised Guidelines in the Implementation of the Pertinent Provisions of R.A. 1273, P.D. 705 and P.D. 1067).

settled in Purok 2 because the household head has been elected as *barangay kagawad*.<sup>14</sup>

The same close kinship is true in Purok 2. Everybody is a relative to almost every one. As with Dinagat, they have formed a close network and have relied on each other for assistance.

Barangay San Marcos is very much a part of the whole ancestral domain<sup>15</sup> being claimed by the Manobo of Agusan del Sur. It is their common ethnicity and close kinship, which glues and sustains the community despite the risks posed by their environment and the remoteness of their location. Some had left the place but have since returned because of the resources readily available for livelihood and because of the strong family ties that they share.

### *Education*

There are only two (2) secondary schools in the municipality of Bunawan, which are located in the poblacion. It has has one non-formal school for the IPs, the Manobo Tribal foundation, which offers vocational skills programs. It is run by the Catholic church and is located in a nearby barangay.<sup>16</sup>

In Barangay San Marcos, there is one public primary school and one in Dinagat being run by a people's organization. This is a community extension school of Urios College in Bunawan.

Of the total households interviewed (there are only 14 households in Dinagat) only three households have at least one member who received some high school education. Of the three, only one has completed high school. There are four households with at least one member who has not been to school at all. Almost the same pattern of educational attainment is noted in Purok 2. There are five households that have members who reached high school level.

The low educational profile of both communities is one of the sources of vulnerability for the residents of the two communities. One reason for the low education is the financial difficulty to pursue secondary education in Bunawan. During flood season, it is risky for students to travel by motorboat.

It may be interpreted that low education is a factor of poverty (transportation expenses) and remoteness of the area. A relative consequence to this low education may be the low capability of the residents to understand better the

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<sup>14</sup> Village councilor; *barangay* (village) is the smallest unit of governance in the Philippines.

<sup>15</sup> The Municipality of Bunawan was pre-inhabited by the indigenous cultural communities classified as Manobo. These ICCs are claiming the area as their ancestral domain. This application was processed by the DENR following DAO No.2 and the same was submitted to the DENR Central Office pursuant to RA 8371. Processing and approval of the CADC is now at the hand of the NCIP.

<sup>16</sup> Education: Non-formal. Bunawan Comprehensive Municipal Development Plan, 2010-2013.

risks brought about by climate shifts and changes and the corresponding future learning on environmental disaster preparedness, planning, and/or prevention that could be taught to them to lessen their risks.



Children going to school

### *Livelihood and household income*

The municipality of Bunawan would identify key Fisheries Development Area Barangay San Marcos as one of the fishing grounds due to its lakes and marshes where freshwater fishes abundantly thrive.<sup>17</sup> Despite this abundance, the Barangay Comprehensive Development Plan San Marcos identifies that seventy-four percent (74%) of the total population of San Marcos earn less than P6,500.00 a month.<sup>18</sup>

1. *Fishing.* All residents of Dinagat are heavily dependent on fishing as a daily means of subsistence. It is done the whole year round. Fishing methods that are commonly used is *panaga* (multiple hook and line), *bantak* (cast net fishing) and *bubu* (cage fishing). The most common freshwater fish caught using the *panaga* is the *haluan*<sup>19</sup> (Snakehead Mullet). Other fish varieties caught by net fishing are *carpa* (common carp), *tilapia* (Nile *tilapia*) and *taiwan* (North African *hito*). All households in Dinagat use the *panaga* method of catching fish because it is the cheapest way to catch fish. A regular-sized hook only costs P1.50- P2.00, while a pack of nylon strings also costs a few pesos. A few households in Dinagat also

<sup>17</sup> Water Resources. Municipal Comprehensive Development Plan, 2010-2013. Bunawan, Agusan del Sur

<sup>18</sup> Municipal comprehensive development plan of Bunawan, Agusan del Sur, 2003-2007 (Draft).

<sup>19</sup> Specie: *Channa maculata*

employ a combination of hook and line and net fishing or cage fishing. Another alternative source of income for the Dinagat residents is gathering shellfish called *kambuay* (large Asiatic apple snail).

Daily income from fishing for Dinagat residents does not vary that much for each household. Daily income mode is less than one hundred pesos (Php100.00) using *panaga*. The daily average income range is from a low of roughly forty pesos (Php40.00) to a high of seventy-three pesos (Php73.00). This is just enough to buy one kilo of rice, which they source out from fish traders. A few households that employ additional fishing method (*bubu* or *bantak*) earn a daily income range between one hundred ten pesos (Php110.00) to Php427.50. A housewife, who is engaged in buy and sell of fish combined with the income of her husband from net fishing earns an average gross daily income of Php1,110.00. This does not take into account the expenses she incurs to deliver the fish in Bunawan market. These expenses include fuel use for their motorboat and tricycle fare. An alternative income source for Dinagat is gathering of shells or *kambuay*, which sells at eighty pesos (Php80.00) per *taro* (cooking oil can).

Daily household income in Purok 2 displays higher variation compared to Dinagat because both spouses are engaged in at least two income-generating activities. For those who are into fishing, daily income ranges from a low of forty pesos (Php40.00) to a high of seven hundred eighty pesos (Php780.00). This income from fishing is augmented with income received from honoraria, sari-sari store sales, as farm worker and from farm production.

They complain of illegal fishing done by some residents. In the past, fish is caught illegally through poisoning. Some fishers used *lannit*<sup>20</sup> for the easy catch but this practice was legally banned by municipal and barangay ordinances. Subsequently, another form of illegal method has been practiced – electrocution –which renders the fish immobile. This system has not yet been formally declared illegal. The leaders in the barangay have always advised the fishermen to stay away from its practice. These methods have taken a toll on the volume of fish found in the marsh and the river. The use of this illegal fishing method has contributed to the aquatic resource and has increased the vulnerability in the livelihood of the two communities.

The freshwater varieties found in the Agusan Marsh and its surrounding river systems are not particularly dependent on water level changes but are dependent only on the location of their feeding grounds. The fishermen however, are the

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<sup>20</sup> *lannit* is a derivation from Lannate, a popular brand of crop pesticide in the Philippines with Methomyl as active substance. Methomyl is not a registered pesticide in some European countries and was retrieved from the markets of Netherlands, Germany and Belgium. There are however, countries where the use of methomyl as a plant-protection product is legally registered, among which: Australia, Canada, India, Madagascar, New Zealand, South Africa, United Kingdom, United States, Vietnam and the Philippines.

ones affected by the level of water by their method of catching. During flooding, they use their *baroto* to locate fish breeding areas instead of the usual on-foot method of putting their lines. This also means extra hand to maneuver the boat while the other attaches the bait and let the lines. During flooding, fishermen use net fishing and have to forego cage fishing.

**2. Farming.** Next to fishing, farming is the second major source of income for the two communities. It starts only during summer (March to May) continuing up to the months of June to September. Farmlands are usually planted with rice or corn and a large part of the harvests are set aside for household consumption the rest is allotted to pay for the inputs used. Fishing, as pointed out earlier, is an all-year-round activity, being done even during the farming period.

Production of staple crops (corn and rice) in Purok Dinagat has decreased in the last few years owing to the increase number of pests (rats and various kinds of insects) that have been attacking the plants resulting to a continuously bad or zero harvests. Very few farmers have managed to save some of their products but this has still resulted to loss and indebtedness to their creditors.

Both communities have experienced production failure in farming which they attributed to the damage caused by pests (rats and insects/bugs). This has been an additional burden to them aside from the threat of flooding which has also cost damage to their farms and harvests.

The response of most farmers in Dinagat is to temporarily stop planting for the next cropping season due to losses and indebtedness. Only three households have availed credit for rice seedlings extended by the Department of Agriculture. Others have instead availed of credit facilities from businessmen from whom they sourced out their farm inputs. These entrepreneurs are also the buyers of their harvests.

The women of Purok 2 are active members of the People' Bank of Caraga (PBC).<sup>21</sup> They have formed themselves into a group of ten individuals to qualify for loans like micro finance or agricultural financing. With the consent of their husbands, most of them have already availed of several loan cycles.

**3. Domestic animal/Livestock-raising.** Majority of the households interviewed in Purok 2 are into livestock-raising (pigs, chicken, swine) compared to Dinagat where only three households have raised pigs. More are into fowl-raising because

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<sup>21</sup> People's Bank of Caraga started the rural banking business in 1972 bearing the business name of Rural Bank of Talacogon. PBC's microfinance services started in 1998, primarily to serve the housewives of agrarian reform beneficiaries, then immediately extending such services to women in rural communities (including indigenous communities) both with or without microenterprises, who are interested in engaging in economic activities to augment household income. PBC is presently a member of the Rural Bankers of the Philippines, Rural Bankers Association Research and Development Foundation, Micro-finance Council of the Philippines, Mindanao Micro-finance Council and the International Micro Credit Summit Campaign.

they are easy to rescue during flood. Raising pigs in Dinagat pose more risk when water levels are high because the bamboo rafts that are become the alternative cages are light enough to accommodate the weight of the swine.

4. *Micro-enterprise*. There are only two sari-sari stores in Dinagat. One opens regularly with some basic household items available while the other is almost always wanting of capitalization.

Livelihood activities in Purok 2 households are a little varied compared to Dinagat. Some household members are engaged as labor to other farm owners. There are also a few who maintain *sari-sari* stores and one prepares rice cakes to augment the income of the household heads. Two household members receive honorarium for services rendered to the barangay (elected councilor, janitor and a barangay health worker).

#### *Health/Sanitation*

Rainwater is the main source of relatively safe, potable water in Purok Dinagat. However, this becomes a problem during dry months. Drinking water is sourced out in Bunawan Poblacion but it is a good one-hour and forty minutes away ride through motorboat. One has to pay a total of thirty-five pesos (Php 35.00) for one water container from Bunawan broken down as follows: twenty pesos (Php 20.00) for the payment of the motorboat, five pesos (Php 5.00) as payment for the water and another ten pesos (Php10.00) for the payment of labor in Bunawan. Water storage facilities and containers are scarce in Dinagat.

Agusan River becomes an easy alternative as source of drinking water in Dinagat when rainwater is not available or if there is no available cash to pay for the potable water from Bunawan. Aside from its use for cleaning, bathing and washing, the water from the river is also used for cooking purposes. It is a common sight in each household to have improvised water filter made up of a water container with sands and pebbles inside. The brownish water from Agusan River is then poured into the container passing through the sands and pebbles. Clear water then drips through the small hole at the bottom of the container. Another receptacle is used to catch the water, ready for drinking or for cooking. Some households though, use the water directly from the river for cooking purposes without having it gone through the "filtering" process.

Most households of Purok 2 get their drinking water from Bunawan because transportation expense is relatively cheap (Php 25.00- Php 30.00). There are also more motorboats plying the Puro 2 to Bunawan route. The resident have also more access to additional source of water because of the availability of shallow wells in the community. They use this for cooking after a filtering process. Water from the Simulao River is only used for washing of clothes and utensils. No household in this community utilizes water from Sumilao River as drinking water.

There is not one toilet in all the households of Dinagat. The residents do their toilet needs along the Agusan River. The only toilet in the *purok* is found in the

school and is generally used by the teachers. The households in Purok 2 on the other hand, had better toilet facilities (with toilet bowls). Water from a number of wells is free and easily available.

Common health concerns in of both communities are cold, cough, fever and diarrhea. Their sickness, according to them is *kasagarang sakit* (common sickness) and is mostly prevalent during and after the rainy season. Purok 2 residents, have easier access to the free medicines available at their barangay health center (also distributed by the health workers) compared to the residents of Dinagat. They also resort to the use of traditional medicines (e.g., herbal) for common ailments when commercial medicines are not available. There are two households, however where the husbands have contracted schistosomiasis.<sup>22</sup> Both men died just after the conduct of the interviews.

For the more serious health considerations (surgery and hospitalization); almost all residents borrow money from their relatives. Their kinship system is the closest layer of source of cash during serious concerns. Aside from their relatives, some Dinagat residents secure emergency loans from a local sect, although this limited amount of money (from church collections) is exclusive to its members.

#### *Women's work*

Both communities reveal a similarity in the patterns of tasks and production for women. They perform household chores on a routine. Majority of the housewives wake up as early as 3:00 am to prepare food for their husbands before they leave for the marsh to check on the fishing hooks. Women in the two communities spend an average of 5 hours in the morning starting with the preparation of food for their husbands and for their children. The regular household tasks include brewing coffee, cooking (rice and viand), washing plates, fetching water and washing the clothes in the river. Water is usually sourced out from either Simulao or Agusan River.

The men folk almost always return between 8:00 to 9:00 in the morning bringing with them their catch. During "low" days where there is only about a kilo of *haluan* brought home, the women immediately bring the fish to the traders in exchange for about a kilo of rice. This would be cooked for lunch. For lucky or "high" days, women would clean the innards of the *haluan* in the river, scrape off the fish scales and sun-dry the fish. Another method of drying the fish is to put it near the *abuhan* (improvised cooking furnace).

Rest means sleeping right after a meal or going to the neighbor's house. Some women from Dinagat tend to their small vegetable plots near the house or going to the farm to weed out grasses during planting season. They return from the farm just before sunset.

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<sup>22</sup> Schistosomiasis is a type of infection caused by parasites that live in fresh water, such as rivers or lakes, in subtropical and tropical regions worldwide.

Household chores start again during the preparation of dinner, when all family members are present. After ensuring that everybody has partaken of their food, cleaning the kitchen and washing of plates follow. Several women who have daughters usually pass on to them the nightly chores.

All households in both communities retire early; usually taking their dinner between six to seven in the evening and sleep thereafter. Family members listen to their solar-powered radios during a short interval after dinner and before sleeping. Some women take advantage of this lull period for folding the clothes and ensuring or checking that their school children have done their assignments for the next day.

The women of Barangay San Marcos perform both production and household roles. From sun-up to sundown, they work for the upkeep of the family and to assist their husbands by doing the ancillary source of income in fishing. They are also able alternatives to do the fishing and farming themselves when men are incapacitated to do the task.

#### ***4.3 Social risk management instruments– Adaptation capacity and analysis***

The two communities' responses to the evident risks that they face regularly have a little variation. Both have utilized management instruments are inherent to them, like their indigenous knowledge systems and practices which they use for their daily survival and those that are made available to them through different institutional and governance systems.

#### **Coping strategies**

Informal

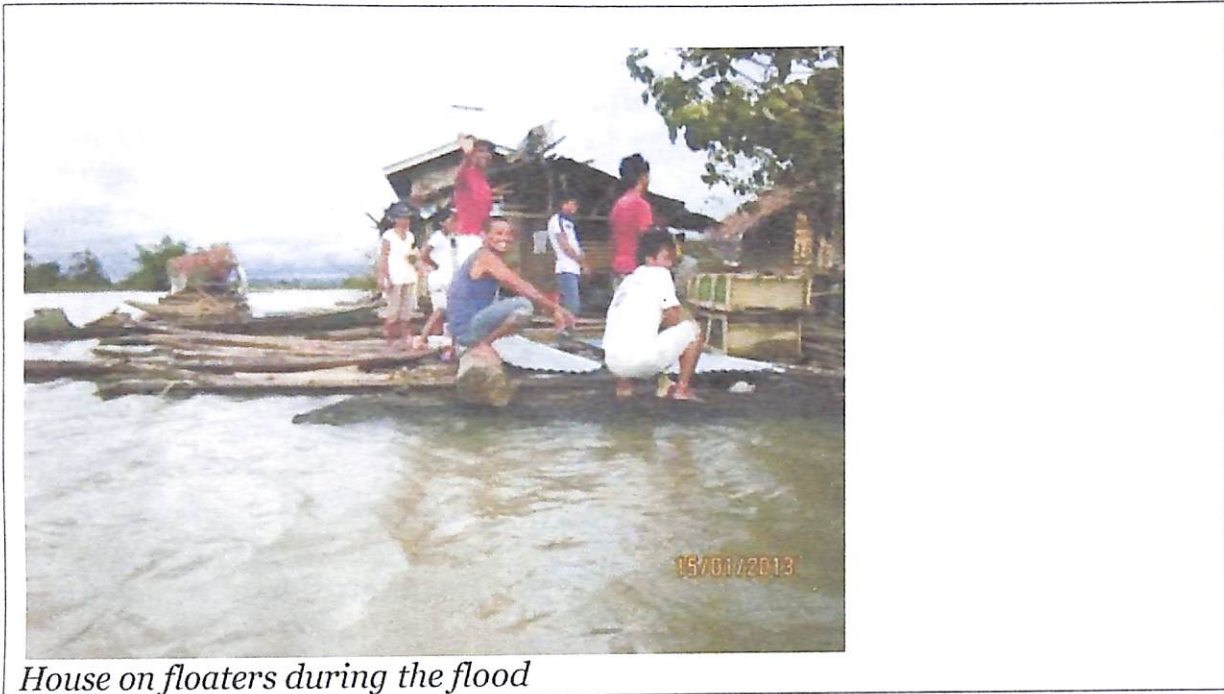
##### ***Dwelling structure modification/architectural adjustment***

As an adaptive measure to the annual flooding, Dinagat residents have attached floaters to their houses. These floaters are made of a combination of logs and bamboo poles. There can be as many as 200 poles attached under a house. Some also own a bamboo raft that is used as floaters exclusively for the livestock. A few houses are built on high stilts but this idea has been proven to be inappropriate anymore during the January 2012 flood. Even the livestock/domesticated animals have their own cages that are also on bamboo floaters. The cages are on stand-by use and are kept afloat on the river when not in use.

Almost all households own a *baroto* (small banca) for fishing and transport during high water level. During the flood of January 2012, the *barotos* even went as far as inside the houses of some residents.

Almost all houses in Purok 2 have stilts instead of floaters because regular flooding only get knee-length compared to the high water level in Dinagat. There

a few however, who have their bamboo floaters ready in the event of extreme flooding.



*House on floaters during the flood*

#### *Indigenous knowledge systems & practices*

As Manobo people, they tap their indigenous knowledge in “foretelling” the dreaded flood. This is what they referred to as *Pito ka handus*, literally meaning, *seven rampages*. During rainy season, they keep track of the number times that water level rises. It is expected that the first to the third series of rain will bring about a rise in the water level but is also expected to subside. The fourth signals the crucial level since this will bring about the highest level in the cycle. Water is not expected to subside immediately. The fifth to the seventh will be the onslaught of flood but this eventually subsides. According to their belief, the seventh flood will be the last in the series of flooding.

As part of their tradition, they tap indigenous healing practices through the use of herbal medicine for common ailments. This is especially true when cash is hard to find during calamities and for the common ailments.

#### *Temporary migration*

A few residents, especially the older ones and who have relatives in nearby areas outside of Dinagat resort to a temporary transfer of residence before the onset of flooding.

#### *Adjusted farming tempo*

Along with this indigenous knowledge and adaptive measures, the communities of Barangay San Marcos also adjust their time of farming since they have to wait for their farms to dry up fully before they till the land for the new farming season to start. During the last big flood of 2012, land preparation was moved from the usual month of April to May because the farmlands had retained so much floodwater.

#### *Borrowing and selling of assets*

When cash is needed during vulnerable times; they resort to selling their assets or borrow from neighbors (usually relatives). Domesticated animals like fowls and pigs are usually the easiest to sell. Some members are also allowed to borrow, during emergency cases, from their small religious organization.

#### *Tribal council assistance*

The barangay tribal council also helps its members through in-kind assistance (medicines). The money is sourced out from the royalty received partly from a mining company (Philsaga), which operates in a neighboring municipality.

#### Public

#### *Barangay LGU relief assistance*

The barangay local government unit, at times, gives food and other in-kind assistance during flood event. This is also in coordination with the municipal government and with non-government organizations. Aside from food and household items; the barangay LGU also extends assistance in health through medicine distribution and referrals to public hospitals.

### **Mitigation strategies**

#### Informal:

##### *Investment in human capital*

Almost all adult members in each household in the two communities know how to fish and to farm. Although the husbands predominantly do these two livelihoods; the wives are also skilled enough to take over these activities when the men are incapacitated to perform these tasks. Next to the wives are the older children who can also take over when both parents are either absent or ineligible for the work. This arrangement ensures that there is food on the table at each mealtime even during flooding.

#### Market-based:

##### *Loans/advances from traders*

Most farmers in the barangay get their agricultural inputs from private individuals/ traders who give out advances and open line credit for agricultural inputs at the onset of farming season. This is an informal “insurance” arrangement for both the farmers and the entrepreneurs. For the farmers, this means having the possibility of a good harvest when they get the fertilizers and

pesticides for their crops. The farmers in turn, will pledge to sell their future harvests to the traders/creditors. During times of bad harvests, payments of the farm supplies are deferred, albeit, with an interest to the advanced original amount.

#### *Health insurance*

A number of residents of Purok 2 and Dinagat are cardholders/members of Red Cross for their health, disability or death insurance at P120.00 per annum as the lowest package.

#### *Market-based loans*

The Peoples' Bank of Caraga (PBC) is located in the nearby municipality of San Francisco. This is where most of the residents of Purok 2 get their financing for micro enterprise and agriculture. It is a micro cooperative where borrowers form themselves groups of ten individuals to become eligible for the two kinds of loan. Interest payment for this loan is at a minimum and a coordinator is tasked to monitor the success of their enterprise. Either loan serves as a cushion that lessens the impact of possible income loss after each calamity especially when some of their assets are damaged due to extreme flooding. These loans are a source of much needed start-up capital to continue their livelihood.

#### Public

#### *Disaster risk management (DRM)*

The barangay LGU has already set up accordingly its Barangay Disaster Coordinating Council (BDCC) in line with the national government's policy on National Disaster Program. Within this structure are the following working committees to respond to calamities in the barangay: a.) Warning; b.) Rescue; c.) Relief; d.) Evacuation; e.) Medical; and, f.) Damage control. One down side is that the trainings on the DRM are only available to selected barangay functionaries, especially those who are members of the committees.

#### *Information dissemination*

The barangay government (through the municipal and national agencies) also paved the way for the installation of solar panels in almost every house in Barangay San Marcos on June 2011. All houses in Dinagat and Purok 2 have solar panels, which could be acquired for an initial amount of one thousand pesos (Php 1,000.00) as down payment but due to the unavailability of cash for most residents, many have only given an amount of between one hundred to three hundred pesos (Php 100.00- Php 300.00) only on the agreement that they have to pay the initial amount within one-year and an additional Php 100.00 per month for maintenance of the panels. One panel can light 3 dimly lit fluorescent bulbs (no wattage indicated) plus a built-in A.M-FM band radio. The provision of solar energy is crucial in the dissemination of information of impending storms/typhoons through the use of mobile phones charging and through radios.

These solar panels also proved to be relevant to the studies of the school children. Whereas before, it had been so difficult to study and to prepare for school assignments; today, these equipment have positively contributed to the better performance of the students.

#### *Early evacuation*

Part of the training in the DRM is early evacuation to the safer areas in the barangay. Usually, the elementary school building located at Purok 2 serves as the temporary shelter for the evacuees.

#### *Rescue efforts*

According to the barangay chairman, he mobilized the *baroto* owned by the local government to help transport people nearby during the flood of January 2012. There is one pump boat (seating capacity is 20 people) being constructed at the time of this interview. This motorized boat should serve those who reside in outlying puroks, especially those who are living inside the lake premises. He readily admitted though; that the additional motorboat wouldn't be enough. He plans to spend for the construction of a bigger boat.

#### *Local health/relief assistance*

Since the seat of government of Barangay San Marcos is in Purok 2, all barangay facilities (barangay hall, health center, pharmacy and day-care center) are also located there. This means that residents enjoy easy access to benefits available in the barangay. They always get first hand information on issues and updates because the barangay chairman and functionaries are all neighbors.

The residents of Dinagat on the other hand, feel neglected by their officials. It is a good thing then, that a non-government organization (NGO) built an elementary school in Dinagat. This NGO has been assisting the community not only through education but also during times of calamity by giving out in-kind assistance such as food, medicine and clothing.

#### *National*

##### *Health insurance and conditional cash transfer*

a.) The Philhealth<sup>23</sup> (Php 100.00 yearly contribution for indigents) program of the national government was initially welcomed but ever since some members have shared their experiences of difficulties in availing its benefits (e.g., documentary requirements), the residents of both puroks have been cautious to use it.

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<sup>23</sup> Philippine Health Insurance Corporation or *PhilHealth* has been created through Republic Act 7875, also known as *The National Health Insurance Act of 1995*. It is mandated to provide for a more responsive social health insurance coverage to all Filipinos.

b.) Senior Citizens<sup>24</sup> Program- For medicine discounts and other discounted amount of basic needs; the Senior Citizen’s membership is also welcomed.

c.) Conditional Cash Transfer (CCT), more popularly known in the Philippines as the *Pantawid Pamilyang Pilipino Program*<sup>25</sup> (4Ps) which, according to them has greatly augmented their meager income. A mother in Barangay San Marcos with three (3) school children receives a total of Php1,400.00 monthly broken down as follows:

<b>Pantawid Pamilyang Pilipino Program</b>	<b>Amount</b>
Php 300.00 monthly per child (Php 300.00 x 3)	Php 900.00
Health allowance for the mother	500.00
<b>Total per month</b>	<b>1,400.00</b>
Released thru ATM every 2 months	Php 2,800.00

Withdrawal of this amount is at the Municipality of San Francisco, where Land bank (a government-owned bank) is located. There are however, some costs incurred by the beneficiary shown below:

From Dinagat		From Purok 2	
Motorboat fare to Bunawan	Php 100.00	Motorboat fare to Bunawan	Php 50.00
Bus from Bunawan to SF	50.00	Bus from Bunawan to SF	50.00
One-way	Php 150.00	One-way	Php 100.00

This means that for every trip to San Francisco, a mother from Dinagat spends Php 300.00 for the two-way ride while a beneficiary from Purok 2 spends Php 200.00 per withdrawal.

According to the Barangay Chairman, there are eighty percent (80%) of the residents are members of the 4Ps in Barangay San Marcos. The beneficiaries related that there had been problems attached with the release of the cash amount; although these were apparent only during the first few months of the implementation. Most of the difficulties were the following: a.) Delay in the

<sup>24</sup> Republic Act No. 9994. Expanded Senior Citizens Act of 2010. Gives privileges for senior citizens; among others: The senior citizens shall be entitled to the following: (a) the grant of twenty percent (20%) discount and exemption from the value –added tax (VAT), if applicable, on the sale of the following goods and services from all establishments, for the exclusive use and enjoyment or availment of the senior citizen (1) on the purchase of medicines, including the purchase of influenza and pneumococcal vaccines, and such other essential medical supplies, accessories and equipment to be determined by the Department of Health (DOH).

<sup>25</sup> *Pantawid Pamilyang Pilipino Program* is a human development program of the national government that invests in the health and education of poor households, particularly of children aged 0-14 years old. It is patterned after the conditional cash transfer scheme implemented in other developing countries. The *Pantawid Pamilya* provides cash grants to beneficiaries provided that they comply with the set of conditions required by the program.

completion of the necessary documents and paper works that had to be submitted, thus delaying the release of the automated teller machine (ATM) and b.) Actual amount dispensed by the machine was not the amount that should have been received by the beneficiaries (i.e., there are ATM machines that releases money only in Php500.00 bill denomination).

There are residents who are excluded from the program although they certainly qualify to become beneficiaries. One common reason shared by the interviewees is insufficiency in information dissemination. The barangay government did not give prior notice for the house visit when the surveyors/enumerators conducted a house-to-house visit in May 2009 to identify the qualified beneficiaries from San Marcos. The result was the exclusion of some qualified residents as beneficiaries to the program.

### **Prevention strategies**

#### ***Market literacy***

The People's Bank of Caraga provides orientation and seminar services for those who want to avail of financial loans from the bank. Part of seminar that a member/borrower is supposed to undergo is formal and educational market economy inputs such as financial literacy to prepare them for their eventual investment in a small but sustainable activity enterprise. This kind of opportunity presented is an alternative for them to improve their income and lives.

### **5. Conclusion**

The social risk management instruments available in Barangay San Marcos, representing the communities along the Agusan Marsh are generally coping strategies and inherently survivalist in nature. These are the adaptive measures that come with their living or being located in an environment that is very susceptible to climate variations. This reality has never been more apparent than in *Purok Dinagat*. Their way of coping is not resisting what happens naturally. Their main strategy is conformity to a natural force that cannot be prevented and that comes regularly.

The household and community levels manage their risks through self-help, innovative strategies to cope with flooding by alterations, modifications of their houses and providing bamboo floaters to the houses and for their domestic animals. They have incorporated adjustability to their farming schedules, usually by waiting for the flood to fully subside before they start land preparation. They also rely on their IKSP to "predict" flood levels. The use of indigenous materials (e.g., bamboos, logs) is an indication that they utilize what is easily available in their immediate surroundings. Their close kinship and common ethnicity has forged a strong sense of reliance on their neighbors and relatives for needed cash during emergency situations.

The barangay unit, in coordination with the municipal government and private organizations provide relief assistance to its constituents during these calamities. These are in-kind items (food, clothing) and are usually very temporary. This help is very dependent on the generosity from outside the barangay and is therefore very irregular because there is no budget allocation for this.

The national government has provided mitigation instruments through policies that have been crafted to include the most marginalized communities in the country, including the indigenous peoples of Agusan del Sur. One of these instruments which is fully appreciated is the conditional cash transfer (4Ps) that seeks to ensure the continuing attendance of students in their respective school despite the risks of flooding. The mothers are also compelled to have regular consultations regarding their own health and the health of their school age children as requirements of the program. The beneficiaries also welcome the regular cash allotment they receive from the program. Philhealth, on the other hand, is also made easily available through low membership fee (for indigent members) but has been reduced so far to a complicated submission of documents resulting in its low utilization in Barangay San Marcos.

At the local level, the barangay government's implementation of the Disaster Risk Management (DRM) strategies could have been one of the most important and effective mitigation measures in response to climate change risks had these trainings been made available to all the constituents.

The participation of the women of Purok 2 in microfinance ventures has played a critical role for these women in accessing additional sources of income. They have diversified their risk by expanding their investment to other enterprise. The procedural policies of PBC to grant loans only to an organized group of ten (10) women which guarantees assistance and checks and balance from the group that the member-borrower will be able to pay her loan obligation.

This is mitigation measure however, is not true for the women of Purok Dinagat. One reason for this non-participation is that the women of Dinagat have not been organized as the women of Purok 2. It is therefore easy to conclude that the availability of management instruments in Dinagat is more limited in this aspect. They are more dependent on cash advances/loans from individual traders.

There is a dearth in the availability of preventive risk management instruments for both communities. The only preventive social risk instrument is market literacy (technological, financial) provided by the People's Bank of Caraga and this is tied up to those who have already availed of financial loans from the institution. This preventive instrument directly addresses income and food risks in the event of a possible calamity. Indirectly, it can address the general welfare of the household (health, education).

## **6. The Recommendations**

The study recommends the following to further minimize the risk of marginalized communities to climate risks:

### *Expanding the coverage of the 4Ps Program (time and coverage)*

The 4Ps (or CCT) program, which was launched in the Philippines in late 2007, is aimed to provide social assistance (cash) and to achieve social development (investment in human capital) has been providing crucial alternative cash source in the indigenous communities of Barangay San Marcos. The beneficiaries (mother and school children) all have benefited from this program directly in their health (improved maternal and child mortality) and educational (completed primary education) aspects, which answers partly the main mission of CCT to prevent inter-generational transference of poverty. This may be only a component of resolving poverty in a barangay where risk is a norm rather than an irregular occurrence, the CCT plays a critical role in relieving their vulnerabilities ever since the program has been implemented in their area in 2009.

This is one mitigation measure, however limited and short-term, that has decreased the vulnerability of the residents of San Marcos. The cash assistance has temporarily alleviated some of their basic needs. The conditionality on school attendance has compelled the students to attend their classes, and thus, is a big factor for the continuity of their learning process. Notwithstanding is the other conditionality on health.

It is in these premises that the 4Ps deserve to be continued, both in its time frame and coverage to cover more beneficiaries who may have been excluded from the program. It may not be the most holistic approach to achieve poverty reduction. It is a known fact that the government still has so much to do in terms of bringing about a more accessible and affordable health to all its citizens. Infrastructure and other social projects are lacking especially in the countryside. It is also far from achieving the political reforms it needs towards development but for the beneficiaries of San Marcos, the program has definitely uplift their daily existence from extreme poverty. A policy amendment is needed to extend the program for another 5 years to ensure that not only is primary education is achieved but to follow through this cohort of students up to high school (secondary education) and to cover more areas than what has already been identified.

### *Coordination of Philhealth at the barangay level*

Philhealth has offered membership to Sponsored Program, which opens up to qualified indigents belonging to the lowest 25% of the population. Philhealth, in partnership with the DSWD and the local governments has identified indigent families who are listed in the National Household Targeting System for Poverty Reduction (the same targeting system utilized under the 4Ps program). The

sponsors (LGUs, private individuals and corporations and the members of Congress) jointly pay the premiums for the registered families.

In general, Philhealth provides the sponsored members subsidy for room and board, drugs and medicines, laboratories, operating room and professional fees for confinements of not less than 24 hours (subject to a list of rates for ceiling/maximum allowances).

The national government effort to include a sponsorship program for the marginalized sector is laudable enough and deserves commendation. Its implementation however, has given difficulties to the members. First is the difficulty of providing the number of requirements to become members. Second is the seeming unavailability of the most crucial medicines in the Philhealth-accredited hospitals.

It is recommended therefore that the Sponsored Program of Philhealth be coordinated at the barangay level with the barangay health workers (BHW) to assist the indigent members with documentary processes for membership and for refund/payment.

#### *Government micro-enterprises at the grassroots level*

This study has pointed out that the community in Purok 2 has availed of micro-financing assistance from the People's Bank of Caraga, which enabled to spread out income risk through diversification of livelihood sources. If Philhealth has innovatively created a program for the purpose of alleviating poverty for the most marginalized sector; a national agency, such as the Department of Trade and Industry (DTI) can also extend its micro-credit

The Rural Micro-Enterprise Promotion Program (RuMEPP) is the current program of DTI, which aims to reduce rural poverty through increased economic development. Through the program, the DTI assists relevant agencies in tapping local and foreign funds for small and medium and enterprises (SMEs). The SMEs are promoted at the provincial level and monitored at the municipal and city levels.

A window of opportunity could be opened through this program by specifically targeting the marginalized sector at barangay levels and coordinated at the municipal levels with the partnership of financial institutions. The mechanism of bringing down programs/opportunities like this at the grassroots level would encourage the participation of the poor sector.

One component that is proposed to be a requirement to any application of micro-enterprise assistance is education on market literacy, business skills training, marketing and networking.

### *Comprehensive implementation of the barangay disaster risk management*

The implementation of the Disaster Risk Management Program (DRM) should be implemented comprehensively at the barangay levels, specifically to barangays that are most vulnerable and regularly at risk with climate changes.

*Training on DRM at the household level.* The current status of implementation is only at the level of functionaries. There is an urgent need to bring this down to household level because they are the most directly affected with the climate hazards. The residents should be trained about DRM.

*Budget allocation for rescue equipment.* The provincial and municipal governments should help those barangays that are at risk and provide for the purchase of rescue equipment that will be used during flooding. The barangay government lacks the financial resource to purchase equipment and would need help from the municipal and province level. Samples of these are motorboats at varied sizes (the small boats are appropriate in entering the Agusan Marsh area), life vests, storm lamps/flashlights, etc.

*Disaster management plan.* The barangay also needs to have a disaster management plan, as required by law (Republic Act 10121) for all levels of government units. The Municipality of Bunawan, thus, describes the plan; *“that includes the prevention of damages in cases of disaster shall be undertaken. The overall is to ensure that the policy directions for disaster management programs is clearly established and defined. Further, as a legislative support for the program, there should be an ordinance that requires sustainable development with sensitivity to natural hazards/calamities.”* It should be pointed out that this disaster management plan should incorporate the community’s indigenous knowledge systems and practices (IKSP).