

## **The Northern Philippine Sea: A Bioregional Development Communication Strategy**

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### **ABSTRACT**

The Philippine marine management challenge requires a scaled up ecosystem approach to the biodiversity-based bioregional level used in marine spatial planning. The related communication challenge is being addressed by a currently informal consortium that includes non-government organizations, local government units, as well as state colleges and universities. The evolving communication strategy described here is focused upon considerations that include local government mandates, status of marine development, province-by-province assessment of coastal economies, cultural relevance, academic programming, and the need for national inputs on counterpart funding. The current work provides a possible model for Philippine application in all marine bioregions. The concept of the bioregional approach was systematically advocated across one bioregion, the Northern Philippine Sea. The Philippine strategy of development communication was used as a template to promote the development of a bioregional approach by establishing an initial level of participation involving the provincial governments as well as the state universities and colleges.

*Keywords:* Marine spatial planning, development communication, biodiversity-based bioregional approach, Ecohealth, Northern Philippine Sea

The bioregional consideration of marine management piloted for the Northern Philippine Sea (NPS) discussed here represents a nationally unique scaling up of the ecosystem approach. The objective of the work reported below was to define an initial progressive bioregional strategy. In part, these activities were built upon the established Philippine discipline of development communication (DevCom)

through a systematic consideration of the jurisdictional, cultural, and ecological situation. The evolution of academe in the Philippines has not resulted in clear mechanisms for new program development. There is neither financing, nor even government-approved approaches for needs assessment to establish reflexive marine programming. Further, the local government units (LGUs) of the Philippines that are responsible for marine management extending out to the 15-km limit generally do not have marine science capacity, nor positions focused on those mandates. The *DevCom Message* advocated in the current work was there is a need for related changes in governance and education, best met through an Ecohealth framework for marine science curriculum (Añabieza, Pajaro, Reyes, Tiburcio, & Watts, 2010; Watts, Macose, Angara, & Pajaro, 2010).

In part, the current work and DevCom message was presented as an advocacy for the mobilizing and merging of LGU needs with education potential and mandate. The promotion of networking between LGUs and state universities and colleges (SUCs) was focused on the establishment, recognition, or mobilization of common interests associated with one ecological unit, the NPS bioregion. The ultimate goal of this hybrid intervention is to create a system of marine science jobs at the LGU level as well as the training systems required to fill those jobs. Faculty positions that validate the need for marine science will create centers of expertise to help meet current and future challenges, particularly those associated with climate change. Enhancing coastal marine expertise in the SUC system will also give the national government additional local counterparts for targeted research, extensions, and development programs. The hypothetical consideration in this study is that DevCom strategies applied systematically to ecological, jurisdictional, and cultural considerations could lead to bioregional advancement. In particular, ongoing efforts would be more sustainable based upon endorsements from the 10 provinces of the NPS and their lead academic institutions. This was the objective of the current phase of bioregional development.

## **THE PHILIPPINE MARINE CHALLENGE: EDUCATION AND GOVERNANCE**

The marine challenge of the Philippines is best documented in the milestone Bureau of Fisheries and Aquatic Resources (BFAR) review, *In Turbulent Seas*, published in 2004. This volume contains 60 individual articles focused on the dependence of the Philippines upon marine fisheries, as well as management efforts and ongoing individual LGU challenges regarding coastal small-scale fisheries. The Philippines is arguably the most coastal fisheries-dependent country in the world with a per capita annual marine fish consumption of 36 kg, an amount higher than that of any other large country in Southeast Asia (Silvestre & Pauly, 2004). Over

80% of the country's provinces are coastal, and the Philippines has a coastline longer than the continent of Africa. The coastal challenges of LGUs are exacerbated by the need to focus on ecological parameters that require new regional and inter-provincial approaches based upon shared ecological resources.

The LGUs currently have a limited capacity for marine resource management in part due to a lack of trained graduates in marine science, as there are currently no other Philippine programs established or under development that encompass a biodiversity-based bioregional approach. One challenge is that there are no specific lines of funding within the academic and political systems that can provide adequate support to SUCs to develop reflexive programs to meet the needs of LGUs. Fisherfolk, poverty, and the decline of the marine environment are linked. Improvements require a holistic paradigm drawing upon all possible potentials for positive change, or a transdisciplinary approach. The Ecohealth ([www.ecohealth.net](http://www.ecohealth.net)) lens as one such approach is focused on the link between human health and the environment and is central to the action described herein.

The development of responsive marine programs at the undergraduate level that employs an Ecohealth lens will further stimulate the directional expansion of the other tertiary education functions of research and extension. For example, at this time the Extension Programs of many SUCs, including coastal jurisdictions, is dominated by agricultural activities. Large-scale changes in governance and education cannot be implemented in one large initiative. There is a need for iterative project action cycles, as found in action research (Lewin, 1948; Reason & Bradbury, 2008). Ultimately, the establishment of any new program to meet the Philippine marine challenge requires stepwise positive change both in terms of academe and jurisdictional position descriptions. Political will needs to be built through local participatory processes involving both agencies and direct beneficiaries. As in action research the current work considers the role of the investigator as one of facilitation through a catalyst role. The first project action cycle outlined here aims to determine if there was a positive change as a result of the intervention. Development communication approaches were adapted to the project with the goal of obtaining formal endorsement from potential partners.

## **A DEVELOPMENTAL AND PROGRAMMATIC APPROACH TO GAP ANALYSIS AND REMEDIATION**

Clearly, there are both global challenges concerning development associated with marine resources, fisherfolk, and poverty as well as international advancements that could provide insights for the Philippines. Globally, sustainable maritime

development has been generally based upon marine spatial planning (MSP) and the bioregional approach (Douvere & Ehler, 2009; UNESCO, 2009) using localized communication strategies (Davis, 2013). The Philippines made extensive commitments to developing MSP through the United Nations Environment Program (UNEP) Convention on Biological Diversity at the Nagoya, Japan meetings with a declaration dated October 29, 2010. The emerging use of electronic communication in terms of the Internet and cell phones makes the outreach to coastal marine fisheries considerations timely. However, there is a significant need for the development of systematic communication strategies.

In general, Southeast Asia has been slow to initiate MSP, perhaps due to similar communication and coordination challenges when considering participation from isolated fishing villages and limited infrastructure. The established discipline of development communication provides the basis for a Philippine communication strategy that can encompass the marine challenge and lead to MSP. Significantly, DevCom principles and approaches have evolved into a nonpolitical format. However, in the case of the marine environment, the communication strategy needs to be based upon the local ecological situation to be effective. The ecological units forming the basis for the communication strategy should encompass individual units that share resources. The bioregional approach for MSP is based upon biodiversity units, and biodiversity conservation is generally considered critical for ecosystem stability and the well-being of those dependent upon related ecosystem services.

The Philippines is designated as a global hotspot for marine biodiversity conservation (Carpenter & Springer, 2005) and has been initially divided into six marine biodiversity regions (Ong et al., 2002). The complexity of the Philippine governance system (Bass, 1995) involving 17 development regions, 80 provinces, and 1,500 municipalities is particularly poignant when considering the challenges of fisherfolk in the coastal barangays. The Local Government Code (Republic of the Philippines, 1991) gave municipalities the primary coastal fisheries management mandate with the provincial LGUs in a coordinating role and having no jurisdictional emphasis on barangay-based inputs. It is, however, generally recognized that improvements require integrated action across all three local government levels, although functional mechanisms remain widely problematic. In part, improvements to the situation require a top-down national approach to provide enabling budgets for local marine management as well as bottom-up reflexive educational development. The current governance component is focused on the provincial level, considering the role of the provincial government in coordination and training for municipal coastal considerations.

The Ecohealth approach (Pajaro et al., 2013; Watts et al., 2010) engaging both marine science and human health could provide a framework to meet the current gaps in the Philippine marine situation and build resilience against the looming coastal challenges resulting from global climate change. In addition, Philippine fisherfolk organizations that develop remedial local approaches, particularly marine protected areas, have been identified as prototypical paraprofessional Ecohealth practitioners (Añabieza et al., 2010). The heritage, geography, and political characteristics of the Philippines define a critical need for strategic development communication as a process to meet coastal challenges in a participatory manner. Isolated coastal communities are often characterized by ill-defined, informal, and shifting fisheries economics that have evolved since the arrival of the first boats to the islands and are now somewhat characterized by the constitutional declaration of municipal independence through the Local Government Code (Republic of the Philippines, 1991).

Although globally there is awareness that large marine bioregions need to be the basis for planning, currently the Philippines has progressed only to the determination of six national marine bioregions (Ong et al., 2002). The need for marine science clearly involves a reflexive new curriculum (Watts et al., 2010). However, the history and function of Philippine development communication as a discipline provide a culturally relevant framework that can contribute to strategic maritime development. The following section outlines the need for a hybrid DevCom approach to help meet the marine challenges of the Philippines.

### **DEVELOPMENT COMMUNICATION (DEVCOM)**

Education and science generally progress by building on what has been done and/or demonstrated previously. The current work considers the growth of development communication as a tool in the Philippines to define hybrid activities required for application in the marine environment. Dr. Nora Quebral is generally considered the mother of development communication. In December 2011, Dr. Quebral delivered a lecture titled “*DEVCOM Los Baños Style*” at her honorary doctorate celebration seminar at the University of London. The following is a summary of that speech, which is also available online (Quebral, 2011). The speech provides a basis for approaching the communication challenges associated with Philippine marine spatial planning.

Dr. Quebral spoke about the history of DevCom which she believes began at an event designed to honor Dr. Dioscoro L. Umali on December 10, 1971 at a University of the Philippines College of Agriculture symposium in Los Baños. The theme of

that 1971 symposium was *In Search of Breakthroughs in Agricultural Development*. DevCom was presented as an *interventionistic* social science approach. Comparatively, in the current work we also approach communication as an intervention with participatory strategies as a future goal. This systematic planned approach was designed to use multiple communication methods including the unmediated word and generally linked to nonformal education. Comparing this Philippine innovation globally, the concept of facilitators working in collaboration with communities is similar to that found in action research (Lewin, 1948; Reason & Bradbury, 2008). However, the focus on agricultural development does not encompass the ecological challenges of the marine system. The stability of the marine system and the resources available for harvest are not defined by the actions of people but rather by the capacity of marine ecosystems themselves.

Dr. Quebral indicated that in the 1950s and the 1960s, the Philippine field of communication was driven by the new electronic media of television and radio. Philippine social scientists also began to consider mass communication and the communication process itself as a form of academic endeavor. However, people working in the press continued to view development communication with great suspicion, considering it to be government communication or merely propaganda. In retrospect and from the international perspective of the second author, the communication characteristics of this initial DevCom period could perhaps be seen as a significant temporal function of nation-building; a coming together of isolated community interests through a national form of best practice transfer. At this time, there is now an opportunity for application of the DevCom approach to the marine setting, driven by the second wave of electronic technology and innovation that was spawned by the growth of the Internet. We suggest that this is because participatory communication on the capacity of the marine ecosystem has been problematic until recent times. For example, there are few or hardly any systematic discussions regarding the fisheries harvest of provinces across any bioregion but through the Internet and cell phone systems, there is now a huge potential for such communication.

Development Communication began as a discipline through specific linkages to agricultural journalism and development communication, then considered a requirement for United Nations development projects. In this way, development journalism emerged with its focus on economics rather than on politics. By the late 1990s, development communication was no longer suspect in Asia as being the lapdog of government. About this time, DevCom strategies were beginning to be used for servicing the development of individual coastal communities for resource

management but not until today are they being coordinated across larger functional ecosystems. Development had become a respectable area for news coverage. Today there are development communication units at the World Bank and elsewhere, and there are communication development curricula not only in Asia where they first manifested but also in Latin America, Africa, and even in some developed countries. In the world of practice, some DevCom equivalents are Communication for Development or Information and Communication Technology for Development. Goals include societal transformation, greater equity, and socioeconomic growth. There is an opportunity in the Philippines to expand upon the concept of DevCom applied across large marine ecosystems or bioregions and between jurisdictions, which could then be of use in the international field.

The principles of DevCom include an in-person exchange of information along the confluence of development and communication processes. The focus is upon pro-poor applications through planned interventions facilitated by professional expertise and a study and analysis of community that includes nonformal education. The shift that is required to apply DevCom to the marine sector results from the fact that harvest is dependent upon the capacity of the entire marine bioregion to produce and is shared across many communities. The current work is focused on applying the DevCom principles to the national priority of managing shared marine resources across many communities and provinces in a bioregional approach. There are no designated funding programs for this form of focused persuasion or *paghihikayat*. This process needs to be properly capitalized financially to respond to the complexities of LGU mandates, the local characteristics of language, politics, and overall culture. These attributes define the need to meet the marine bioregional challenge of the process of getting acquainted or establishing good relations (*pagkakakilala*), feeling each other out or getting an intuitive feeling for the situation (*pakikiramdam*), talking to each other or talking things over (*pag-uusap*), giving way to each other (*pagbibigayan*) leading to cooperation (*pagsasamahan*), a progression that has been defined as fundamental in Philippine culture (Jocano, 1999). Considering pelagic (deep water and highly migratory) fish, this requires a systematic approach not only with several barangays and municipalities, but also across provinces. Currently, this process is primarily dependent upon NGOs without baseline funding and whose international support is dwindling. In the Philippines, there is a clear economic reality for consideration of MSP and bioregional approaches to marine resource management in priority-setting at the national level. Development requires bioregional consensus regarding database will be used, how the data are interpreted, and what actions will then be initiated. The principles of DevCom provide a basis for building those relationships.

Agricultural applications of DevCom have in part defined the role and function of extension programs for Philippine SUCs. The marine sector has not been similarly serviced by SUCs, whether through extension, research, or undergraduate programming. The building of SUC-LGU partnerships to uplift coastal communities and promote sustainable marine resource programs will require a new form of DevCom that involves a cyclic review, selection, and agreement on large-scale databases on marine bioregions and their resources. Thus an understanding would emerge between potential bioregional partners regarding aspects such as the level of harvest of specific species, number of fisherfolk, poverty, and the possibility for coordinated action. As outlined by Jocano (1999) this process would move forward from consultation (*pagsasangguni*) to consensus (*pagkakasundo*) and cooperation (*pagsasamahan*). The required approach has only recently been made increasingly possible through the rapid expansion of the Internet and e-mail, the second wave of electronic communication development. To be effective across bioregions, the use of the Internet, cell phones, and e-mail perhaps must be elevated and seen as a form of the one-on-one relationship imperative (*kapwa*) that includes shared responsibilities for regular and timely information exchange. The Philippine heritage of DevCom is strong and the following sections outline the disciplinary adaptations for leadership on the marine environment.

## **METHODS AND DESIGN OF THE ACTION: THE NORTHERN PHILIPPINE SEA**

The NPS (Figure 1) is the location for the current intervention. The work was conducted as one project action cycle as defined in action research (Reason & Bradbury, 2008). There is a need for people and organizations along the Philippine coastlines to be linked in a participatory strategy that recognizes and respects local access to resources and considers as well the shared nature of these resources across the bioregions. The critical need for interprovincial fisheries management collaboration is enhanced across the NPS stems due to the dominance of pelagic (deep water and migratory) fish species across the bioregion. This consideration was validated through an analysis of the local Aurora Province catch (Watts et al., 2007) based upon the quantitative model of Licuanan, Aliño, Campos, Castillo, and Juinio-Meñez (2006).

The project was initiated by using the Internet to identify e-mail addresses and cell phone numbers that could be used to make connections. Not all possible partners could be reached this way; thus, we needed to travel to their offices even just to make appointments. Initial contact was then followed by a letter of introduction describing an interest to meet with officials and discuss the development of a bioregional approach for marine management as well as related expertise needs

## Provinces of the Northern Philippine Sea

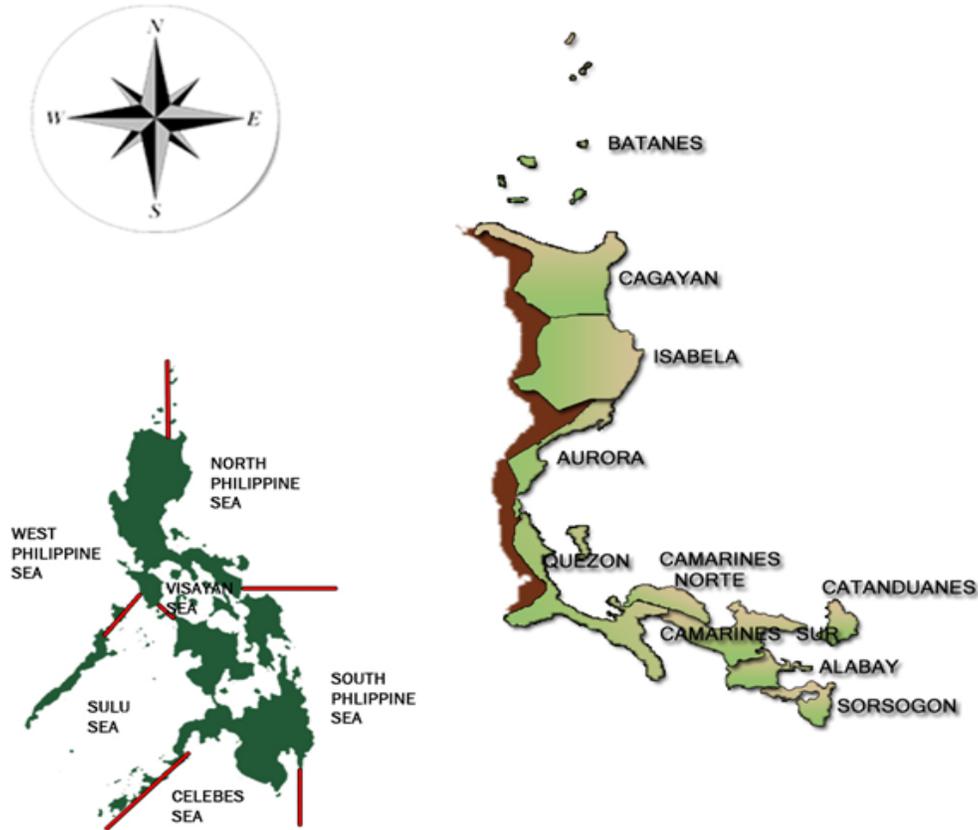


Figure 1. Northern Philippine Sea Marine Bioregion provinces. This figure is adapted from Ong et al., 2002.

associated with the design of a bioregional marine science program. The idea was new to most of the SUCs and provincial governments and, as a result, there was a need for consultation at their end to determine who would lead such an initiative for the institution or provincial government. Challenges occurred when the contacts we were able to make stopped responding to e-mails and cell phones due to a variety of reasons, including priority-setting for action, local calamities, lost cell phones, and inconsistent Internet access. Travel to the 10 provinces was generally done using local buses, jeepneys, and tricycles. The process required about six months, including the time for material development, planning, communication, and travel.

The goal was to initiate a representative and participatory process that stretched across the bioregion. Early in the global development of guidelines for participatory

approaches, Rosener (1978) emphasized the need to establish common understanding or group agreement on goals and situational causes. To establish a working participatory approach to managing a marine bioregion, one initial challenge is to develop a bioregional standard for knowledge on causes and effects of issues such as coastal poverty, the decline in fisheries, and the ecological basis for what is often called *production*. Common and shared approaches to disaster risk reduction can emerge from this process, but there is a strong validation economically to focus on marine catch. The establishment of a working participatory process is a preface towards subsequent agreement on goals that can lead to consensus, understanding, and sustainable development. This cannot be done through a single event but rather requires an iterative approach to information dissemination and local knowledge feedback that moves progressively towards understanding and broader consensus-based actions. Thus, the marine bioregional approach requires the development of a knowledge management system that incorporates an iterative and increasingly quantitative understanding of ecological capacity and social process. The first phase of this approach reported in the current work was focused on getting the endorsement of the lead jurisdictional and educational agencies in each of the 10 NPS provinces.

Clearly, there are also significant needs for coordination for this scale of activity, perhaps at least potentially best done through the extension program mandate of the academe. Under the Local Government Code (Republic of the Philippines, 1991), the coastal resource management mandate is most strongly linked to the municipalities, with the provinces in coordinating roles. The SUCs are at least potentially and in many cases directly connected to the LGU mandates and needs through their academic functions of teaching, research, and particularly extension. However, in the early stages the coordination function of new reflexive bioregional programming was the role of the NGO Daluhay, under contract with the Aurora Marine Research and Development Institute of Aurora State College of Technology.

The primary communication challenge regarding Philippine marine biodiversity conservation is the need to establish professional and paraprofessional social networking through e-mail and other electronic approaches. The more traditional DevCom approach of unmediated communication and the development of communication materials for handouts are currently required as a starting point to work towards those goals.

## **THE NORTHERN PHILIPPINE SEA (NPS) MARINE BIOREGION**

Considering the ten provinces that border the NPS Marine Bioregion, only Isabela can be characterized as having a majority of non-coastal municipalities (Table 1).

**Table 1. Coastal Municipalities of the Northern Philippine Sea (NPS) Provinces**

PROVINCE	MUNICIPALITY LOCATION		
	Coastal	Non-coastal	Total
Batanes	6	0	6
Cagayan	15 <sup>1</sup>	14	29
Isabela	4	30	34
Aurora	7	1	8
Quezon	34 <sup>2</sup>	7	41
Camarines Norte	9	3	12
Camarines Sur	22 <sup>3</sup>	15	37
Catanduanes	10	1	11
Albay	13	5	18
Sorsogon	14 <sup>4</sup>	1	15
<b>Total</b>	<b>134</b>	<b>77</b>	<b>211</b>

*Notes.* Several provinces border other bioregions, specifically: three municipalities on the South China Sea<sup>1</sup>; 17 municipalities on the Visayan Sea (VS)<sup>2</sup>; eight municipalities on VS<sup>3</sup>; one NPS municipality also bordering VS<sup>4</sup>; one NPS municipality also bordering the Southern Philippine Sea (SPS); three municipalities on SPS; and eight on VS.

Although this information is readily available, the current work brought together the data in a comparative fashion as part of the materials that were used in PowerPoint presentations for direct and unmediated communication with the senior administrators of the SUCs and the lead offices of each of the 10 provincial LGUs.

Tabulation of these results was part of the materials and methodology for development communication across the bioregion. The intention was to build an understanding regarding the commonality of goals and shared resources across provinces, where development is more often considered only separately. Many provinces have developed around the economy generated by marine fisheries, while in Isabela the provincial government and Isabela State University are just now beginning to explore the potential of their long coastline. Although these jurisdictions share a common resource, there are significant local cultures that include, for example, aspects of indigenous rights, politics, languages and dialects, communication strategies, economy, geography, and perhaps most significantly, province-based approaches to sustainable development. On the coast of the NPS Marine Bioregion, 64% of 214 municipalities are coastal (Table 1) with shoreline barangays estimated at more than 1,000.

The materials developed for multi-media presentation software (e.g., PowerPoint) support on unmediated communication as well as handout brochures were defined

separately for each province. We considered it critical for the current intervention that we demonstrate at least a rudimentary understanding of the provincial economies and be able to put the further development in support of marine resources in context. The written materials that were handed out in the offices of the SUC administrators and senior provincial officials did not attempt to break down the entire economy provinces but quantified marine fisheries impact for their further contextual consideration (Table 2).

**Table 2. Characteristics of Northern Philippine Sea Provinces**

<b>PROVINCE (Capital)</b>	<b>Geography &amp; Agriculture</b>	<b>Challenges &amp; Opportunities</b>	<b>Fisheries* (P. Billions)</b>
Batanes (Basco)	Many hilly areas developed for agricultural grazing rocky shoreline	Population entirely Ivatan-indigenous; some of largest waves in world; most expensive for travel in NPS	0.26
Cagayan (Tuguegarao City)	Rice, corn, peanut, beans and fruits, cattle, hogs, carabaos poultry; hardwood, rattan, bamboo furniture	Extensive development for marine fisheries harvest in both the NPS and West Philippine Sea	6.8
Isabela (Iligan City)	The rice and corn granary of Luzon due to the extensive broad plains and rolling terrain that allow cultivation	Limited development of their long coastline and a related provincial expansion vision	0.12
Aurora (Baler)	Narrow coastal lowlands & rugged Sierra Madre Mts.; sabutan, coconut, nipa, bamboo and rice	Developing tourist destination for surfing/hiking; new special economic zone proposed	0.73
Quezon (Lucena)	Narrow coast from Aurora to Bicol & Visayan Sea; leading coconut producer, rice, corn, banana coffee	High marine fisheries dependence for economy; good roads to Manila/Bicol	16.5
Camarines Norte (Daet)	Rugged rolling hills, mountain terrain fertile coastal plains; abaca, rice, coconut, banana & root crops	Many developed and potential tourist destinations; coastal fishing has a long heritage in provincial culture	3.7
Camarines Sur (Pili)	Rich and fertile soil; 60%+ of province under cultivation; coconuts, cereals and root crops, also on Visayan Sea	Considering division of province; more developed area on Visayan Sea and rural areas on NPS	8.3
Catanduanes (Virac)	Rugged, becoming more mountainous towards the central portion of island; local agriculture, good forests	Popular surfing destinations; 10 of 11 municipalities of the province are situated along the coastal fringe	2.2
Albay (Legazpi City)	Coconut, rice, sugar and abaca; coastline on both NPS & Visayan Sea Bioregions	Site of iconic Mayon Volcano, Bicol University Tobacco Campus strong fisheries program	2.8
Sorsogon (Sorsogon City)	Irregular topography, except landlocked Irosin, all towns along coast; agriculture mostly for local use	Gateway to Visayas & Mindanao: Roll-on/Roll-off ferry terminals, borders S. Philippine and Visayas Seas	5.3

*Notes.* \*The economic impact of marine fisheries was calculated from landed catch value (Bureau of Agricultural Statistics, 2012) and calculations on Asian economic impact for fisheries (Dyck & Sumaila, 2010).

## **BIOREGIONAL COMMUNICATION DESIGN AND APPLICATION**

The approach in the current intervention was specifically designed so as to support the future engagement of local fisherfolk themselves in both formal and informal education program development for enhanced livelihoods and sustainability. The scope of working with the fisherfolk communities themselves is huge and critically must have the endorsement of the provincial governments, down to the municipal governments, and then to the fisherfolk barangays themselves. Pursuing endorsements by the provincial governments through communication materials and methods also establishes that the initiative is not intended to circumvent their provincial authority.

Philippine protocol requires briefing the provincial governor prior to proceeding to the municipalities for similar meetings with mayors. These courtesy and information calls took considerable planning and in-person visits to work towards setting up a scheduled meeting with each governor. The process also needs to be renewed after each election with new appointees. However, the engagement of LGU staff at both the provincial and municipal levels is somewhat dependent upon this protocol. To engage the barangay-based fisherfolk, it is best to have clear endorsements at all levels of government so that all officials will consider the process as somewhat outside of local and national politics. To start the process with fisherfolk directly or even at the municipal level without engaging the province would generally be seen as a political move and could possibly doom the advancement of the goals, perhaps for decades.

The current DevCom strategy was initiated by maximizing communication through cell phones and the Internet prior to travel. We learned from this experience that electronic communication has challenges, as most offices have neither official/advertised phones or e-mail addresses nor established communication policies for external inquiries. The primary focus for this intervention was on the use of unmediated communication with provincial and SUC leaders. A PowerPoint presentation was prepared that outlined the bioregional socioeconomic considerations for coastal and fisheries science and management. A second PowerPoint presentation was individually prepared for each province on local fisheries, information that none of the 10 provinces had previously accessed. This gave the facilitators the opportunity to address provincial characteristics, challenges, and opportunities. Considering the complexity of each individual DevCom approach, for the purposes of comparison only, the current paper will provide details regarding Cagayan and Isabela provinces only, with further information on related and initial needs assessment and the case of Batanes Province discussed in the subsequent section.

The initial and subsequent presentations to a representative of the Cagayan governor (and the governor himself, based upon the initial endorsement) included a reference to our background research that found a new provincial ordinance concerned with an increasing challenge associated with fisheries harvest by boats from other jurisdictions. As well, we presented to them for the first time data on the huge significance of coastal fisheries in Cagayan (Table 2). We provided copies of our PowerPoint presentations so that the information could then be shared throughout the provincial jurisdiction. The approach was intended to specifically focus and build upon the marine challenges that they had recently identified and were currently working upon. Our background research on Isabela Province indicated a comparatively small coastal marine fisheries, a limited number of coastal barangays (Table 2), and a provincial desire for development expansion into coastal regions.

The Isabela Province PowerPoint presentations and brochure were put in a strong development framework, compared with the more management-oriented approach for Cagayan Province. However, in both cases, officials were able to see how their province compared with others in terms of marine fisheries, and there were initial discussions regarding the development of a consortium to consider common and shared fish stocks. For each of the 10 provinces, a brochure was developed to summarize the socioeconomics associated with marine fisheries and put that in the perspective of developing a new Bachelor of Science curriculum and an NPS consortium. PowerPoint presentations were also prepared to consider the development both from a governance and an academic standpoint. In Cagayan and Isabela, there was a strong academic interest in the further development of marine science. Isabela State University is in the process of starting a coastal campus, while Cagayan State University would like to revive a recently closed marine program.

Planning for this initial cycle of development also involved the identification of possible databases that could provide background information that could be of interest to the potential partners across the NPS. The Bureau of Agricultural Statistics (2012) provides provincial data on marine fisheries throughout the Philippines. This includes the delineation of landed fish value. Based on the research of Dyck and Sumaila (2010), we were able to calculate the economic impact of marine fisheries for the entire bioregion and, through other online sources, compare this with the income of provincial governments for reference. Although most government officials and academics recognize that marine fisheries is important for the economy, this was perhaps the first time that many had considered quantitative data regarding this fact.

To reiterate, the current initiative built upon the work of DevCom aims to establish that the development approach is nonpolitical. This has worked in some provinces when considering aspects of health development, and an extension of this nonpolitical approach to the environment and Ecohealth may be viable when based upon a comprehensive approach to courtesy calls and detailed discussions, regardless of the time and resources required. In one province, we were not able to get an audience with the governor after four visits and attempts to establish a schedule for that purpose in the province. That province, in particular, is very much isolated from international and NGO-related efforts and is very sensitive to external ideas that could be linked to alternative political groups. Emphasis was therefore placed upon gaining the trust of provincial officers so as to increase the number and quality of endorsements for a direct presentation to the governor. Alternatively in that province, we worked more with the SUC representative and have established a unique development path for that jurisdiction.

From the data (Table 2), we were able to provide information regarding the economic significance of marine fisheries, which is sometimes almost 10 times that of the provincial government income, and we were also able to show how there is a positive correlation between the percentage of coastal municipalities in each province and dominance of marine fisheries economically (Figure 2). These results were perhaps particularly of interest for several provinces, such as Isabela, which appears to be in a position of having large coastal development potential when compared with other provinces. This form of computer-research databases can be used to enhance subsequent iterations of the communication and development strategy. In one sense the marine bioregional process is one of advocacy, creating a sense of community and building relationships. The process is aimed at the establishment of a consortium that includes a range of relationships: those between SUCs and LGUs, interprovincial LGU linkages, collaboration among SUCs, and an NGO role for initial advocacy, database use development, and formulation of a bioregional management strategy.

## **BIOREGIONAL COMMUNICATION RESULTS AND ANALYSIS**

All the SUC and LGU partners were very appreciative of this collaborative approach towards maritime development. Requests for endorsement letters were supported by the DevCom approach of unmediated communication, in this case with people in positions of authority, and parallel materials that included fisheries databases, socioeconomic calculations, and inter-provincial comparisons (Tables 1 and 2; Figure 2). Endorsement letters were subsequently submitted to the Commission on Higher Education (CHED) to assist with their review and provide inputs on the

proposed new program. Seminars and workshops were undertaken in several provinces, including Catanduanes, Sorsogon, Albay, and Camarines Sur, as a beginning for the more detailed needs assessment process. In Catanduanes, the province took the lead in facilitating a workshop on coastal resource management (CRM) held at Catanduanes State College (now Catanduanes State University), inviting representatives from each of the 11 municipalities. The Catanduanes workshop focused on how to start a CRM program that is province-wide and holistic in nature.

Another workshop was also conducted in Albay province through the Millennium Development Goals (MDGs) Office; the aim was to plan the province's next progressions for coastal development. Further, a workshop was conducted in Camarines Sur, with representatives from across the province evaluating aspects of enforcement as part of the initial needs assessment for this province. In the next iteration of these efforts it would be useful to consider the development of informal video documentation from across the NPS showing local challenges, opportunities, and the logistics required for this level of sustainable development process. Our

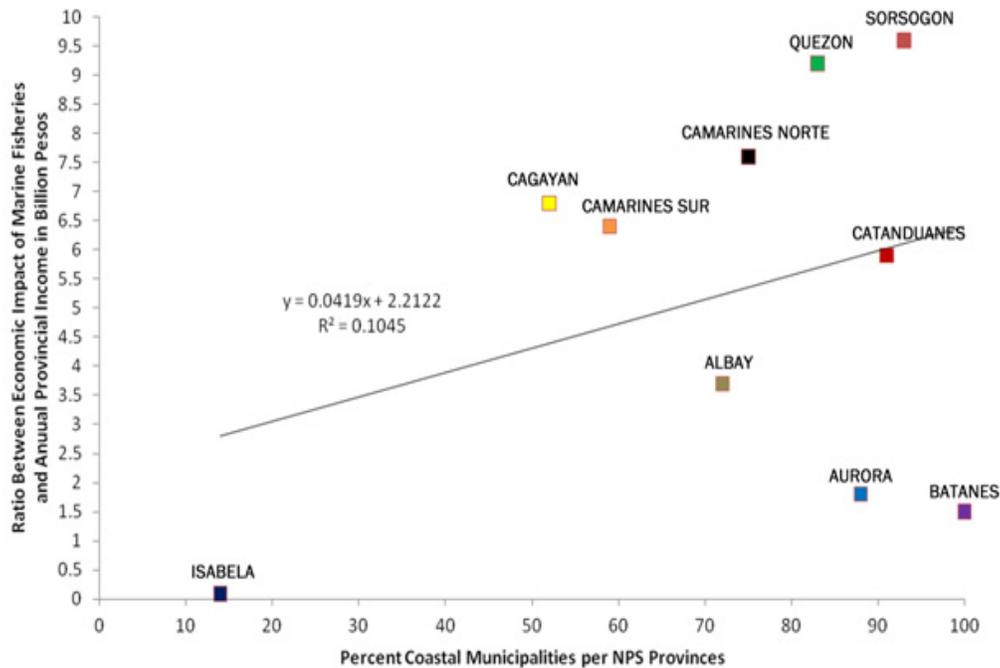


Figure 2. The ratio of economic impact of marine fisheries and annual provincial income compared to the percentage of municipalities that are coastal in the Northern Philippine Sea provinces. Data calculated from catch value data (Bureau of Agricultural Statistics, 2012) and conversion to economic impact according to Dyck & Sumaila (2010).

initial interactions indicate that in some provinces, more than others, there is a particular need to ensure that any process not only goes through the LGU protocol but is as well validated by the Philippine National Commission on Indigenous Peoples (NCIP) as part of the global recommendation by the United Nations regarding *free and prior informed consent* (United Nations, 2007). Batanes, for example, is entirely populated by the indigenous Ivatan.

If the perception is that the Batanes portion of the initiative is focused on curriculum, there may be a limited need to consider indigenous peoples' law protocol. However, if an indigenous group sees a project as some form of *development*, it is critical that the indigenous communities be approached and engaged according to accepted protocol. In all cases, the next round of communication and action should involve systematic courtesy calls to NCIP provincial offices to ensure that protocols are being met while at the same time working further down to the municipal offices reaching into the barangays to engage fisherfolk themselves. In the case of Batanes, consideration has to be given to the high cost of traveling to the area in order to work on the initiative. We aimed to maximize our stay in that province and also worked to engage two levels of government in order to obtain counterpart funding resources for travel. The Batanes experience demonstrates the significance of ensuring that the approach appropriately engages indigenous peoples under the guidelines of the Indigenous Peoples Rights Act (IPRA) that is administered by the NCIP.

The communication process initiated had three primary results: an initial systematic dissemination of information regarding the NPS and MSP; the gathering of bioregional information regarding fisheries and local culture; and the establishment of connections with all of the 10 provinces and the initiation of an ad hoc NPS management consortium. This initial approach to the establishment of an NPS-DevCom network resulted in significant buy-in both at the level of the provincial government and through their identified primary SUCs. All 10 provincial governments informally endorsed the concept of participating in a bioregional network, with 8 out of 10 provinces providing a formal written endorsement prior to the completion of the participation cycle in September 2012. The DevCom approach was successful in meeting the initial goal for this first iteration of the intervention: the endorsement of the lead agencies. The results were the same for the SUCs (Table 3), with every province providing at least one formal endorsement. In four cases, the agencies approached requested either that further needs assessment strategies be put in place before they provided formal endorsement or that additional rounds of meetings were required for clarification.

**Table 3. Marine Science History and Perspectives along the Northern Philippine Sea: Provincial Governments, State Universities and Colleges**

<b>MARINE ASPECTS OF 10 PROVINCES AND 10 SUCs</b>	<b>NUMBER</b>
Provincial leaders previously considering marine spatial planning	1
SUCs previously considering bioregional approach	1
SUCs with 4-year inland fisheries program	8
SUCs with at least one marine scientist	3-5*
SUCs with three or more marine scientists	1
SUCs providing informal endorsement for bioregional program	10
SUCs providing formal endorsement for bioregional program	8
Provinces providing informal endorsement for bioregional program	10
Provinces providing formal endorsement for bioregional program	8
Existing SUC marine science program	1
Previous SUC marine science program	3-6*

\*The range of numbers represents different possible definitions of marine science aspects.

Each provincial LGU and individual SUC had the task of developing their letter of endorsement to include their perspective on the path forward for the development of a bioregional approach to marine management. The unmediated presentations to SUC and provincial leaders led to specific requests to begin broader needs assessments through specific workshops for several potential partners. The formal endorsements provide documentation for designing the project action cycle in the bioregional approach.

## **DISCUSSION**

Traditional European disciplines that have been adopted in the Philippines and globally are generally characterized by the reductionist approach which breaks down research and instruction into disciplines and specializations. To meet broad development goals that are inclusive of people and the environment, the focus on academic disciplines and specializations can perhaps best be replaced by a transdisciplinary approach. Historic divisions have as well been characterized by the separation between social and natural sciences. The social sciences are perhaps in the best position to lead the development of the transdisciplinary approach due to their approach to include the human element. Increasing the size of academe and strengthening tertiary education can be critical for some nations. For example, many African countries have only 3% of their population able to go to college. In the Philippines, tertiary level education reaches 30% of the population. This thus implies that compared with least developed countries, there is a potential to

refocus academe resources, perhaps through economic justification of programs and graduates for areas such as agriculture and aquaculture as well as the social sciences.

The current action focused on the economic impact of marine fisheries. The coastal process must also consider the development of livelihood supplements that can perhaps relieve pressure on the fisheries resource and disaster risk management. In many cases, tourism has been identified as a primary opportunity for livelihood expansion. However, all activities need to be considered within the framework of an integrated coastal resource management strategy and the development of a representative and inclusive participatory approach. There is a need to build out from the barangay level to municipal, provincial, and interprovincial approaches based on what Rosenor (1978) referred to as a common understanding of the problems and causes of the situation. This approach needs to engage indigenous peoples and other marginalized groups, including youth and women, in an iterative renewal of the approach to coastal management. In particular, efforts are required to engage the women in fisherfolk barangays, as women have been found to be under-utilized in community leadership associated with fisheries and MPAs (Pajaro, Mulrennan, Alder, & Vincent, 2010). This level of approach involving marine and coastal spatial planning is particularly critical for the Philippines due to the many heavily populated low-lying coastal communities and the national economic dependence upon coastal people and their provision of critical fish protein for the nutrition of the country. Given the looming coastal challenges resulting from climate change, there is perhaps a good case to be made for the concept of a national MSP disaster risk management program focused on fisherfolk and their coastal communities.

The development of a new Philippine approach to marine science requires the balancing and facilitation of both jurisdictional and academic engagement as well as a further symmetry between the top-down jurisdictional mandates and the often under-considered perspective of fisherfolk themselves. The U.S.-based *Marine Ecosystems and Management* journal recently ran an article on different approaches to communication for advancing MSP (Davis, 2013) that included applications aimed at other artisanal fishers in the Azores (Portugal), to the involvement of entertainers and artists, as well as the presentation of informal videos and films (United States and Canada). Previously, the group led by artisanal fisherfolk under PAMANA or Pambansang Alyansa Ng Mga Maliliit Na Mangingisda at Komunidad na Nangangalaga ng Karagatan at Sanktwaryo sa Pilipinas (<http://pamana.50webs.com>) had reported in the same journal on the approach of working through grassroots organizations to scale up ecosystem-based management (Tiburcio & Watts, 2008). However, to

develop PAMANA approaches in new jurisdictions will require systematic courtesy calls, starting with the office of the provincial governor and then, upon approval there, to the office of the municipal mayors, and finally down to the level of barangay captains.

In part, these developments can occur through the ongoing advancement of PAMANA as paraprofessional Ecohealth practitioners (Añabieza et al., 2010) and as well through influence on the approach to MPA networks and the development of a new marine science curriculum (Watts et al., 2010). The planning for the NPS approach began in Aurora Province where we engaged Joey Ayala and the Bagong Lumad Artists' Foundation ([www.blafi.org](http://www.blafi.org)) to provide their artisan approach to development outlined in their *Siningbayan Fieldbook*. From this development, we worked to expand upon the mandate of PAMANA as an advocacy group to include elements of best practice transfer facilitation, bioregional development, and the promotion of new marine protected areas and networks. The current paper is only focused on the top-down aspects of developing MSP through LGUs and SUCs. However, a linked initiative funded by the United States Agency for International Development (USAID) and the National Academy of Sciences in the United States is currently partnering with the authors' group on bottom-up development of curricular education strategies involving fisherfolk and other local considerations. As in the DevCom agricultural approach, a nonformal education design is also under development.

In the opinion of the second author, from an international perspective, the Philippines is under-developed in terms of systematic use of either cell phones or Internet-based communication. Initial approaches indicate that there are no policies in place for responding to external communication inquiries. For example, there are no designated e-mail addresses or phone numbers at the provincial or SUC level that receive inquiries and are also mandated to respond. Further actions in this development approach involve partnerships under development with Philhealth, the National Telehealth Program and the Aurora Provincial Health Office to pilot an approach aimed at Ecohealth databasing on fish capture and nutrition through the use of cell phones. In general, there is a need to develop ongoing strategies for reflexive top-down information dissemination based in part upon local knowledge feedback and other situational inputs. In particular, there is a need for real-time information on resource status including the monitoring and evaluation of resource status, as well as local management responses, plans, and actions. The development of electronic systems for this type of information exchange will make facilitation of positive change by scientists easier, with a huge reduction in the time and resources required for travel. The development of local ordinances and other policies

up to the level of Republic Acts will require a balanced approach to the engagement of local situations and broader approaches to generate political will.

## **CONCLUSION**

In general, we are suggesting somewhat of a renaissance in terms of Philippine education, to increase coastal education effectivity. The current intervention was aimed at developing interprovincial awareness of common development needs, objectives, and challenges associated with the marine environment, specifically the NPS bioregion. Emphasis was given to the need to establish this common understanding, a process initially described by Rosener (1978) as a starting point for participatory strategies. This being the first project action cycle in a broader participatory status, the intervention successfully established a common understanding encompassing both the SUCs and the provincial governments of the NPS.

Most of the systems are in place to develop functional communication networks for the NPS, in the form of cell phone and Internet capacity at the municipal, provincial, and SUC offices. However, the use of these systems is somewhat ad hoc. As hypothesized, the use of more traditional DevCom strategies and materials are sufficient to reach the goal of formal endorsement for program development from the SUCs and provinces. As we move towards a higher level of engagement through electronic communication, these new approaches might also become part of the DevCom discipline. The SUCs may also represent an untapped resource in the form of highly developed information and technology laboratories and staff. Colleges and universities could potentially become key players in the management of data and information across the bioregion. Thus the suggestion is to shift some of the SUC resources dedicated to computer training into the extension section of the institutions. The development of expertise for marine science needs to be continued through further efforts to conduct needs assessment and develop reflexive SUC programming (Watts et al., 2010) to support the mandate of the LGUs in the nationally critical area of marine resource management. Actualizing the international commitment of the Philippines to engage in spatial planning for the marine environment may be critical for the well-being of the country, given that the economy and culture are both dominated by coastal activities. The further consideration of global climate change and risk management for coastal regions should perhaps be considered in making these and related actions a national priority for sustainable development.

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