PUBLIC POLICY RESPONSES TO CLIMATE CHANGE IMPACTS AND CONSEQUENCES TO THE FISHERY SECTOR

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The NGOs for Fisheries Reform (NFR) is a national coalition of 13 non-government organizations. The NFR was established in 1994 and it was instrumental in the passage of Republic Act 8550 or the Philippine Fisheries Code of 1998. The NFR primarily seeks to establish a conducive policy environment for policy reforms in the fishery sector. This paper was presented to the Conference on Women in Fisheries and Climate Change that was held in Bohol last March 9-12, 2010.

I. INTRODUCTION

The International Panel for Climate Change (IPCC) 4th Assessment Report is considered to be an important document because it provided scientific bases to long-standing belief that there is a marked change in global climate. The IPCC Report claims that climate change adversely affects communities, especially developing countries such as the Philippines. It has been reported that climate change is the 'greatest stressor in the 21st century that threatens both the present and future generations' (Philippine National Convention on Climate Change (PNCC), 2008). It poses challenge to the sustainable development paradigm that natural resource managers and planners in the Philippines have been working to achieve in the last 2 to 3 decades. The effects of climate change are alarming, which threatens wide-ranging sectors, most notably the fishing communities along the coasts in the world. The IPCC Report points to high possibility on coastal areas around the world being radically altered due to climate change. Corals, for instance, have been observed to have low adaptive capacity and are highly vulnerable to thermal stress. An increase in sea surface temperature (SST) of about 1-3 degrees Celsius are likely to result in more frequent coral bleaching and widespread mortality (IPCC 4th Assessment Report, 2007). Coastal wetlands including sea marshes and mangroves are likely to be negatively hit by the sea-level rise. With a reported increase in the SST, considerable impact can be seen in both the inland and coastal marine ecosystems[i]. A marked change in sea temperature will have resulted into disturbance of these sensitive ecosystems. It is believed that increase in SST increases the occurrence of coral bleaching, which poses direct threats to established community-managed marine protected areas as well as productivity of reef fisheries. Moreover, diversity of fish species and migratory patterns of these fish species are to be drastically altered because the Philippine tropical oceans receive greater amounts of solar heat input due to global warming. Equally alarming, climate change threatens to submerge low-lying fishing communities due to accelerated sea level rise[ii]. Changes in weather patterns also lead to changes in fishing patterns, which means longer hours at sea but lesser fish catch for municipal fisherfolks.

II. LIMITATIONS OF THE PAPER

The paper is an attempt to discuss the varying policy and program responses to institutional weaknesses to address climate change impacts to fishing communities. The Philippines has produced several policies in the forms of Executive Orders and legislations by Congress with regard to climate change and fisheries. These were good laws but somewhere along the line there are significant gaps that need to be addressed. These policy gaps are the focus of this paper.

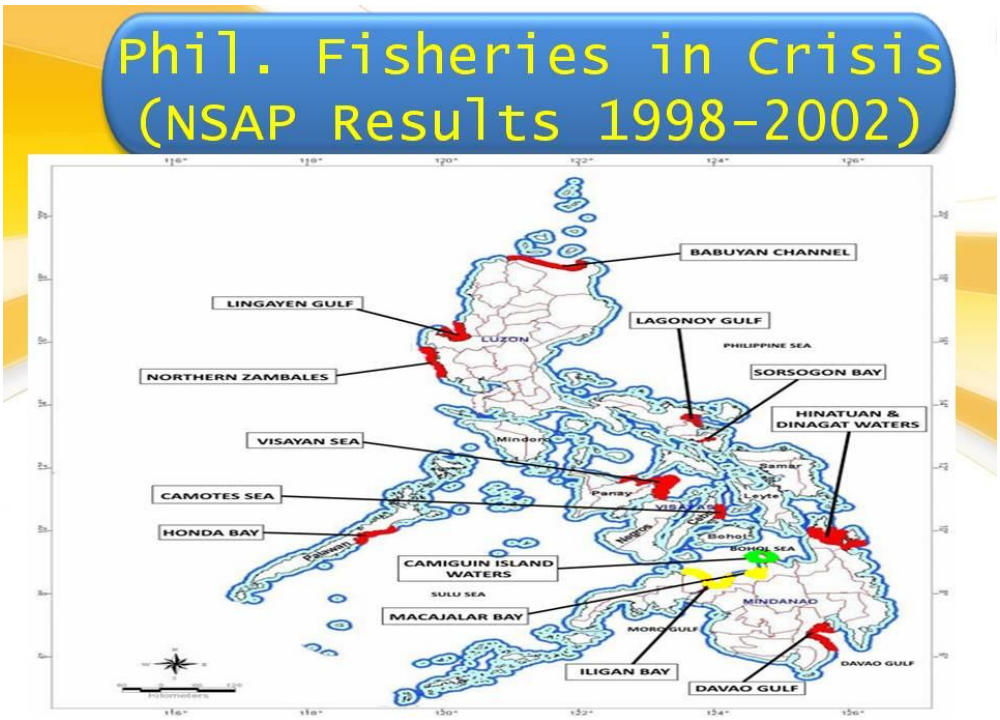
This is no, however, a technical paper that establishes scientific bases that global climate change translates to further deterioration of important coastal and marine ecosystems. The author thinks that the scientific community has already produced significant studies on this. Consequently, depleted resources translate into reduced fish catch and reduced income of municipal fisherfolks. The paper focuses on public policy responses that help in increasing the capability of local government units and municipal fisherfolks to respond to the consequences of climate change impacts.

III. THREATS TO COASTAL ECOSYSTEMS

The threats of climate change to Philippine fisheries and coastal biodiversity are real. These threats further aggravate the already dismal condition of Philippine fisheries. Once, the country is naturally endowed with rich coastal resources. It has a coastline of 17,460 kilometers. Its territorial waters including its Exclusive Economic Zone (EEZ) total 2.2 million square kilometers, of which 226,000 square kilometers are coastal while the rest are oceanic (CNFIDP, 2007:19). The country's coral reef areas are considered to be the most extensive, second only to neighboring Indonesia. It has large tracts of mangrove forests and sizable sea grass areas scattered around its coasts. In fact, the country is considered to be the apex of the Coral Triangle, which is recognized as the world's center of marine biodiversity (National Plan of Action for the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security, 2009:1).

To date, over 70% of coral reefs in the country are in poor state, and less than 5% are in excellent condition (Licuanan and Gomez, 2002). Only half of the 978 square kilometers of sea grass beds in 96 surveyed sites have remained while the rest are already lost or severely degraded in the past 56 years (as cited in Fortes and Santos, 2004:90). Equally alarming is the fact that of the estimated 450,000 hectares of mangroves recorded in 1918, less than 140,000 hectares exist today (White and de Leon, 1996:84). Based on the National Stock Assessment Program of the National Fisheries Research Development Institute (NFRDI) under the Department of Agriculture-Bureau of Fisheries and Aquatic Resources, of the 17 major fishing bays only 2, the Camiguin and Macajalar Bays, remain within the maximum sustainable yield[iii]. All the rest, including Manila Bay, Davao Gulf and Honda Bay, among others, are already overfished.

Figure 1. National Stock Assessment Program, DA-BFAR



IV. THREATS TO FISHING COMMUNITIES

The Philippines is a resource-dependent economy. This means that whatever changes that occur in the country's resources, it has dire effects to people who depend on these resources. It is no wonder that that poverty in fishing communities speak loudly about the deteriorating state of coastal and marine resources in the Philippines. The fisheries sector, which is considered to be one of the poorest sectors in the Philippines, will definitely bear the burden of climate change. Poverty situation in the Philippines is disturbingly high. The government claimed that the country has made significant progress to improve its poverty situation by pointing out that 'the proportion of the population living below US$1.25-a-day declined from 34.9 percent in 1985 to 22.6 percent in 2006, or a reduction of about 2 percent per year over the two decades' (KALAHI-CIDSS, 2009). However, Balisacan (2009) showed that despite a reportedly improved economic performance as reflected in the historic increase in Gross Domestic Product from 2000 to 2006, poverty remained widespread. Notably, poverty is predominantly found in rural areas, where populations face declining agricultural productivity and resource degradation.

The Millenium Development Goal (MDG) envisioned to reduce the populations living in poverty by half in 2015. Based on government's report, this first MDG target is attainable. This paper, however, suggests that the government will surely miss its target unless it focused its poverty alleviation programs to the rural areas and to the fisheries sector, which is considered to be the poorest sector. Notably,

despite the government's claim that it made strides in combating poverty, poverty conditions across sectors are disturbing. Based on the National Statistical Coordination Board (NSCB,2006), all sectors posted increases in poverty incidence between the period 2003 and 2006. The fisherfolks, children and farmers are the three poorest sectors in the country. The poorest fisherfolks are found in the CARAGA Region, the Autonomous Region of Muslim Mindanao (ARMM) and the Bicol Region (See Table 1).

Table 1. Poverty Incidence and Poorest Regions in the Philippines, 2006

Sector	Poverty Incidence		Region	
	Highest	Lowest	Poorest	Least Poor
Fisherfolk	66.9	23.9	1. CARAGA 2. ARMM 3. REGION V	1. REGION III 2. REGION II 3. NCR
Children	66.3	15.2	1. ARMM 2. REGION IVB 3. REGION VIII	1. NCR 2. REGION III 3. REGION IVA
Farmers	62.3	16.9	1. ARMM 2. REGION IX 3. REGION X	1. REGION II 2. REGION III 3. REGION I
Women	58.9	9.7	1. ARMM 2. REGION IVB 3. CARAGA	1. NCR 2. REGION III 3. REGION IVA

Source: NSCB, 2006 Poverty Statistics for the Basic Sectors.

Table 2 indicates that if we take the three poorest regions in the country, several coastal municipalities socially and economically depressed thus are less resilient to climate change consequences. The CARAGA is the poorest region in the country. This means that in the region, which is composed of the provinces of Agusan del Sur, Agusan del Norte, Surigao del Sur, Surigao del Norte and Butuan City, around 49 coastal municipalities are under extreme poverty conditions. On one hand, the ARMM Provinces, which include Maguindanao, Shariff Kabunsuan, Lanao del Sur, Basilan, Sulu and Tawi-Tawi, have 62 coastal municipalities living in poverty. The Bicol Region, on the other hand, which is comprised of Albay, Camarines Sur, Camarines Norte, Catanduanes, Masbate and Sorsogon, have 89 impoverished coastal municipalities.

Table 2. Number of Coastal Provinces and Municipalities in the Poorest Regions

Regions	Provinces	Coastal Municipalities
CARAGA	Agusan del Sur	NAD
	Agusan del Norte	8
	Surigao del Sur	25
	Surigao del Norte	16
	Butuan City	NAD
ARMM	Maguindanao	6
	Shariff Kabunsuan	NAD
	Lanao del Sur	22
	Basilan	7
	Sulu	17
	Tawi-Tawi	10
Bicol Region	Albay	13
	Camarines Sur	22
	Camarines Norte	9
	Catanduanes	10
	Masbate	21
	Sorsogon	14

Source: National Mapping Resources and Information Authority, 2008.

Fisheries being the livelihood of last resort which means that fishing is every poor man's and woman 's source of income and sustenance makes poverty more critical. Poverty reduces the adaptive capacity of fishing communities to climate change impacts. Poverty also increases the vulnerability of fishing communities to extreme weather events, sea level rise and increase in sea surface temperatures. Poor fishing communities are deprived to make choices to re-settle, for instance, from low-lying coastal areas to relatively safe human settlement. They are also deprived of access to health services especially those who lived in island communities and thus are difficult to reach.

The total number of fishing population that are could be highly vulnerable to climate change is significantly large. Based on the National Statistical Coordination Board (NSCB), the total number of population residing in coastal areas is estimated to be around 43 million in 2005. By 2020, the coastal population is estimated to grow at around 55 million. The annual population growth rate in coastal areas is 2.26%. In 2010, the projected population density in coastal communities is 347 persons per square kilometres (*See Table 3*).

Table 3. Population Density in Coastal Areas

Parameter	2000	2005	2010	2015	2020
Population					
National	76,498,735	84,299,000	92,736,000	100,571,000	108,210,000
Coastal Areas	39,007,905	42,992,490	47,295,360	51,291,210	55,187,100
Non-Coastal Areas	37,490,830	41,306,510	45,440,640	49,279,790	53,022,900
Land Area (square kilometers)					
National	300,000	300,000	300,000	300,000	300,000
Coastal Areas	136,400	136,400	136,400	136,400	136,400
Non-Coastal Areas	163,600	163,600	163,600	163,600	163,600
Population Density (Person per square kilometres)					
National	255	281	309	335	361
Coastal Areas	286	315	347	376	405
Non-Coastal Areas	229	252	278	301	324

Source: NSCB, 2000.

CASE STUDY OF BARANGAYS BUCANA AND BAGONG KALSADA IN THE MUNICIPALITY OF NAIC, CAVITE[iv]

Table 4 shows the initial results of a study conducted last February 2010 by students from the Ateneo de Manila University. The community indicated several changes in terms of temperature, weather patterns and occurrence of extreme events. However, these changes were not directly associated with climate change since the level of awareness of the community on climate change is low. These changes manifest in several cases like decrease in abundance and diversity of fishcatch. Key informants noted that in the 1950s and 1960s, their fish catch include tuna, talakitok and tanigue, which come with premium prices. At present, they catch tulingan and hasa-hasa, which are considered to be less profitable. Also, in the past, municipal fisherfolks spend 6 hours at sea and come back with large volume of fishcatch and translated into surplus income. Now, even if they spend the whole day at sea, their income ranged from Php200 to Php300.

PERCEIVED CHANGES	VULNERABILITIES	ADAPTIVE CAPACITIES
TEMPERATURE Warming of Sea Temperature Upswell of colder seawater during the rainy season	LIVELIHOOD: decrease in abundance and diversity of fishcatch; increased risk of incurring losses from fishing expeditions RISK TO LIVES: increase in risks to lives of municipal fisherfolks HEALTH AND WATER: Increased susceptibility to saltwaterintrusion of groundwater sources; increase in water borne diseases SOCIAL RELATIONS: 'multiple burden' for women having to spend more time looking for alternative sources of income; non-recognition of women's contribution to disaster recovery INFRASTRUCTURES: Settlements and facilities located near the coast being destroyed or damaged	BARANGAY BUCANA: Access to financial support from local credit facilities (cooperatives); 'damayan' concept BARANGAY BAGONG KALSADA: Access to financial support from local credit facilities; Mobilize activities like coastal rehabilitation
WEATHER AND CLIMATIC CHANGES Unpredictability of weather patterns Frequency of cold wind surges Uncertain rainfall		
EXTREME EVENTS Increase in frequency and intensity of typhoons Increase in intensity of terrestrial heat Increase in magnitude of waves		

It is also noted that the consequences of having less catch poses additional burden to women fisherfolks to look for alternative sources of income. This is true especially during prolonged rainy season and after the occurrence of extreme weather event when they are not able to go out to sea. Moreover, there is also an observed saltwater intrusion of groundwater sources in the two coastal barangays. This translate into increase number of cases with urinary tract disease and diarrhea among children.

V. PUBLIC POLICY RESPONSES TO CLIMATE CHANGE IMPACTS TO FISHERIES

Coral Triangle Initiative-National Plan of Action

The Coral Triangle Initiative (CTI) is a regional agreement between six countries including Indonesia, the Philippines, Malaysia, Timor-Leste, Papua New Guinea and the Solomon Islands. The agreement aims to protect the global epicentre of marine biodiversity. It represents 76% of all known coral species, 37% of all known coral reef fish species, 33% of the world's coral reefs, the greatest extent of mangrove forests in the world, and spawning and juvenile growth areas for the world's largest tuna fishery (Regional Plan of Action, September 2008). It is believed that the fisheries industry of countries included in the coral

triangle support around 363 million people, of which more than 120 million people directly benefit from the resources found within the coral triangle. The Philippines, on the other hand, is believed to be the 'hottest of the marine biodiversity hotspots in the world.' The total number of fishing populations that are most likely to be affected by climate change has already been discussed above.

Based on the National Plan of Action of the Philippines, the Integrated Coastal Management (ICM) is considered to be the over-all framework of the Coral Triangle Initiative (CTI). The ICM is defined as 'a dynamic process of planning and management involving stakeholders, and requiring the analysis of the environmental and socio-economic implications of development, the ecosystem processes, and the interrelationships among land-based and marine-based activities and jurisdictions' (NPOA, p.12). At first glance, the adoption of ICM as an over-all framework of CTI is consistent with Executive Order 533, which was signed by President Gloria Macapagal-Arroyo last June 6, 2006. It declares ICM as a national strategy and policy framework for sustainable development of coastal and marine resources.

The ICM framework can be considered as a significant gain for NRM practitioners. It harmonizes the human and environmental components of resource management, as each component is treated as important in achieving 'sustainable livelihood, poverty alleviation and reduction of vulnerability to natural hazards.' It takes into consideration the active roles of major stakeholders in achieving its desired goals.

The 5 over-all goals of CTI-Regional POA include the following:

1. Priority seascapes are designated and effectively managed
2. Ecosystem approach to management of fisheries (EAFM) and other marine resources fully applied
3. Marine protected areas (MPAs) established and effectively managed (including community-based resource management)
4. Climate change adaptation measures achieved; and
5. Threatened species status improving

It is observed that Goal Number 4 of the NPOA pertains to responses to climate change impacts to fisheries. There are several actions that were identified by the national government that were specified in NPOA, which are summarized into two over-all targets. The first target is to formulate a region-wide early action for climate change adaptation plan for the near-shore and island communities. This is expected to be functional in 2012. Actions included in Target 1 include the conduct of vulnerability and risk assessments, identification and implementation of immediate climate adaptation measures and mainstreaming early warning systems, among others. Programs for fisherfolk settlement that will be affected by sea-level rise are included under this target. Target 2, on the other hand, aims to improve Knowledge Management, wherein national centers of excellence on climate change adaptation will be established by 2013.

Issues and Concerns:

What is remissed in the CTI, however, is the idea of stakeholders participation in the whole development process. Compared with EO 533, which specifically identified the important roles of local government units down to the *barangay* level, NGOs and private sectors, in developing ICM Programmes, the CTI NPOA seems to be guided by the top-down approach in development planning. The major stakeholders: the municipal fisherfolks, non-government units and the LGUs are completely left out in the development process. There have been no consultations on the content and substance of the CTI-NPOA. Or if there were consultations, only selected fisherfolk organizations and selected LGUs have been invited. In fact , if we are going to compare EO 533 (Adopting ICM as National Framework) with EO 797 (Adopting the CTI National Plan of Action), there is a big difference. EO 533 ensures that stakeholders' participation is an integral component of government programs. EO 797, on the other hand, mandates the LGUs to integrate the NPOA Priority Actions into the local plans and programs without even consulting them. Thus, at the very start, the whole project that is called CTI NPOA has never conformed to the ideals of stakeholder participation as clearly stipulated in ICM.

If stakeholders participation must be considered in the whole development process, grassroots participation must be at the center of climate discourse as well. It is because fishing communities and the local government units understand best their weaknesses and strengths in responding to climate change-related events. Municipal fisherfolks understand their resources better than anyone. Traditional knowledge and practices should also be considered especially in crafting early warning systems. In one of the author's visit in the Municipality of Naic in Cavite for the refinement of NFR's research tool on climate change and fisheries, it was pointed out by a fisherfolk leader that most of the time they rely on their 'gut feel'. They rely on the wind to predict whether there is a storm coming and there would be strong wave currents. This 'gut feel' are obviously not founded on scientific bases but equally important in crafting effective early warning systems. Also, adaptation measures should be properly designed that are easily understandable and accessible to fishing communities.

Another significant issue in CTI is its different fund sources. Most notably is the significant allocation coming from the Asian Development Bank (ADB), which is a financial institution that extends loans and shares technical expertise to its country members in the implementation of development programs. In the indicative financing of CTI, the ADB will allocate around US$233,750,000 or around Php10,752,500,000 (US$=Php46.00). Other fund sources include the Global Environment Facility (GEF) under the United Nations, bilateral and multilateral agreements and international NGO partners like the Conservation International (CI), the World Wildlife Fund for Nature (WWF) and the Nature Conservancy. What is alarming is the nature of available funds for the implementation of CTI-RPOA, which are mostly in the form of loans and partnership agreements. Loans and partnership agreements are often defined by conditionalities. Past experiences are replete with conditionalities that are not beneficial to developing countries. For instance, the structural adjustment programs under the International Monetary Fund (IMF) have spelled doom to the Philippines as it liberalized its economy in exchange of loans. Equally important is the availability of information on partnership agreements. The government

should be made accountable to its constituency with regard to all partnership agreements it will enter into. The right of the public for information should be respected at all times.

Comprehensive National Fishery Industry Development Plan

The Comprehensive National Fisheries Industry Development Plan (CNFIDP) is important in institutionalizing principles and strategies for sustainable fisheries management. The CNFIDP, as mandated under the Fisheries Code, is designed to provide a comprehensive framework for promoting optimal development and long-term sustainability of benefits derived by the Philippines from its fisheries resources. It provides for the strategic priorities and directions for the fisheries sector over the next years (2006-2025) in response to current (as well as potential) issues and challenges facing the Philippine fishery sector. With the current highly over-exploited status of the country's fisheries and coastal resources, the CNFIDP contains both development and conservation elements.

It is an attempt to employ an inclusive approach to fisheries management and development with participation of industry stakeholders from the municipal, commercial, post-harvest and aquaculture sub-sectors. While history is replete with grand programs that have only led to the present crisis of Philippine fisheries, it is important for the artisanal fisherfolk and their allies to collectively and exhaustively engage government and the private sector in the implementation of CNFIDP.

Issues and Concerns:

Though the said plan was officially adopted by the BFAR by virtue of the fisheries order it issued on June 24, 2008, several issues are left unsettled as to its implementation, the establishment of institutional mechanisms to carry out the programs including the political will of the core implementers. But what is critical is that the CNFIDP is not a climate-proof government program. It renders the document incomplete because it failed to address climate change as the primary threat to the gains from CNFIDP implementation. However, if we examine the CNFIDP, there are several opportunities to include in the design of its activities the climate change adaptation measures for fisheries. For instance, part of the Comprehensive Education Program for Fisheries, Fisheries and Aquatic Resources Management Councils and Fisherfolk Organizations is the discussion on the consequences of climate change to fishing communities.

R.A. 9729 or the Climate Change Act of 2009 and Disaster Risk Reduction and Management Act of 2009

R.A. 9729 or the Climate Change Act of 2009 was signed into law by President Gloria Macapagal Arroyo last October 23, 2009. It mandates the creation of a policy-making body that will formulate and monitor action plans that respond to climate change-related events. The Commission shall be headed by the Philippine President. A climate change office shall be established to assist the commission in the performance of its function. The Commission is mandated to formulate a Framework Strategy on Climate Change within six months from the effectivity of the said Act. A National Climate Change Action Plan will be developed out of this Framework. R.A. 9729 also mandates the LGUs to create their respective Local Climate Change Action Plan, copies of which shall be submitted to the Commission. The

Commission is likewise mandated to submit an annual report every 30th of March to the President and both Houses of Congress. The passage of the Climate Change Act of 2009 is a welcome policy development. It entails that the climate change discourse has already been mainstreamed thus institutionalized in government's platforms and priorities.

The proposed DRRM Act of 2009, on the other hand, provides for the development of policies and plans and the implementation of actions and measures pertaining to all aspects of disaster risk reduction, management and recovery. Activities include establishment of good governance structures, risk assessment and early warning, knowledge building and awareness raising, reducing underlying risk factors, and preparedness for effective response and early recovery. Under the said bill, the policy-making functions of the National Disaster Coordinating Council will be placed under the newly created National Disaster Risk Reduction and Management Council. The Office of Civil Defense, on the other hand, will be replaced by the National Disaster Risk Reduction and Management Authority, which like the Climate Change Commission will be under the Office of the President. The DRRM Act of 2009 is expected to be signed into law by the President in May 2010.

The author deemed it important to include here the discussion on the Climate Change Adaptation framework that is being initiated by the Adaptation to Climate Change and Conservation of Biodiversity (ACC-BIO) under the Department of Environment and Natural Resources (DENR). The ACC-BIO facilitated several consultations with different sectors including agriculture, energy and fisheries, among others, to formulate a national framework on climate change adaptation. Dr. Angel Alcala, a respected Filipino marine scientist and currently connected with the Silliman University Angelo King Center for Research and Environmental Management, led the formulation of the Philippine Strategy on Climate Change Adaptation for Coastal and Marine Sector. However, in the course of the consultation with various civil society organizations, it was proposed that the adaptation framework should not only be based from the climate change threats to natural ecosystems but also to human ecosystems. Thus, Dr. Jose Ingles and Dr. Jimely Flores were commissioned to fill up this gap. However, the adaptation strategies and approaches that were suggested are adopted from the technical paper produced by the Food and Agriculture Organization of the United Nations in 2008. The strategies under the capture fisheries include better fisheries management, reduced fishing efforts and diversity sources of income and livelihood for municipal fisherfolks. What is important to highlight in the adaptation framework is the recognition that different coastal areas and fisheries sub-sector have different levels of understanding and different levels of vulnerabilities and exposure to climate change. What is the immediate thing to do is to understand the different scenarios by conducting vulnerability and risk assessment studies. The results of which shall form the action plans to address the consequences of climate change.

Issues and Concerns:

A significant issue related to the preceding discussion is how to harmonize the different roles of agencies involved as specified in the Climate Change Act of 2009 and the DRRM Act of 2009. The newly created institutions like the Climate Change Commission and the National Disaster Risk Reduction and Management Council will be placed under the control of the Philippine President. At some point, there

may be harmonization and complementation of roles and responsibilities between these two commissions. They have share common responsibility to formulate policies though the National Disaster Risk Reduction and Management Council have expanded roles to implement programs.

In terms of the climate change adaptation framework for the coastal and marine sector, little is known whether the framework will be adopted by the Climate Change Commission. It is because the formulation of the adaptation framework started before the Climate Change Act of 2009 was signed into law. Moreover, the climate change adaptation strategies mentioned in the proposed framework are nothing new. Activities like reduction of fishing efforts and diversification of sources of income and subsistence are the exact activities proposed to resolve overfishing.

VI. INSTITUTIONAL CAPACITIES TO RESPOND TO CLIMATE CHANGE-RELATED CONSEQUENCES TO FISHING COMMUNITIES

With the passage of the Climate Change Act of 2009 and the signing into law of the DRRM Act in May 2010, it seems that we have succeeded in developing a policy environment conducive in responding to climate change-related consequences to the Philippine fisheries sector. The next important thing to do is to assess the institutional capacity of the Bureau of Fisheries and Aquatic Resources (BFAR) and the local government units to implement programs to address the consequences of climate change to fisheries. It is because weak institutions increase the vulnerabilities and risks of fishing communities from climate change impacts.

If we are going to assess the readiness of BFAR to implement climate change-related programs, a closer look of the labor force of the Bureau is wanting. Based on the data presented by BFAR in a meeting of the NAFC Committee on Fisheries and Aquaculture last March 5, 2010, there are a total of 2,451 plantilla positions needed by BFAR to perform its duties as a line bureau. At present, there are only 1,492 plantilla positions that are filled. It is also important to note how much budget is allocated for BFAR to perform its mandate. In the study conducted by NFR, it was noted that BFAR's budget allocation is minimal. From the period 2005-2009, BFAR's regular budget is nil. BFAR's budget comprised 13.7% of the total budget of DA in 2008. The following year, BFAR's budget is 13% of the total budget of DA. In terms of budget allocation in fisheries modernization, budget allocation for the fisheries sector decreased from 5.13% of the total AFMA budget in 2008 to 4.26% of the total AFMA budget in 2009 (*See Table 4*).

Table 4. DA and BFAR Regular Budget in Pesos (2005-2009)

REGULAR BUDGET					
AGENCY and ITEM	**2005**	**2006 (reenacted)**	**2007**	**2008**	**2009**
TOTAL DA	2,916,015,000	2,916,015,000	3,111,308,000	3,198,643,000	3,615,228,000
Department of Agriculture (OSEC)	**2,056,783,000**	**2,056,783,000**	**2,228,408,000**	**2,305,085,000**	**2,520,201,000**
Bureau of Fisheries and Aquatic Resources	**418,896,000 (14.36%)**	**418,896,000 (14.36%)**	**440,903,000 (14.17%)**	**438,338,000 (13.7%)**	**469,998,000 (13%)**
AFMA					
AGENCY and ITEM	**2005**	**2006 (reenacted)**	**2007**	**2008**	**2009**
Total AFMA	**10,261,068,000**	**10,261,068,000**	**19,600,358,000**	**23,343,840,000**	**44,474,644,000**
TOTAL DA	11,029,225,000	11,029,225,000	14,190,734,000	21,608,404,000	37,606,066,000
Department of Agriculture (OSEC)	**10,030,878,000**	**10,030,878,000**	**13,065,616,000**	**20,200,292,000**	**33,893,456,000**
Bureau of Fisheries and Aquatic Resources	**829,268,000 (8%)**	**829,268,000 (8%)**	**914,388,000 (4.6%)**	**1,199,180,000 (5.13%)**	**1,897,608,000 (4.26%)**

Source: Department of Budget and Management

That is for the capacity of national institution like the BFAR to respond to climate change. What is the adaptive capacity, on the other hand, of coastal local government units and fishing communities to respond to climate change issues. For this, the author will use the data gathered from the study conducted by the students from the Ateneo de Manila University under the "Environment, Culture and Society" class of Dr. Liza L. Lim. Based on FGDs and key informant interviews from Barangay Bucana and Bagong Kalsada in the Municipality of Naic, Cavite, it was observed that there is a low adaptive capacity to climate change for local institutions. There is a direct correlation between the levels of understanding of climate change impacts of LGUs and fishing communities to their adaptive capacity to climate change consequences. The greater the level of understanding of the community to climate change impacts and consequences the higher their capacities to reduce their vulnerabilities and exposure to climate change-related phenomena. Notably, mass media (i.e. television, radio and local broadsheets) are instrumental in disseminating climate change-related information, the level of understanding of municipal fisherfolks in the two coastal barangays are still at the cognitive level or they are conscious of climate change. But this does not translate into relating events such as reduced fish catch and coral bleaching to climate change. Instead, they are credit these phenomena to overfishing and cyanide and dynamite fishing. It was also observed that municipal fisherfolks received little assistance from the LGUs in times of natural

calamities like the Typhoon Milenyo in 2006. They rely, instead, to their immediate families, friends and neighbours.

VII. CONCLUSIONS AND RECOMMENDATIONS

This paper concludes that:

1. Public policy responses to climate change consequences to fisheries sector are relatively good. However, there are issues particularly on the implementation as well as harmonization of policies, roles and responsibilities of concerned agencies and institutions;

2. The institutional capacities of BFAR, the LGUs and fishing communities are weak in terms of responding to climate change-related impacts to fisheries sector.

This paper suggests that:

1. Public policy responses should be made appropriate to geographical areas since these have varying degrees of vulnerabilities, hazards and exposures to climate change. An immediate complementary activity should include the conduct of risk assessment of fishing communities. The results of these assessments should be the bases of local climate change adaptation plans and local disaster risks and management plans.

2. There is a need to improve the institutional capacities of BFAR, the LGUs and fishing communities. An assessment of their capacities should be made to make appropriate interventions.

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[i] Houghton, et. al., (2005) reported that the changing climate resulted into an increase in sea-surface temperature (SST). It was reported that from 1976-2000, the SST has increased 0.14 degrees Celsius for every ten years.

[ii] The IPCC 4th Assessment Report claims that the warming of the climate system is indisputable. This is evident from observations of increases in global average air and ocean temperatures, which resulted in the melting of snow and ice and the rise in the global average sea level. The Report recorded that 11 of the last 12 years (1995-2006) were ranked as the twelve warmest years in the instrumental record of global surface temperature since 1850.

[iii] The rise in SST is logically dependent with the rise in global average temperature. The IPCC 4th Assessment Report claims that global average sea level has risen since 1961 at an average rate of 1.8 (1.3-2.3) mm/year and since 1993 at 3.1 (2.4-3.8) mm/year. The rise in SST is widely attributed to thermal expansion, melting glaciers and ice caps, and polar ice sheets.

[iv] In February 20-21, 2010, Ateneo de Manila University students under the "Environment, Culture and Society" of Dr. Liza L. Lim, assisted the NGOs for Fisheries Reform to further refine its research tool on the Vulnerability Assessment of Fishing Communities in the Philippines. The initial results of the study is discussed in this paper.

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