# Development of Spatial Strategies for Small Island Landscapes in the Philippines

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**Dortmund, 14.10.2020** **Edgar M. Reyes, Jr.**

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*To the island communities of Batanes, Siquijor and Camiguin…*

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## Executive Summary

Small islands are among the most fragile and vulnerable yet diverse and unique ecosystems on Earth. The complexity of small islands stems from the fact that these areas are inhabited by human communities relying on its resources. Understanding small islands therefore, includes the geographic characteristics, small island biodiversity, isolation and integration concepts and the relevant contributions of the human communities residing in these spatial units. Spatial planning and management of small islands is anchored to these facts justifying the consequent need for its sustainable development.

Literatures on small island development point similar unique characteristics describing the Philippine small island provinces. However, spatial strategies for small island development have still been a challenge making it as the goal of this research. Such research goal corresponds to two-pronged ideas: (1) the comprehensive profile gap analysis of the small islands, in terms of its biophysical/ ecological attributes, socio-economic characteristics and the link between the ecosystems and the local economy; and (2) the spatial interaction analysis through the natural resources of the small islands flowing along the regional spatial system.

Philippine islands are fragile, vulnerable yet it supports the regional economy showing the unique characteristics and owing some bases for planning to achieve sustained development. Among 16 island provinces in the Philippines, three were chosen given its similarities in terms of geographic and biophysical attributes (physical size, biodiversity, topography, etc), population size, and socio-economic characteristics. The three small island provinces are Batanes, Siquijor and Camiguin, which represents the three major island groups in the Philippines (Luzon, Visayas, Mindanao), respectively. Including in the analysis is the descriptive roles the selected small islands perform in their regional administrative landscape namely, the Cagayan Valley, Central Visayas and Northern Mindanao regions.

Current development planning activity for small islands ideally looks into the small island character that will inform better planning. However, the actual procedural methodology limitedly highlights the unique island characteristics making spatial planning not concretely targeting the actual needs of small islands. Also, the context of small island resources flow, as an expression of spatial interaction integral to provide a vivid picture of the small islands has not been given proper attention. These gaps in analysis and planning for small island provinces have been addressed through this research.

Through the innovative methods applied the results show the unique character of the small island provinces stems from the socio-demographic and cultural (High Population density and low growth rate, *Isola Effect*, Sea-faring culture, migration patterns); environmental (coastline to physical size ratio, vulnerability to hydro-meteorological hazards and disasters, complex geographies and ecosystems, ecosystem continuum); economic (narrow and concentrated economic base, vulnerability to environmental shocks, import orientation, prominence of varied informal economy, subsistence and extractive economy); Infrastructure (Physical isolation and accessibility concerns, centralization for provision of support services); and institutions (satellite town effect, unclear hierarchical spatial roles), which were highlighted to provide bases for developing spatial strategies.

Further application of the spatial interaction analyses confirmed these characteristics and provide deeper context on the actual conditions of small island provinces not seen on the

usual island analysis conducted for planning small islands. These results include: 1) Physical distance as an intervening factor in addressing the issues of island isolation and accessibility done through a distance analysis; 2) spatial interaction scores for small islands, through Gravity model, further solidify the existing weak human settlements interaction as a function of material resources exchange/flows, transportation and accessibity; 3) No matter how weak the spatial interaction, it does exist, however, the quality seems undervalued by disproportionate sharing of the monetary values translated from the interaction; 4) The network analysis shows a direct dependence of the identified top economic industries to the existing ecosystems in the small island, making it vulnerable to shocks on the ecosystems; 5) Material flows confirm the existence of material resources outflows; and 6) the value chain analysis done for the material resources outflows (Batanes: Garlic, Root crops, Fishery resources; Siquijor: Cattle, Banana, Fishery resources; and Camiguin: Lanzones, Coconut and Fishery resources) confirm further that material resources values accumulation are skewed towards the regional economic environment and not the small island provinces. Also, the DPSIR framework created for the tourism activities for the small island cases show incremental benefits for the locals, however, the long term impacts may not be as positive if not significant interventions will be made.

Given these insightful characteristics of small islands and integrating them to provide better contexts to the small islands in the Philippines, developing island strategies transcending from the protection, production settlements and infrastructure policy areas were done. Through these broad strokes spatial policies, various spatial strategy recommendations were identified, such include: (a) Fragile nature of the small island ecosystem showing vulnerability and direct impacts to each other demands the ecosystem continuum concept application, lest the creation of Small Island Province Ecosystem Continuum (SIPEC); (b) spatio-temporal measures for the production perspectives including the carrying capacity issues of the natural environment and the in-situ value creation for material resources of the small islands; (c) mainstreaming of the island communities concern including the indigenous rights and island living context to alleviate impoverish conditions; and d) green or nature-based solutions as supporting mechanisms for island development, to mention a few.

Indeed, the small island context is important baseline information for developing its spatial strategies through the confirmed small island characteristics ascribed from the exhaustive profiling and the spatial interaction analysis. Without these combined methods, highlighting the unique small island features will be difficult if not impossible. Furthermore, these highlighted characteristics as inputs require both the horizontal (inter-sector analysis) and vertical (spatial unit coordination) integrations for better appreciation and coordination among all the sectors under the concerns of the local government. Other recommendations to help improve the existing situation in small islands include the retrofitting of existing methods to better capture the situational conditions of small islands; venturing on sustainable agriculture and tourism practices translated into spatio-temporal zoning recommendations; backing up the spatial strategies with policy recommendations containing all the protection, production, settlements and infrastructure instrumentalities and making these strategies be made into short-, medium- and long term perspectives, among others.

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## List of Acronyms

| | |
|---|---|
| **ADB** | Asian Development Bank |
| **AIP** | Annual Investment Programming |
| **BFAR** | Bureau of Fisheries and Aquatic Resources |
| **BPOA** | Barbados Program of Action |
| **BPO-IT** | Business Processing Outsourcing (Information Technology) |
| **CAR** | Cordillera Administrative Region |
| **CBMS** | Community Based Monitoring System |
| **CCS** | Coastal CORE Sorsogon |
| **CDP** | Comprehensive Development Plan |
| **CLUP** | Comprehensive Land Use Plan |
| **CLWUP** | Comprehensive Land and Water Use Planning |
| **CPT** | Central Place Theory |
| **DENR** | Department of Environment and Natural Resources |
| **DFID** | Department for International Development |
| **DPSIR** | Driver-Pressure-State-Impact-Response |
| **DOT** | Department of Tourism |
| **DTI** | Department of Trade and Industry |
| **ECAN** | Environmentally Critical Areas Network |
| **EEA** | European Environment Agency |
| **EEZ** | Exclusive Economic Zone |
| **ELA** | Executive Legislative Agenda |
| **EP** | Ecological Profile |
| **ESA-OAS** | Environmental Strategic Assessment- Organization of American States |
| **EURISLES** | European Islands System of Links and Exchanges |
| **FGD** | Focus Group Discussion |
| **GDP** | Gross Domestic Productivity |
| **GHG** | Green House Gas |
| **GIS** | Geographic Information System |
| **HLURB** | Housing and Land Use Regulatory Board |
| **HVCC** | High Value Commercial Crops |
| **IAD** | Integrated Area Development |
| **IEM** | Integrated Ecosystem Management |
| **IPRA** | Indigenous Peoples Rights Act |
| **ISISA** | International Small Islands Studies Association |
| **IUCN** | International Union for the Conservation of Nature |
| **IWC** | Island Web Consortium |
| **IWRM** | Integrated Water Resource And Management |
| **JPOI** | Johannesburg Plan of Implementation |
| **KBA** | Key Biodiversity Areas |
| **KII** | Key Informant Interview |
| **LGU** | Local Government Unit |
| **MA** | Millennium Assessment |
| **MCC** | Modified Coronas Classification |
| **MDG** | Millennium Development Goal |
| **MFA** | Materials Flow Analysis |
| **MIMAROPA** | Mindoro, Marinduque, Romblon, Palawan |
| **MPA** | Marine Protected Area |
| **MSI** | Mauritius Strategy for Implementation |
| **NCR** | National Capital Region |
| **NEDA** | National Economic Development Authority |
| **NGO** | Non Government Organization |
| **NIPAS** | National Integrated Protected Areas Networks |
| **NSCB** | National Statistical Coordination Board |
| **NTT** | Nusa Tenggara Timur |
| **OECD** | Organisation for Economic Co-operation and Development |
| **PAO** | Provincial Agriculture Office |
| **PCIP** | Philippine Commodity Investment Plan |
| **PCSD** | Palawan Council for Sustainable Development |

| | |
|---|---|
| **PDPFP** | Provincial Development and Physical Framework Plan |
| **PhP** | Philippine Peso |
| **PIEP** | Philippine Institute of Environmental Planners |
| **PSA** | Philippine Statistical Authority |
| **PSIC** | Philippine Standard Industrial Classification |
| **RDP** | Regional Development Plan |
| **REED** | Rural Economic and Enterprise Development |
| **RPFP** | Regional Physical Framework Plan |
| **R2R** | Ridge to Reef |
| **SAMOA** | SIDS Accelerated Modalities of Action |
| **SDG** | Sustainable Development Goal |
| **SEP** | Strategic Environmental Plan |
| **SIDS** | Small Island Developing State |
| **SITC** | Skye International Teleservice Centre |
| **SIPEC** | Small Island Province Ecosystem Continuum |
| **SLA** | Sustainable Livelihoods Approach |
| **TIEZA** | Tourism Infrastructure and Enterprise Zone Authority |
| **UN** | United Nations |
| **UNCED** | United Nations Conference on Environment and Development |
| **UNCLOS** | United Nations Convention on the Law of the Seas |
| **UNCTAD** | United Nations Conference on Trade and Development |
| **UNDP** | United Nations Development Program |
| **UNESCAP** | United Nations Economic and Social Commission for Asia and the Pacific |
| **UNEP** | United Nations Environment Program |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organization |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **VCA** | Value Chain Analysis |
| **VIEDA** | Vancouver Island Economic Development Association |
| **WB** | World Bank |
| **WTO** | World Tourism Organization |
| **WTTC** | World Travel and Tourism Council |
| **WWF** | World Wildlife Fund for Nature |

# CHAPTER ONE

*“Everyone knew that all islands were worlds unto themselves, that to come to an island was to come to another world”*

*-Guy Gavriel Kay*

# 1. SUSTAINABLE PLANNING OF SMALL ISLANDS

## 1.1 Introduction to Small Islands Studies

Exploring the unknown and less studied aspects of reality is what researchers and scientists always sought. These mysteries are somehow provided by small islands as they present the context of ultimate search and discoveries on what is seemingly unknown to many.

In cultural anthropology, small island landscapes have become an interesting unit of analysis as they present remoteness and isolation issues, with this, the increasing need for the researcher to unravel the mysteries of small island landscapes in this ever-challenging world is created. Although tainted by the global conditions of exposing small islands as areas where impacts of climate change and disasters are eminent, dealing with small islands does not need such push to continue its discussion as the basic understanding of small islands is yet to be fully explored.

Interestingly, many research works use islands as pilot sites. In ecology, the likes of Robert H. MacArthur and Edward O. Wilson use islands as natural experimental units in their 1967 theory of Island Biogeography. In addition, the domains of geography and physical anthropology look at small islands as microcosms in studying human behaviors. Also, in holistic and integrated science of human ecology, such as the systems analysis, small islands has been the direct option for such, this paved way to the success of the man and biosphere program by UNESCO.

Although small islands are seen as microcosm of a larger unit area, given the fact that the dynamism of competition for scarce resources and increasing human population pressures to the island environment are very much felt. With this, the impacts that small islands had to deal involve both addressing its local fragility and resources use context and global scale challenges (Deschenes & Chertow, 2004) and consequent interaction of small islands to the larger island units and other islands systems.

In dealing with island sustainability studies, much research works regard islands as pivotal sites, of which the results could provide solutions introduced into broader planning and development hierarchies and scales (Wallner et al, 1996, Deschenes and Chertow, 2004). However, the success has been limited as small islands pose a complex system to analyze, thus, aspects of developing sustainable indicators for small islands has been limited for a single economic unit in small islands (Bunce 2009, Boonchai and Beeton 2015, Banos-Gonzalez et al. 2016, Blancas etal. 2016, Pizzitutti et al, 2017).

Given such challenge, this study will still try to attempt to comprehensively describe small islands and how it is distinctive from other landscape units or ecosystems. This attempt is done by providing the unique characteristics of small islands, indicators for sustaining the quality of its ecosystems and human survival, and how these indicators could be better addressed through a systematized strategic spatial model for planning small islands.

### 1.1.1 Why Deal with Small Islands and the Spatial Interaction?

Island ecosystems are distinctive systems providing special and unique services (cultural, ecological, economic, political, social, etc) to larger neighboring island that allows continued interactional growth. In addition, according to Agenda 21, small islands are strategically important environment and development resource that need to be properly managed.

The reality that island ecosystems are fragile and vulnerable deems it imperative for island management to be emphasized. Sustainable island management as an approach will provide the means to conserve the natural functions of island ecosystems. Furthermore, effective island management will denote the synergistic development of the island and the larger spatial system it interacts. This can be related to the famous phrase "*No man is an Island*" lifted from John Donne (1624) poem. Although much of this pertains to human beings needing to collaborate, small islands case, particularly those inhabited by human communities require the same attention and action.

Island isolation is a major problem of many island ecosystems. Small islands, often treated as an isolated landscape, must highlight its relationship with other larger spatial system. As seconded by Garliardi (2009), emphasizing that the "relationship paradox between connection and isolation" that is critical to the appreciation of both the challenges and opportunities for small islands.

As such, island studies covering isolation and connectedness problems, especially those highlighting spatial interactions, are relevant since the Philippines is an archipelago and is situated in the Asia Pacific region. More so, the contexts of poverty and food insecurity in small islands directly relates to its character as being remote and isolated.

The approach to potentially solve the problems and concerns of island spatial systems is to understand its interplay to the larger spatial unit or the mainland/ regional landscape system. With this, understanding the multiple linkages between this type of spatial system (island-mainland) plays a key role to properly assess the regional dynamics and to better approach sustainability issues.

Multiple linkages are related to economic activities, shared natural resources and the ecological processes therein, socio-cultural similarities and ethnic groupings and distribution, and political relations. All linkages that exist between the island and mainland system can be spatially determined and analyzed.

More importantly, the results of this study will try to muddle through on improving the quality of life of the affected island communities, as they are usually the disadvantaged sector. Furthermore, as sustainability is anchored with balanced development, environmental security and stability is an eminent aspect of island sustainable management.

Furthermore, analyzing the character of the linkages therein may lead to sustainable growth for both areas especially under the mantle of regional development planning. Ultimately, its contributions to improved quality of life of the people are one of the long-standing reasons why this study is to be conducted.

### 1.1.2 Why Plan for Small Island Landscapes?

Recent studies on small islands planning focused on watershed management, tackling water as among the most scarce and important resource in small islands making integrated water

resource and management (IWRM) plan a requirement but not in small islands chain or the archipelagic landscape.

Small islands have been treated similarly as other spatial systems, although it is clear that small islands are unique and require as special management strategies to recognize real efforts towards sustaining it. In the IWRM framework (UNEP, 2012), due to the small size and other unique physical characteristics of small islands, the impact of the surrounding sea is more evident as compared to larger islands and main lands.

Attempts for creating a framework for managing small islands have been made, through the IWRM of UNEP, but no consolidated and concrete report has been in circulation in the scientific world regarding its sustainability. Identifying at least the important factors to consider in studying and planning for small islands could shed light in highlighting sustainability issues.

### 1.2 Rationale for Small Island Planning

Small islands have an important place and significance in the world's social, environmental and economic future, but these sites are often seen and treated as isolated and separated in people´s minds and actions. Also, small islands are not inert geographical or physical objects; they are places where peoples and their history and culture, interact with dynamic and changing socio-economic and environmental forces; places of life and action where it is important to appreciate and value what is going on (Chapman, 2011).

Putting small islands at the center of spatial planning is an important consideration in this research as the increasing concerns for effective planning and management of small islands are felt.

In addition, small islands in the Philippines also constitute the rural secondary settlements supportive of the rapidly urbanizing regional centers. Development planning in these areas is prioritized as rapid urbanization is expected in the regional centers. However, this fact does not discount that small islands need equal attention in terms of the longer-term development in lieu of the rural-urban sustainability.

In support to this, the Philippine president on his State of the Nation Address in 2016 also set the tone for projects related to inter-island linkages as a priority aspect for the Philippine administration. Thus, suggesting that understanding the small island context and its relationship with the other island groups in the larger regional environment is very critical.

Lastly, improving the quality of life of people, especially the island communities are as imperative as those communities in the mainland. Island communities represent the poorest of the poor and the most vulnerable communities.

### 1.3 The Research Objectives

The study generally aims to develop a framework for understanding and planning small islands by analyzing the spatial linkages of small island spatial system and the larger mainland/ regional spatial system counterpart.

This analysis will then inform the small island spatial system on the proper management and development strategies and at the same time its possible contributions in improving the regional economic growth.

A two-pronged analysis was done for the study; first, the understanding of small island landscapes in terms of their uniqueness and spatial planning characteristics, and second, the spatial interaction through resources flows that both inform the small islands link to the regional economic landscape and spatial development strategy for sustainable island planning.

As such, it is also critical to highlight the specific objectives that needed to be answered for the achievement of the goal; the following are the specific objectives:

1. Characterize the larger regional spatial landscape and the selected small islands within the region;
2. Identify the role of the small island system on the regional spatial landscape;
3. Determine the nature and extent of the island-mainland/ regional landscape linkages in terms of natural resources distribution and flow;
4. Analyze the spatial dimension of the linkages between the small island and the mainland/regional landscape in the context of spatial planning; and
5. Come up with recommendations to build an indicative strategic model for small island spatial development integrated in the larger regional development planning.

Answering these set of specific objectives is critical in the study as it provides direction and means to achieve the general research objective.

### 1.4 Assumptions and Limitations in Doing Island Studies

Small island studies bank in the fact that geographic boundaries are defined due to its innate character, such presents small island as a manageable unit of study (Deschenes & Chertow, 2004), although island continuity or discontinuity is a matter of perspective, the research focused on the latter as defined by its political and administrative boundaries. Through this, the innate character of small islands can also be properly identified and differentiated further establishing the context of small islands in spatial planning.

The context of island as a landscape is used to define the complex geographies present in the small islands of the Philippines, this means, the island landscapes are actually the critical ecosystems forming parts of the small islands directly impacting the livelihoods of the communities therein.

The small island cases chosen for this study were ranked based on the selection criteria discussed in the later chapter. Moreover, the Philippine small island cases represent the provincial administrative units for spatial planning to work successively as per the local government code (Republic Act 7160), where provinces are the largest political subdivision of local governments able to do physical framework (spatial) and development planning.

Integrating different sets of methodology was done to effectively analyze the small islands condition in relation to the research agenda. Also, given the natural conditions in small islands, a holistic approach is necessary to assume to the sustainability factors sought in the research. As such, combining the results of several methodological approaches and discussing it comprehensively provided the context of important factors to consider in achieving small island sustainable management. The analysis and planning tools used considered the types of present data available at the agencies and the local governments. This merits the fact that data availability was not a problem but fitting methodology could be used to achieve desired results.

Still, the combined methodological approaches will require datasets that may have been omitted or discarded in the already available data, making primary data gathering as an equally important aspect of the methodological approach. This provided the triangulation aspect of the datasets available further confirming the validity and quality of data used in the research. At the same time, all secondary data were based from official records of the local government and agencies concerned. Harmonizing these datasets to arrive into a generalizable representation of the island case is important to arrive into a more comprehensible research results.

Also, some agricultural data were sourced out from different agencies, majority of which, however, was taken from the Philippine Statistical Authority (PSA), the lead national agency on statistical information of the country regarding population, agriculture, etc. Other datasets were taken from the provincial and regional offices of each of the selected small island provinces.

Comparing the results of the three selected cases brings depth and weight to the characters of small islands in the Philippines. In doing so, the common generalizable characteristics can be gathered. These spatial characteristics of the small island cases form the bases for answering the first research question whether the small islands are unique landscapes affecting specialized analytical and planning considerations. Therefore, in-depth discussions for each case made the cases of the small island province more apparent and understandable.

Through available literatures, the characteristics of small islands were determined and compared to what exists in the Philippine context. In addition to this, identification of salient indicators is made assuming for the sustainability measures imbued in this research.

Furthermore, the achievement of the desired results relies primarily on the research framework as lens for analyzing the small island and its interaction with the larger regional economic landscape.

The greater focus on the economic landscape through natural resources flows is a simplified model of the linkage of the province (Small Island) to the larger regional landscape. Using the abundant and natural resource within the small island as a representative of the resource flow acts as a means to assure that flow of resources really does exist between the two spatial systems. Without setting this as research limitations, the spatial linkage will not be properly established.

# CHAPTER TWO

*“Knowledge is an island surrounded by a sea of mystery”*

*-Chet Raymo*

# 2. THEORETICAL BACKGROUND ON SMALL ISLAND STUDIES

The increasing interest on small island studies started at the advent of issues related to sustainable development three decades ago. As sustainability issues bring forth the alarming and irreversible depletion of natural resources, protection of the existing biodiversity and critical ecosystems, such as small islands, is imperative. This is the reason for the international organizations to put forward issues related to small island protection, planning and development.

This chapter further contextualizes the intent of the study by reviewing several theories, researches, documents and methodologies leading to a better understanding of the small islands and where the actual research stands in terms of the research agenda and gaps the study would like to focus.

## 2.1 The Small Island Story

The island story is both inspiring and mystical; although such stories are exciting; several challenges are apparent and ever present in islands. Exploring these gaps and uncertainties is very important to mainstream small islands in a greater scientific inquiry.

### 2.1.1 Small Islands Conceptualization

Islands are defined as a land mass surrounded by water. As simple as it is, several categorizations and definitions are still needed to grasp what small islands are. Among the important threshold criteria for defining islands include, size factor, remoteness, morphology, population size, and gross domestic productivity (Wong et al., 2009).

Some of the existing definitions of small islands are summarized in Table 2.1. Here it can be argued that, despite the differences in the definitions, still, there are a lot of unifying characteristics that make it more interesting to look at.

Indicators such as size, geographic character and population are among the most mentioned factors identified in the different definitions of small islands. Although qualifying for a small island differs for every international organization based from the limits they set (Wong et al., 2009). Important as it is, still, looking deeper into the situations of small islands and their unique stories are more important to consider given all the threats and vulnerabilities these units experience.

**Table 2.1. Conceptualizations for Small Islands by Various Authors**

| Author/s (Sources) | Definition | Features |
|---|---|---|
| **Hess (1990)** | *10,000 square kilometers or less in surface area and to have 500,000 or fewer residents* | Size, Population |
| **Glassner (1990)** | *as a sub-continental land area surrounded by water* | Geographic |
| **Article 121 UN International Convention on Law of the Sea (UNCLOS)** | *An island is a naturally formed piece of land surrounded by water on all sides, emerging above the surface of the sea at the highest tide, capable of sustaining human habitation or economic life on its own, and with dimensions that are smaller than that of a continent* | Geographic character, Population, Size |
| **Millennium Ecosystem Assessment** | *Lands isolated by surrounding water and with a high proportion of coast to hinterland.* | Geographic character |
| **Rosenzweig (1995); Vicente (1999)** | *Small biotopes, with terrestrial (non-migratory) fauna that have been sufficiently isolated from continents that there have been little if any movements or genetic exchanges with continental populations, leading to local adaptation and endemism* | Biology |
| **www.ocean-climate .org** | *Characterized bio-physically as having limited land area, small plains, high exposure to unpredictable marine weather and having subsistence population depending on its resources* | Geographic character, Size, population |
| **Encyclopedia Britannica** | *Any area of land smaller than a continent and entirely surrounded by water. Islands may occur in oceans, seas, lakes, or rivers. A group of islands is called an archipelago* | Size, Geographic character |

### 2.1.2 The Value of Small Islands and its Niche

Fragile and vulnerable as it is to both natural and human-induced disaster, small islands are significant due to the intrinsic values of its ecosystems, the unique cultural identity and the role it performed in the larger regional economic landscape (Ishihara, Hoshino, & Fujita, 1996). Clearly, these assumptions have greatly manifested in the various international declarations set forth to show how small islands are faring in the world views (Table 2.2).

These sets of internationally-led conferences, point-out clearly that the value of small islands is a strategic resource for development, management (United Nations, 1992) and protection. Although there has been earlier notions (1980s) of small island protection and management through the Convention on the Law of the Sea, which created Exclusive Economic Zones (EEZs) endowing many small islands with substantial oceanic resources. Small islands often lack the capacity to exploit these resources, and rights of access are leased to other countries (Kerr, 2005). Such concerns were also highlighted in the Millennium Development Goals (MDGs) (Boto & Biasca, 2012) and consequently in the recent Sustainable Development Goals (SDGs) (Table 2.2).

Table 2.2 Timeline of International Declarations Governing the Protection and Sustainable Management of Small Islands (including SIDS)

| Year | Declaration | Important Feature |
|---|---|---|
| **1986** | *First islands of the World Conference* | Discussion on the common interests on small islands<br>Creation of International Small Islands Studies Association (ISISA) (1994)<br>Other Islands of the World conference happened in Tasmania (1988); Bahamas (1992); Okinawa, Japan (1994); Mauritius (1998); Isle of Skye (2000); Prince Edward Island (2002); Kinmen, Taiwan (2004); Maui, Hawaii (2006); Jeju, South Korea (2008); Bornholm, Denmark (2010) |
| **1992** | *Earth Summit (Agenda 21)* | Small island developing states are a special case both for environment and development<br>Updating and reviewing policies (Rio+20) |
| **1994** | *Barbados Program of Action (BPOA)* | Policy document that addresses the economic, environmental, and social developmental vulnerabilities as well as the mitigating measures<br>Creation of Global Island Networks (1994); Skye International Teleservice Centre (SITC) (1995)- created a network of extensive collection of island links and contacts; Island Web Consortium (IWC) (1997); European Islands System of Links and Exchanges (EURISLES) (1999)<br>BPOA+5 (1999), Adding the themes of climate change, natural and environmental disasters and climate variability, freshwater resources, coastal and marine resources, energy and tourism. |
| **2000** | *Millennium Development Goals* | Goal 8, the development of global partnership for development, Target 14 is said to address the special needs of landlocked countries and small island developing states |
| **2002** | *Johannesburg Plan of Implementation (JPOI)* | acceleration of national and regional implementation of further sustainable fisheries management and assistance to SIDS, providing support for the implementation of their specific components, for freshwater programs, reduction, prevention and control of waste and pollution |
| **2004** | *United Nations Conference on Trade and Development (UNCTAD)* | Is a Special Treatment of Small Island Developing States Possible? |
| **2005** | *Mauritius Strategy for Implementation (MSI)* | Further Implementation of the Program of Action for the Sustainable Development of Small Island Developing States (BPoA)<br>MSI+5 (2010), focused on data management, monitoring and evaluation, strategic partnerships, UN System |

| | | |
|---|---|---|
| | | support and the special case of small island states |
| **2007** | *United Nations Framework Convention on Climate Change (UNFCCC)* | Vulnerability and adaptation to climate change in small Island Developing State |
| **2011** | *United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)* | Rio+20 Pacific Preparatory Meeting. The "Blue Economy": A Pacific Small Island Developing States Perspective |
| **2012** | *The Future We Want (Rio+20)* | Paragraph 178-180, on the special case of SIDS in the development agenda<br>Starting up the process in the identification of Sustainable Development Goals (SDGs) from MDGs |
| **2014** | *SIDS Accelerated Modalities of Action (SAMOA) Pathway* | The sustainable development of small island developing States through genuine and durable partnerships<br>SAMOA PATHWAY High-Level Midterm Review (2019) |
| **2015** | *The Global Goals (SDGs)* | The Sustainable Development Goals (SDGs), are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity (Target 13.b, 14.a, 14.b)<br>Creation of SIDS Partnership Framework |

Providing these set of clearly defined and supported value of small islands in the international scene, studies concerning small islands have started to increase in the last few decades. Small islands studies are relevant and current as Baldacchino (2006) described, as remote and insular, suggesting peripherality, being on the edge, being out of sight and so out of mind: situations which both expose and foment the weakness of mainstream ideas, orthodoxies and paradigms. As such, studies concerning small islands are often untouched and less tackled.

The existing studies for small islands, however, are mainly related to the stability of the island system itself. The context of resource use, island isolation, and climate change and risk reduction are among the themes that have gained attention in the international scene. These themes come from the basic idea of what small islands connotes: terms such as islandness, remoteness, smallness, vulnerability, underdeveloped, etc (Ishihara et al., 1996). Also, small islands are seen as more subordinate and far-flung, thus notions of periphery and being on the out-skirts define the need to really study small islands.

In the advent of climate change and disaster risk reduction in the last decade, small islands gained similar attention. Although it generates less than 1% of Greenhouse Gas (GHG) emissions, the damages small islands face from global warming – storm surges, rising sea levels, beach erosion and coral bleaching, are irreversible (World Tourism Organization, 2014). Since the 1990s, the call to study small islands' susceptibility to external influences and strategies to tackle externally-related issues were seen already necessary (Ishihara et al., 1996). However, little attention was made into concrete actions.

### 2.2 Small Island Landscape Vulnerabilities in the Context of Spatial Planning

Small islands are pronounced as among the most threatened landscapes in the world due to its character- small size, isolation and fragility (BPOA, 1994), this has been critically followed in recent decade highlighting the efforts to ensure sustainable small island development in balance with ecosystem health and social justice for island communities with due consideration on the nature of archipelagos and archipelagic planning ("The Ambon statement," 2010). Also, the impacts related to climate change and disaster risks making small islands more vulnerable (Nurse et al., 2014; Tegart & Sheldon, 1993) adds to the urgency of small-island planning and development.

Through a conference held in Ambon, Indonesia (August 3-5, 2010) the following statements were affirmed and acknowledged internationally:

> *Archipelagic regions, consisting of small islands and extensive marine territories, including coral reefs, have very specific policy, planning and development requirements.*
>
> *Small islands and coral regions have unique ecosystems and cultural heritages, including traditional systems for managing terrestrial and marine resources.*
>
> *Small islands and coral reefs are especially vulnerable to modern global and local human impacts, including climate change and unsustainable human uses. Unsustainable fishing practices, mining or poor land-use practices can seriously damage both ecological and social systems.*
>
> *Regional management must acknowledge and engage with traditional community practices and incorporate with these into coastal management initiatives.*
>
> *There is a need to develop partnerships of all stakeholders to rehabilitate, restore and conserve coastal and small island ecosystems and contribute to sustainable*

*development for communities. Enhanced knowledge from research is needed to contribute to effective policy.*

*There is a need to develop international dialogue between archipelagic states and regions in order to identify and progress global strategies to address the challenges identified above.*

*Finally, we strongly recommend enhanced efforts to address the impacts of climate change, especially sea-level rise, on small island regions. This should involve urgent adaptation and mitigation initiatives, and national and international efforts to reduce carbon emissions.*

Although it is clear at the international scene that small islands need to be focused, still, it does not necessarily translate to the local level. Given the inherent character of small islands, with limited resources, tenuous resource security and fragile natural environment, the need to bring human industry within the limits of environmental carrying capacity is of immediate importance for island systems (Deschenes & Chertow, 2004). Thus, localized action is necessary for successful island developments to occur. However, the attention of the local government units to this matter is, if not minimal, lacking.

The Philippines as an archipelago, poses yet another concern when it comes to spatial dynamism. Comprised of several thousands of islands, most of these are rich in biodiversity; however, many have fragile ecosystems and very limited freshwater resources. Such fragility faces the continuing threat of isolation from the mainland, being located far from political and economic centers (Coastal CORE Sorsogon (CCS), (MaCEC), & Quezon), 2011). With this, the assembly of Local Government Units (LGUs) and concerned Non-Government Organizations (NGOs) situated in small island systems assert a call for an adequate attention to the uniqueness that small island system posts and the threats it faces with the rapidly changing environment. Some of such concerns agreed and called upon for a national attention by the Advancing Safer Communities and Environments against Disasters in 2011 are as follows:

*First, small islands of the Philippines are most exposed to extreme climate and weather events, geophysical hazards and are also exposed to human-induced hazards due to irresponsible extraction and unregulated use of its very limited natural resources.*

*Second, small islands are home to many of the poorest and vulnerable households in the country with close to half of its population living below poverty line. Also equally worth mentioning is that many small islands in the Philippines have remained not only physically and geographically isolated over the many years but have been cast into isolation economically, politically and socially by governments who have not given attention to their concerns.*

*Third, with its natural resources small islands have contributed to national economy significantly yet their very natural resource base has been sacrificed.*
*Fourth, given their high level of exposure to extreme climate and weather, geophysical and human-induced hazards, the vulnerability of its population, the limited capacities of the Local Government Units to address the challenges of the overwhelming climate and other disaster-related threats, the survivability of small islands and its communities is threatened.*

*Lastly, the very basic rights to life, property, development, environment of the women, men, children, youth, elderly, and persons with disabilities living in the islands are now being put at risk because of inaction to the challenge of natural and human-induced hazards in the now fast changing climate.*

Similar problems are encountered by small island systems in the Pacific region ranging from problems related to human development, subsistence economy, land tenure and management and governance and institutional issues (ADB,1996). Such studies basically tackle how governance and donor focused development plans affect the development of Islands countries (ADB, 1996). Consequently, such planning, often lead by the economic planning agencies, overlooks the importance of policy analysis and the relevance of a strategic development issues identification (Brown and Standingford, 1991). With such, limits set on the analysis cause severe mismatch with the needs and requirements especially of the island system.

Such conditions are not directly addressed as spatial planning in the developing countries, although climate change and disaster risk reduction has been a central theme for decades now, looking at things in the context of small islands, is still limited.

### 2.2.1 The Small Island Ecosystems and Local Development Planning

Small island economies seize to exist independently, regardless of isolation, based on its natural resources endowment and the consequent management of such resources by the human population. Supportive to this is a study in the Pacific Coast of North America by Fitzhugh and Kennett (2010) that showed two concurrent major results taken as the factors of the small island and mainland interaction through time: (1) the degree of socio-economic self-sufficiency of island populations and (2) the nature of resource distribution and the socio-political dynamics. This phenomena has manifested in the tropical city of Darwin, where smallness and physical isolation away from other Australian cities both creates and limits opportunities, through seasonal flows of tourists and visitors, social and business networks throughout scattered remote aboriginal communities across a large hinterland, and through cross-border exchanges and trade with neighboring South east Asian cities (Gibson et al, 2010). This has been the case of other small islands in the Pacific, to a more intense or lesser extent.

Such degree of interaction happening significantly, poses that the critical analysis of the natural resources present is imperative for sustainable island management. Nevertheless, failure to engage in sustainable planning has threatened the existence of small islands (Deschenes & Chertow, 2004). Thus, sustainability decisions are important over more immediate planning horizons. However, with the survivalist notion of many small islands government, the long-term sustainability advocacies are always at risk.

Addressing sustainability starts with a critical assessment of the resources. Ecosystems found in small tropical islands usually encompass the total environment, from mountain down to the coastal-marine ecosystems that add to the already complex nature of small islands. Analyzing the several ecosystems present in small islands may direct to the different tools used for ecosystem assessment. However, assessments of the total system where these entire environments connect and are linked are still limited. The increasing use of economic valuation of ecosystem services has been tagged as among the frequently go to solution to somehow address this challenge; however, this poses structural limitations on the ability of markets to provide comprehensive pictures of the ecological values involved indecision processes as it looks at only a subset if not crudely assessed (MA, 2005; Boto & Biasca, 2012).

Strategic environmental assessment exists for different ecosystems. Many international organizations are funding and successfully conducted comprehensive environmental assessment. However, its consequent use for community management through localized

planning is limited due to limited integration capacities of the local governing bodies in using these information for further activities (Smith, S., Richardson, J. and McNab, 2010;UNDP, 2016). These outputs are rather shelved in offices or off for records purposes only.

Crude as it is, the local governments of small islands in the Philippines are still limited in the use of such methodologies due to lack of capacities and resources to do so. The local planning assessment activities, try to integrate this aspect by doing an initial assessment of the natural resources present in the spatial unit. However, the usual land use planning assessment tools often, limit themselves in the ecosystems that are present in the areas. Limits set to the unique cases of small islands and having multifold ecosystems to consider, are still imminent. The problematic conditions for properly assessing small island ecosystems were addressed by the introduction of the ridge-reef approach to planning or ecosystem-based planning. Although it started as more comprehensive approach to coastal ecosystem conservation (IUCN, 2019), its concept has been adopted by the Housing and Land Use Regulatory Board (HLURB) in the Philippines in 2013 as an aspect to consider in pursuing local development of municipalities, cities and provinces (such includes the small islands). Still, the local planners, with these initiatives at the national level cannot fully integrate the aspect due to lack of skills and competencies (Quitalig & Orale, 2017; Legaspi, n.d.).

Sustainability is a function of ecosystem stability. However, it is equally important to note that small island system resources, no matter how rich, are anchored to a disproportionately large through-put system controlled by global forces and multinational actors (Mcelroy & Albuquerque, 1990). This situation puts small islands in the larger arena of regional economic landscape as it contributes to propel the continuous development of the whole larger regional landscape.

### 2.2.2 Analyzing Small Island Resources and Poverty Nexus

Poverty in the context of natural resources use involves a spectrum of possible linkages. According to a World Bank report (Mink, 1993) environmental degradation contributes to poverty through worsened health and by constraining the productivity of those resources upon which the poor rely, and poverty restricts the poor to acting in ways that are damaging to the environment. Even the United Nations, since the advent of Agenda 21, sees that poverty and development issues and environmental protection as two complementary objectives.

Direct association of natural resources to human development issues, such as poverty, is related to resource use. Practically, livelihood activities of islanders are attached to the natural resource base found in their area. The World Bank (2004) findings showed that over 90% of people living in extreme poverty depend on forests for some part of their livelihoods. Livelihood dictates the survival capacities of the human communities in an area, thus analyzing livelihoods is a means of understanding the complexity of the human and natural resources linkages. The livelihood of people could be analyzed on a larger spatial level, through the Sustainable Livelihoods Approach (SLA). The interaction in terms of livelihood can be obtained through the analysis of its framework. However, it is not intended to suggest that the starting point for all livelihood analysis is the Vulnerability Context, wherein the results yield the Livelihoods Outcomes. Livelihoods are shaped by a multitude of different forces and factors that are themselves constantly shifting, People-centered analysis is most likely the best way to begin with simultaneous investigation of people's assets (Solesbury, 2003). The integration of the island concerns into a larger regional spatial unit could be

realized through the feedback mechanisms integrated in the SLA such as (a) Transforming Structures and Process and the Vulnerability Context; and (b) Livelihood Outcomes and Livelihood Assets (DFID, 1991).

Socioeconomic profiling as a tool providing basic information on a spatial system which focuses on the economic characteristics of small islands, wherein physical and environmental vulnerability are also analyzed matching with the economic vulnerability (Brigulio, 1995) provides an issue-based approach on resolving poverty problems by also providing potential resilience options. Since socio-economic profiling limitedly includes the ecosystems and natural resources available in the spatial unit in its analysis, the advent of ecological profiling came to be an instant solution as it gives an equal footing for both socio-economic profile and environmental profile (Serote, 2008). This has been a requirement for every local government in the Philippines to at least provide a good profile for further analysis.

Although less tackled due to data accuracy limitations (Jenkins, Pierson, Pohnan, Ramirez, & Wang, 2012), Materials Flow Analysis (MFA) is a good tool to potentially relate the natural resources flows and its impacts to poverty. Often used in analyzing raw material products transformation, resource and energy consumption and waste management, its use in the interdisciplinary studies are always in combination with other analytical tools (Kytzia, 2003; OECD, 2008). Also, island application for poverty reduction is often limited to purely economic input-output analysis and not dealing directly to poverty and other development issues.

### 2.3 Spatial Integration and Development Planning

Spatial integration is a term loosely used but has been vaguely defined. The idea of spatial integration has been used to usually approach space rather as a proxy for socio- economic integration in general in detriment of its materialities and physicalities (Buhr, 2014). It is always assumed as the lack thereof of integration, but defining it has been inadequately treated. Others, like Ruiz-tagle (2013) has defined it as differentiated from the process of segregation. A definition of *spatial integration expresses the opportunities for and level of (economic, cultural) interaction within and between areas and may reflect the willingness to co-operate. It also indicates, for example, levels of connectivity between transport systems of different geographical scales. Spatial integration is positively influenced by the presence of efficient administrative bodies, physical and functional complementarity between areas and the absence of cultural and political controversies* (Boe, D., et al., 1999).

The concept of spatial interaction then is coming from the nature of cooperative interactions and its role in successive complementation. It may reflect the ideas of Scott (2001) involving the role of small cities in the cultural economy as a boutique or niche markets facilitated by the pitch of uniqueness built around the past, regionalism, and localism. In cultural analysis which shows more supplementary relationships, small cities are framed as places where ideas are backward and inward looking (Lorenzen et.al., 2008).

The nature of connectedness for small islands for spatial integration, given its seemingly isolated and remote character can be explained in terms of size, proximity and location. According to the study of Jayne, et.al. (2010), these factors place specific burdens on small cities and islands and must be accounted for in theorizations of the geographies of the cultural economy. Spatial integration comes with concrete ideas of these factors, so the opportunities coming along with this are maximized.

Furthermore, in cultural economy, wherein small islands fits in a larger regional economic environment, such opportunities are in part tied to the location relative to metropolises/ economic centers, the access to infrastructure networks and proximity to national/ international markets. These opportunities are also shaped and reshaped by different regulatory arrangements and socio-cultural imaginaries ( Bell and Jayne, 2009).

In a sense, for spatial integration to work in line with development planning, all the factors related to connectedness and effective cooperation among the spatial units concerned must be properly understood and linked. As Buhr (2014) explained that spatial integration concerns the development and maintenance of relations of use and knowledge over the practiced space.

### 2.4 Small Islands Landscape and Regional Development Planning

Contemporary theories on spatial integration and regional planning trace its roots from classical planning theories. These theories, although may not fully explain certain phenomena are still relevant and can be drawn inspiration with.

The Location Theory by Johann-Heinrich von Thünen is among the most influential theories in spatial interaction. Many other studies have launched its origins in this theory as it provides a clear description of the agricultural land uses profitable for his estate. In his work in 1826, "*Der Isolierte Staat*" ("The Isolated State"), he developed one of the first models to describe the land use practices radiating out from a central market location (Crosier, 2011). This novel observation had soon then been picked up by other theorists in trying to establish the interaction of settlements by looking at which settlements functions as center/primary urban area and which are secondary settlements.

Also worth noting is, the classical Central Place Theory (CPT) of Walter Christaller (1933) followed by August Lösch (1940) that predicted that the demand for any particular good would decline regularly with distance from source of supply, due to the transportation costs (Brown, n.d.). Thus, the location of a central place follows a certain range of distance from one another to optimize the interaction among settlements. Furthermore, such spatial linkages were translated to growth poles and nodes wherein the relationships of the growth nodes and the secondary, tertiary and peripheral settlements were emphasized. In addition, Gunnar Myrdal's Theory of Cumulative Causation shows the relationship of settlements through the spread effects and the backwash effects (Ho, 2014), both on the central places and the peripheral settlements. Zipf's Law or the rank size rule also draws its inspiration from these classical theories. Zipf's Law is a mathematical regularity that shows that the probability or the frequency of an observed event is inversely proportional to its rank (Hsu, 2008).

Consequently, the principles of human settlements as a result of the study made by Constantino Doxiadis also illustrate the importance of spatial interaction. Particularly, the inclusion of networks (roads, telecommunications, etc) provides a clear manifestation of spatial linkages of different settlements (Doxiadis, 1970).

Lastly, many studies have been made to analyze the connection between urban and rural areas. As a spatial unit, these two areas are generally characterized differently. However, for the continued growth of both areas, careful analysis of their relationship must be understood. The interaction between the two shows the relative importance of both in the continuous growth and development of urban and rural settlements.

Much of the literature on spatial linkages center on these aspects, few literatures tackle the island-mainland spatial system and is only limited to regional growth and development theories. Island inclusion in large scale planning is crucial especially in the aspect regional planning. Equal and inclusive growth, as promoted by the Local Government Units can only be achieved with due consideration with all the members or parts of the system mutually benefiting through enhanced and managed interaction.

Indonesia, also an archipelago like the Philippines, tackles regional planning issues and concerns in terms of the decentralization policy and financing. It looks at regional development and financing through infrastructure investment for development. Some of the results show that regional development planning and financing should have substantial central control and oversight, though decentralization policy has already been implemented, due to the bureaucracy and fragmented nature of sectoral planning that exist in the country (Crane, 1995). With such issues and concerns, the foreseen needs for planning and its consequent regulation is still a priority especially for the Rote Island of the eastern Indonesian Province of Nusa Tenggara Timur (NTT), wherein, many stakeholders see the need for planning and collaboration and resettling various views of development in the region such as who should be involved and how development should take place (Wright and Lewis, 2012).

In the Philippine context, regional integration was conceptualized under the flagship of the Region IV-B (MIMAROPA region) but with the focus of inter-island equitable growth and development. Such undertaking differentiates the island systems from the others within the region in terms of their competitive advantages and uniqueness (NEDA IV-B, 2009). The issue on how the different island systems interact is not comprehensively discussed as the plan only provides guidelines and basic comparative status for the island systems within the region.

Regional integration and interfaces can be properly analyzed by looking at the rural-urban linkages/interactions in terms of three categories: the Livelihood, Economic Synergies and Political Synergies (Hutter A. and R. Neidhardt, 2006). In the context of regional economic assessment, the comprehensive review of economic trends and changes in the regional economy since the mid-1980s of the Vancouver Island/Coast Economic Region was successfully carried out. The analyses looked at the key factors which drives economic change and the observed trends in the region. It also showed an examination of opportunities for economic growth and gave an insightful listing of challenges (VIEDA, 2003). It also provided basic methods to study an island system at a broader context, which showed how economic development is driven and which forces trigger it. Analysis enables the reader to have a grasp of the challenges of an area having island systems that can be further seen as areas where spatial planning can intervene and several planning lessons could also be derived.

Additionally, some approaches to trans-boundary planning provide procedural approach on regional analysis and planning within the lens of shared natural resource. Several case studies from the Dominican Republic, Panama, Bolivia, Paraguay, Equador and Mexico show the usefulness of tailor-fit guiding frameworks which cut across the concerns of natural resources management and regional development (Department of Regional Development Secretariat for Economic and Social Affairs Organization of American States,1984). These also showed infrastructure imposition and its impacts to regional and environmental planning. The approaches also revealed the challenges faced in the development of a multinational river basin and produced resource development studies. Furthermore, trans-boundary planning tries to look at the trends and constraints and emerging challenges in regional development planning.

Island-mainland interaction measured through at the regional/sub-regional lens shows the interface, concurrence and possible mismatch in the existing relationship. With this, varying degrees of solutions could be suggested in order to arrive at a fitting formula to manage the interaction in line with the attainment of an equitable and balanced development.

The integration of the island system to the mainland counterpart as exemplified in at the regional level context can be seen on the planning approaches employed, economic integration and even livelihoods analysis.

Effective island management strategies transcend from treating the island spatial system isolated from others, but always related to other nearby spatial system. In a study entitled the Spatial Transformation Strategy: Province of Batangas in 1976 by the Filipinas Foundation, Inc., several key indicators were used to assess the provincial spatial dimension of economic health. These indicators were classified as indicators that would show the existing level of economic health – (a) status indicators (such as kilometers of road per 1000 hectares, per capita municipal income, the number of establishment per 1000 population, percent population in the *poblacion* and population density) and (b) trend indicators, similar to the status indicators, only that it focuses on the observed trends through historical data.

The Rural Economic and Enterprise Development (REED), according to Hutter and Neidhardt (2006), looks at not only the interplay of economic indicators for economic development but also its use to analyze and plan economic promotion measures in the rural area. Similarly, the underpinning of this approach is the careful accounting of the following: (1) political and institutional framework factors, (2) the infrastructure, services and markets situation, (3) the competitiveness of businesses, and (4) the involvement and networking of interested groups and individuals (Hutter A. and R. Neidhardt, 2006). These measures can be good indicators of economic interaction between two systems, especially for the case of the rural-urban interaction. However, for small islands, like those small island developing states (SIDS), it is beset by commodity price fluctuations due to their highly specialised production and export activities, which affect their terms of trade and, in turn, other economic outcomes (Santos-Paulino, McGillivray, & Naudé, 2011).

# CHAPTER THREE

*“Islands are natural workshops of evolution”*

*-Richard Dawkins*

# 3. RESEARCH GAP AND RESEARCH AGENDA

### 3.1 Small Islands Research Gaps

Studies in small islands are increasingly getting popular. Island assessment, island resiliency, island sustainability, to name a few, has been an apparent theme in the past decade. However, the procedural approach in doing island analysis and planning is still relying primarily in the general ecosystem analysis approached individually exclusive of the others and omitting the context of ecosystem continuum. As already established, small islands are unique ecosystem cases. As such, a different and more complex level of analysis is necessary to practically solution small islands sustainability issues. With lacking specific set of tools and analytical approaches to indicatively address the special case of small islands, the actual research gap is identified. Finding out this gap will lead to better small islands planning for sustainable management of its resources.

This research gap on bridging the sustainable management, planning and development of small islands through an indicative planning model approach will also require an understanding of how the small islands interact with other spatial units, thus flow of island resources will be part of the research agenda and will be directly dealt by answering the research questions posted in the succeeding section.

#### 3.1.1 Spatial and Economic Integration of Small Islands

A number of research works directly tackled small island problems, pointing out to the usual drivers of island issues such as population, energy, habitat loss, pollution, degradation of the fragile ecosystem, economic changes, natural hazards and climate change and sea level rise (Wong, et.al. 2000). Solutions vary depending on the innate character of the small island and the nature and type of problem or issue it faces. However, it is impossible to properly analyze the economy of islands by restricting the analysis to just what happening on the islands (Baldacchino, 2013). Therefore, critically looking at interactions and the actual dynamics at the regional spatial system is as equally important to look at and focus.

Regional dynamism expressed in the small islands context can be dealt in understanding the unique case of small islands in the larger regional spatial system. Thus, spatial integration plays a critical role in closing this development gap for small islands. Given a considerably rich understanding of the approaches to look at the situation of small islands and its role in the larger spatial system, the spatial integration, in terms of the materials flowing from the island spatial unit to the larger regional/ mainland spatial system, is but necessary to look at to justify the rightful integration needed in creating a sound regional economic environment with due respect on the resources capacity of small islands and development agenda for the regional economic environment.

#### 3.1.2 The Research Questions and Assumptions

For this matter, the research gap that will be focused on is two-pronged: (1) the comprehensive profile gap analysis of the small islands, in terms of its biophysical/ ecological attributes, socio-economic characteristics and the link between the ecosystems and the local economy, and (2) the spatial interaction analysis through natural resources of the small islands flow along the regional spatial system. Although the main context of the

research will deal on the natural resources or material flows, still, a very vivid picture of the small island context must be well-established first. Therefore the main research question runs as “Why is the flow of natural resources along the small island landscape important in developing spatial strategies for sustainable island development?” This theme is almost always neglected in a lot of spatial planning activities in developing countries as its impacts are not directly measured due to data availability issues in every aspect of resources that flow throughout the system. This notion is perfectly captured in the Organisation for Economic Co-operation and Development (OECD) guidebook on material flow analysis (2008) states that high quality information on material flows results from a good understanding of the natural resource bases of the economy.

The main research question directly links to the research gap previously mentioned as the answer to this research question muddles to the development of a spatial strategy working specifically for small islands in the Philippines. Also, it generally answers the main research objective of developing a framework or a spatial strategy for small island spatial planning. Furthermore, the specific objectives in this research can be translated into supporting research questions below providing a stepwise means to tackle the main research question.

1. What is the uniqueness of island-mainland/ archipelagic landscapes?
2. How do resource exchanges happen in this type of landscape?
3. How do the perceived problems reflect the material flows between the small island and the mainland (regional spatial unit)?
4. What are the spatial planning interventions that can be done to promote/ sustain/ improve small island development?

With these supporting questions, the complexity of the problem at hand can be limited and tackled accordingly to provide light in terms of creating more sustainably-managed small islands. The first sub-question discusses importance of establishing the ecological and socio-economic conditions of small island cases. The question will also stresses the necessity to account the direct relationship of the actual island ecosystem and basic industries of the small islands. Also, the answer to the question will also discuss the similar characteristics of these cases particularly their uniqueness in terms of their geographic settings and other affecting factors.

The second sub-question is in terms of the resources exchanges, small islands have unique yet finite resources; these resources are the small islands’ main means of livelihood. Thus, tracing how such resources flow in the whole regional spatial system is interesting and may shed light on how the basic economic resources are flowing and circulating in the entire economic landscape. Also, the economic role of the small island in the regional economic landscape will be analysed here based from the spatial plans existing in the region. Consequently, the third sub-question will be answered also by establishing the nature of problematic situation expressed in small islands and the regional spatial system.

Lastly, the fourth sub-question deals with trying to find fitting solutions to the identified problems and create a workable framework that integrates such small island concerns in the regional spatial planning framework. This could form key bases as other studies have not yet been able to fully integrate systematically these important aspects and develop it into a comprehensive model. Thus, setting up such an integrated model would, however, be a major step towards sustainable regional development because it would allow (i) the the assessment of natural and economic sustainability and (ii) capture interrelationship between different environmental problems and time-dependencies. Such an integrated model shows potentials for (a) analyzing possible problem shifts and rebound effects within the lifecycle of buildings and in the use of different resources (e.g. gains in energy efficiency may create

future waste problems), (b) an integrated analysis of socio-economic and technical driving forces in the development of the built environment, and (c) a multi-criteria evaluation of strategies to enhance regional sustainability including environmental and economic indicators (Kytzia, 2003).

### 3.2 The Research Agenda

This research will attempt to provide a more specific approach to analyze small islands in the Philippines in the attempt to achieve its more sustainable management. Current framework for studying small islands in the Philippines remains conceptual as for the notion of its unique character and specific needs. Consequently, no conclusive attempt to really deal with small island issues has been made to highlight its current issues and bring into the table as objectives for better planning and management. The existing general framework remains as a generic guide that is not usually translated to the actual planning context of small islands.

#### 3.2.1 The Research Goal: A Means to an End

Stepwise attempt to achieve the research goal points back to how the research objectives were addressed. Alongside the objective's complementarity is the process on how these objectives are solved and contributed to the attainment of the research goal. As summarized in Table 3.1, the following are the strategic planning tools, framework, and concepts used to address the objectives of the research. In this table, the horizontal and vertical logic of attaining the research goal is synthesized.

**Table 3.1 Means of Achieving the Research Goal**

| Research Objective Theme | Research Concept/ Tools Used |
|---|---|
| *Small Island Characterization* | Ecological Profiling, DPSIR Framework, Ecosystem Continuum, Scalogram Analysis, Land Cover Analysis |
| *Small Island Economic Drivers* | Industrial Activities Characterization, Centrality analysis |
| *Material Resources Outflow* | Networks Analysis, Material Flow Analysis, Commodity Flows, Value Chain Analysis |
| *Spatial Dynamics* | Spatial Linkages/ Interaction |
| *Regional Development Planning* | Physical Framework Planning, Policy Analysis and Recommendation |

Ecological profiling, as a tool to characterize a spatial planning unit (whether an island or any other spatial unit), remains critical in providing succinct information about the planning area. Since this preliminary planning activity follows a certain format, often, the complex ecosystem of small islands is overlooked. The additional planning tools used as part of the research methodology which further refines the ecosystem continuum concept emphasized in small island studies can be a good workable approach to see through the island context in a more detailed manner. Using this lens, the finite resources of small islands can be highlighted and put directly as context of analysis that is commonly not addressed.

Also, using the DPSIR (Driver-Pressure-State- Impact- Response) framework to analyze the small island resources issues can be simple but can accrue to the grassroots problems of island natural resources with reference in the social and economic vulnerabilities that is

often discussed in the ecological profiling. Here the integration of the social, economic and environmental concerns is vividly discussed.

Agriculture and tourism as main economic driving forces for small islands' development is discussed in the ecological profiling. Consequently, adding the centrality tool and linking them to the natural resources endowment and economic industry formation can provide a better context of small islands in terms of its natural resources use and flows, thus better informing the local planners and decision makers in the rightful protection and conservation of resources necessary for managing small islands. Also, strategic directions for small islands in terms of industry formation based on the existing natural resources accounts can be sustainably managed by using this methodology.

Regional materials/resources outflow, an equally important factor to analyze in the theme of sustainable small island management, is an activity in local development planning that is commonly overseen. Much of the gaps within which this analysis operates are on data availability. With the methodology employed in the research, the problems on data availability can be addressed in a way directly applicable in the context of small islands. This analysis further justifies the important role of small islands in the regional economic development landscape and at the same time showing aspects and concerns unique to small islands which the local and regional planners, alike can focus on and be given direct attention.

Furthermore, this study could create greater appreciation in the small islands context that is relevant now in this age of natural and climatic hazards, where small islands are a hot topic; however, understanding the realities at the small islands grassroots context is still a predicament to the international scientific community.

### 3.2.2 The Research Contribution to the Field of Spatial Planning

Spatial Planning is continuously developing as a field of study integrating other allied disciplines within it. The Philippine spatial planning system also traces its roots decades ago and continuously being molded by current trends in integrating environmental and socio-economic concerns.

Being deeply engrained in the spatial planning system in the Philippines, small islands are not seen as a planning unit but almost always forming part of the analysis of administrative boundaries. Tackling the small island theme can be done if the small island forms the actual administrative units or integrated in the larger next level spatial concern. In both ideas, the Philippine planning can be still tagged as novice and needs much push to be properly addressed. Also, the context of Philippine small islands in the regional spatial environmental planning denotes archipelagic analysis and planning, which does not only seek to understand the small island per se, but also intends to provide better understanding of the archipelagic landscape.

**Rural Development.** With the increasing attention to urban areas in the coming decades due to the fact that more than half of the population is expected to settle in urban areas in the next years, studies related to rural development and its linkage to the sustainability of urban areas and fringes are equally relevant. Small islands are study cases forming much of the rural development issues only adding the context of islandness. Some development related aspects in terms of the issues and concerns, methodological approaches and conditions are applicable to small island studies vis-à-vis rural development studies. Thus, it is imperative to conduct such studies to further develop the domain of rural development.

**Small Island Landscape Analysis.** With the use of DPSIR framework, holistic understanding of the local situation explained through observed conditions and backed up with quantitative information can be a good way to make people understand better the complexity of the resource use in small islands. Collectively, the tools forming part of the analysis for the small islands can be useful for other island analysis in the tropics as homogeneity in terms of context and data availability is very apparent.

**Island Ecosystem Valuation.** The use of Material Flow Analysis and Value chains to provide value on selected natural resources is a precursor to ecosystem valuation as emphasized by Gomez-Baggethun and de Groot (2010). The diagram below shows that the methodological approach employed in the research corresponds to the biophysical valuation approaches already established (Figure 3.1). Physical consumption of goods and the consequent cost estimation together with the materials flow and land cover analysis were also applied in the research. Since island ecosystems are commonly seen in terms of its component ecosystems and not as a functioning whole, the results of this study could inform mechanisms to better subject the whole island ecosystem into valuation. Better valued small islands, no matter how crude and simplified the results maybe, is a good take-off point to further study and analyze small island landscape and provide the context of its significance in spatial environmental planning.

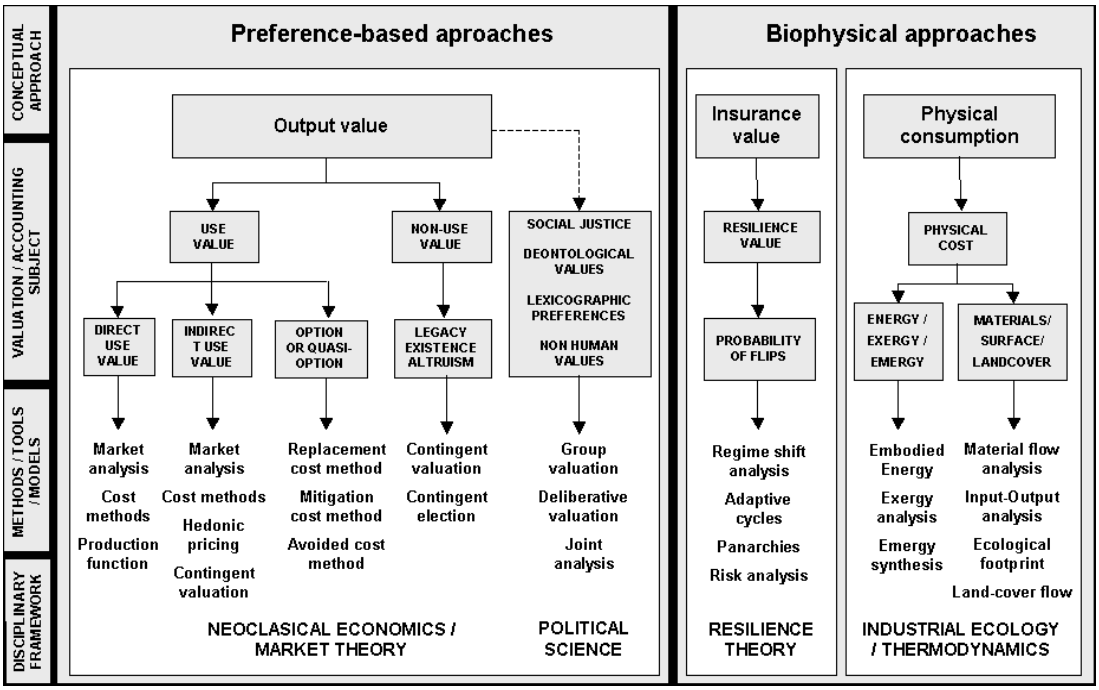



**Figure 3.1 Ecosystem Valuation Approaches** *(Gomez-Baggethun and de Groot, 2010)*

**Small Island Spatial Planning.** The concept of planning for small islands always transcends the notion of Integrated Water Resources Management (IWRM). This study could provide additional information and bases for improving the existing methodologies for such planning activity; however, IWRM has always been applied in small island developing states, and not much on the cases of small islands in an archipelagic landscape. This study could further establish the application of IWRM to small islands forming archipelagos.

**Local Economic Analysis.** Reviewing the local economic context of the small island provinces by analysing the economic sectors in small islands like agriculture, manufacturing and industry, services provision and tourism, is paramount in local economic analysis. As ecological profiling and local economic development sectoral analysis from local land use planning is exhaustive enough, targeting aspects commonly not sufficiently tackled will be

the focus. As such, the economic resources outflows and value of economic resources circulating within the small islands and throughout the whole economic region are just among the aspects that can be focused on.

**Regional planning.** The introduction of MFA in the regional economic analysis can shed light to the problems of small islands natural resources outflows. With this, more empirical bases can be assumed to impact discussions on equitable distribution of material wealth in the region favoring small island communities. Also, putting such analysis in regional planning will gain more grassroots grasp on the natural resources' reality of an economic region with small islands unlike the existing generic framework of analysis the alienates the local planners in the unique context of small islands. Alternatively, this tool can be explored to be applied directly by the local planners and agriculturists in doing sectoral analysis for developing the agriculture base of small islands.

### 3.3 Targeting Local Island Development Institutions

Providing case-based understanding of how small islands should be analyzed in relation to other islands is a paramount concern in this globalizing world. Local planners, decision-makers, as well as policy makers can better update and address the concerns of small islands in the tropics.

**The Local Government Unit (LGU).** The methodology employed in the research directly uses data available within the local governments that only needed to be organized to be useful in the further analyses in small island development. Managing familiar data and producing a concrete output would give the local planners the power in planning for their own resources. Also, the practical application of the actual planning tools to use that will directly use the available data can be supplemented by this research, which up to this date is a mere procedural collation of datasets with no impact aside from fulfilling a policy-driven task among LGUs.

**Decision-makers.** The results of this research could inform the decision makers to prioritize programs and projects related to local livelihoods. Local decision-makers and those at the regional and national level will be better informed of the actual local context of small islands that could be a lot different from the cases of other local governments.

Scientific reports cannot impact the local communities and the island ecosystems without the political will and leadership of the decision-makers; thus, this research is a good platform for decision makers to be informed of the small island province context apparent and unique to them alone.

**Local Planners.** Through the results of this research, development planners at the local island provinces and municipalities could enhance their planning and development strategies to better complement the unique needs of islands. Also, methodological approach fitting on the island context can be implemented through this research so as to maximize the use of the research with the goal of better island spatial development. Exact methodologies on dealing with the socio-economic and environmental situations of small islands can be employed using what has been learnt in this research.

Studies on spatial development of small islands are helpful especially for the Philippine Institute of Environmental Planners (PIEP) in pushing towards the development of unique landscapes especially in the case of the Philippines.

# CHAPTER FOUR

*“Islands are havens and breeding grounds for the unique and anomalous. They are natural laboratories of extravagant evolutionary experimentation”*

*-David Quammen*

# 4. THE RESEARCH METHODS

This chapter features the methodological approach used in the study. Based from the different literature and studies discussed in the previous chapter and by integrating all the probable methodologies to come up with a framework to approach the research agenda, this chapter highlights the concepts, theories, frameworks, methods of analysis and data collection strategies as well as some limitations of the methodology.

### 4.1 Research Approach

The research combined several approaches to potentially produce the desired outputs to answer directly the research question. This section delves into the combined approaches done to guarantee that the appropriate methodologies were selected; thus ensures the quality of data gathered falling perfectly to the desired outputs upon analysis.

Also, the selection and harmonizing of these methodologies to arrive to one conclusive approach is discussed in this chapter. Several related studies employing some of these methodologies were also considered thus allowing adjustments in the technicalities further refining the approach to deliver quality outputs.

#### 4.1.1 The Case Study

The study will use a case study approach to effectively create the scenario of the actual planning activities. Case studies provide the understanding of contemporary phenomenon, in-depth and within its real-life context (Yin, 2009) of the exact spatial units under study; thus, in the realm of spatial planning, providing spatial context is significant. Also, since small islands are the theme of this study, the case study approach works as it deals with observing several phenomena of some sort occurring in a bounded context (Miles and Huberman, 1994). In the context of “islandness”, forming the boundaries provides the unique cases of the planning areas and explores its relationship with the larger regional landscape.

Case studies of the small islands in the Philippines form the collective case study type (Crowe, et.al, 2011) providing several in-depth contexts in the attempt to generate better understanding of small islands-mainland spatial interactions and its impacts to landscape planning.

Since studies exploring the linkages of small islands to the regional landscape have diversified, with theoretical inclinations stemming from Geography, Sociology and Ecology, an approach such as case studies, that will explain, describe or explore events or phenomena in which they occur is essential (Yin, 2009).

While spatial planning heavily leans towards providing workable solutions on observed spatial planning phenomena, the usefulness of case studies in providing explanatory and context specific solutions is equally imperative. Case studies with such approach, involve the critical analysis of the Philippine Spatial Planning framework in line with the cases of small islands. Although several variables can be generated to potentially provide a collective understanding of the small island-mainland spatial interaction, still, specific recommendations may be applied into the small island contexts. The value of collective case studies, as such, is that it would compare the existing spatial planning framework in the Philippines and reveal whether it is generally applicable in the unique contexts of small islands. Since local spatial development planning in the Philippines does not perfectly fit

the context of small islands, therefore, results of this research provide a more concrete context to analyze the exact concerns of small island provinces in the Philippines.

### 4.1.2 Mixed Methodology

The research employed mixed methods; thus, maximizing both the advantages of qualitative and quantitative approaches.

Spatial interaction concepts, applied into island-mainland interaction in the grand context of regional landscape planning, needs both the richness of quantitative data and depth of explanatory complexities that can be gained through qualitative approach. Scores and numbers can be integral to explain spatial interaction phenomena. Through the qualitative approach, the deeper and explanatory underpinnings of such numbers can be elaborated clearly, to give a more complete understanding of the story (Creswell, 2007) in the context being studied.

In addition, spatial analysis, with the unique characters of small islands in the context of regional landscape, needs its own approach to effectively deliver its complexity into the scientific arena. Mixed methods also offer several advantages, such as the following: (1) triangulation and corroboration of results, (2) elaboration and clarification of results, (3) development of new methods, (4) discovery of new or contradictory perspectives, and (5) expansion of the scope of inquiry (Bryman, 2006; Greene, Caracelli, & Graham, 1989).

## 4.2 Framework for Analysis

Frameworks are guides to substantially analyze the research in terms of content and procedural arrangements which helps ease the researcher of the tedious activity. Several frameworks are at use in this research to potentially address the research agenda.

### 4.2.1 Theoretical Framework

The Central Place Theory by Walter Christaller (1933) and later by August Lösch (1954), looks at the spatial distribution or arrangement of settlements and its consequent relationships among other settlements. Drawing from this in economic geography, the context of homogeneity and nodal development theory are the most defining factors in the assessment of spatial economic phenomenon (Hall & Hite, 1970). However, for this study, it will be limited to the relationship of one settlement (island) in relation to a larger set of related settlements (mainland/ regional landscape). Eaton & Lipsey found that population, purchasing power of the people and transportation costs are constants in the centrality analysis of services (1982). Thus, these indicators will be recorded and used as bases in the application of the theory. Just like other studies that used the Central Place Theory, the other basic assumptions will be limited as well due to the geographical conditions of the study area and other variables that cannot be held constant. Such classical theory still holds on local settlement analysis for regional planning and has been used with other theories in explaining regional economic phenomena (Hall & Hite, 1970; Wilson, 2000).

Taking its underpinnings in the Central Place, the leading classical spatio-economic theory available, the economic linkages analyzed provided bases for computing the centrality index of settlements in each of the three island landscapes. The centrality index will potentially determine the spatial distribution and relationships of island settlements under study and also the larger regional landscape system where it belongs. The facilities, services and infrastructures, which dictate the economic activities, are the bases for the scoring. Distance

as an intervening factor is treated with the Location Theory of von Thünen applied in the context of islands in relation to the nearest urban center in the regional spatial landscaped.

Economic linkages will further be supported by the flow of commodities being studied as a result of the commodity flow analysis that will be done simultaneously. This is supported by Edward Ullman's Theory on Spatial Interaction.

### 4.2.2 The Conceptual Framework

The analysis of this spatial dynamics between the island province and the larger spatial system will be based on the linkages therein (Figure 4.1). Measures of effective interaction will be based from the socio-cultural, economic and political contexts. The results of the analysis will provide inputs for better regional growth and understanding of probable framework to better manage small islands. Furthermore, integrating the results to the concerns of spatial planning (assures that the concerns of raised from the analysis of the linkages are carefully woven into implementation.

The areas selected for planning are the following: Cagayan Valley, Central Visayas and Northern Mindanao regions. These areas include the small island provinces and the regional landscape where the three small islands belong. After identifying the characteristics, these will be analyzed based on their effects to the other spatial system. The results will be the foundations for understanding the existing linkages of the two spatial systems (island and mainland).

**Island- Mainland Spatial Characterization.** Description of the two spatial units/systems will center on the basic socio-demographic, ecosystem and economic character of the small island cases. The collated descriptions from the 3 factors mentioned will be the bases for the analysis of spatial interaction which is the focus of the study. Profiling these aspects will provide bases for the context of islandness of these spatial systems that embraces the situations faced by small island communities apart from those in the mainland.

Ecosystems profiling, through land cover accounting, is done to provide a rich dataset that assumes for the natural environmental context of the small island cases. Several services are assumed to be eternally provided by these ecosystems to maintain the intact environment and at the same time as raw materials for the livelihoods of the communities in the small islands. Therefore, concrete information about the natural environment must be discussed. Problem analysis using the lens of Ridge-to-reef or ecosystem-based planning will be fundamental to produce a more compelling outcome for the context of small islands.

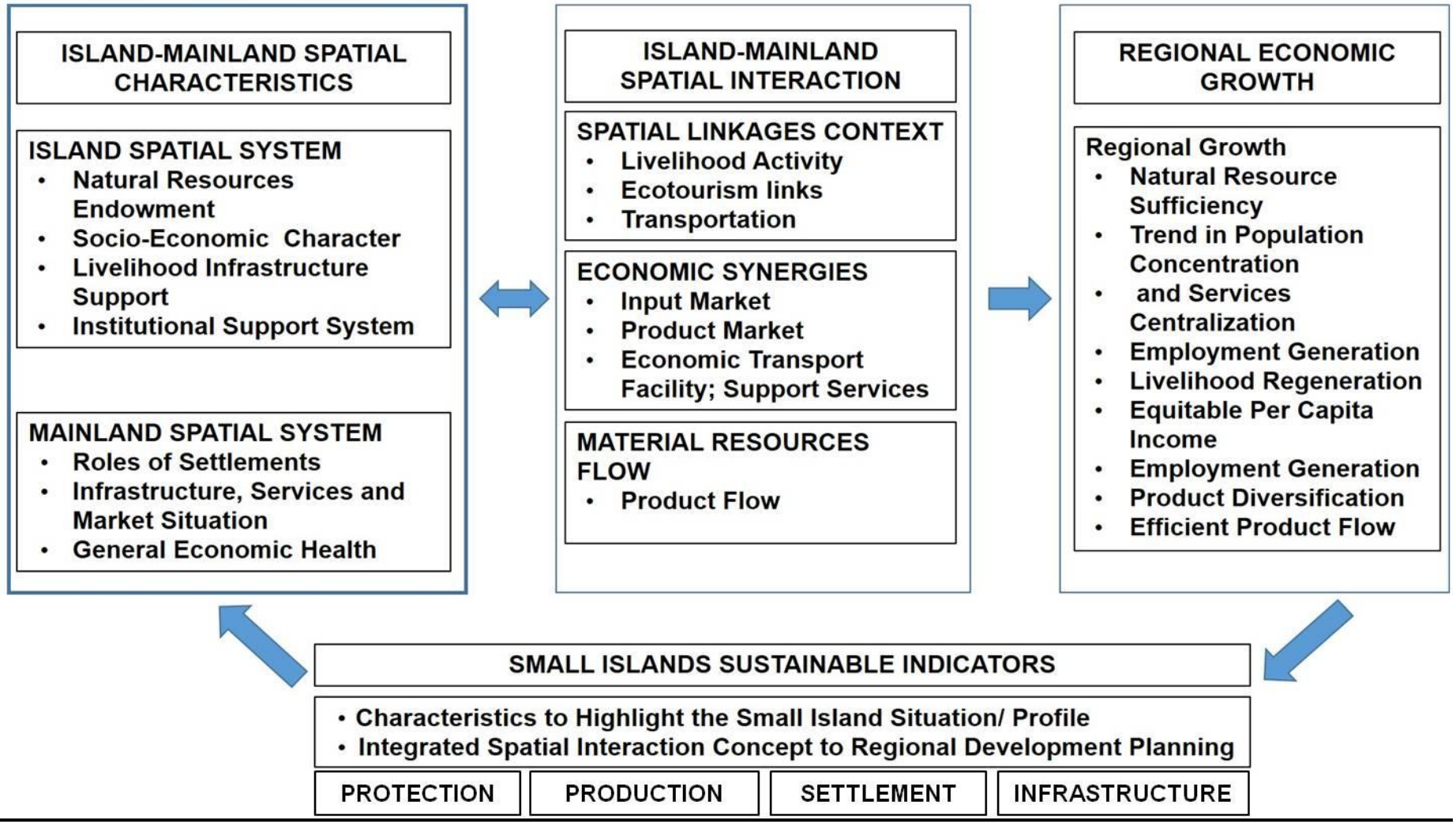



**Figure 4.1. Conceptual Framework for analyzing the Dynamics of the Island and Mainland Spatial Systems.**

The ecosystem analysis of small islands will focus primarily on the existing ecosystems within the island. Ecosystem based approach or the ridge-to-reef (R2R) approach (Figure 4.2) will be essentially followed. With this approach, better understanding of the linkages of the ecosystem will be brought into the main issues as well as providing a more integrated approach to addressing socio-economic problems related to the problems in the natural ecosystems.

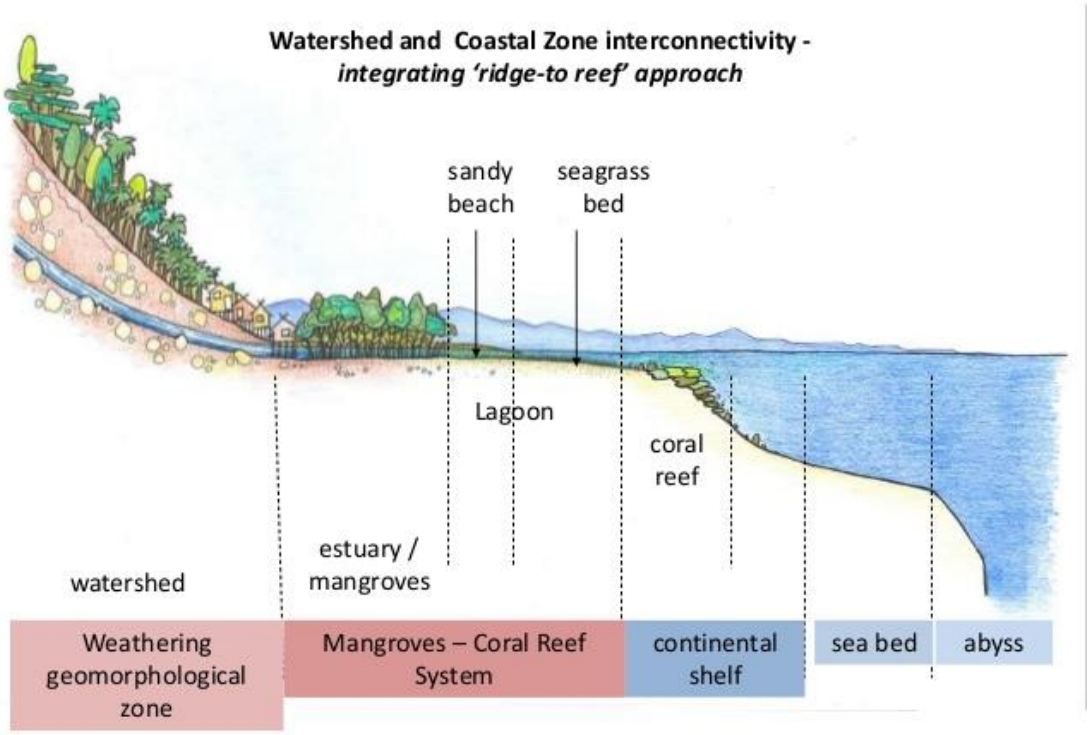



**Figure 4.2 The Ecosystem-based Approach** *(Ruiz, 2015)*

Focusing on the economic context of the case study areas, only those with direct implications from other descriptive sectors will be included in the characterization or profiling. Profiling the economic sector of the small islands is crucial. Inventory of economic support facilities and services will also provide a good characterization of the spatial systems. Due to this, only socio-demographic (to derive the population density) characters that will help for comprehensive discussion of the impacts to the economic character will be included.

The analysis will focus on agriculture and tourism as economic sectors which are very pronounced in small islands. These sectors have direct linkage with the natural small island environment. Agriculture (farming and fishing) is natural input intensive and uses basic natural resources extraction activities and tourism. Being a service type of economic activity, it inevitably relies on the natural environment capital of small islands for the aesthetic values it provides.

The existing role of a spatial unit can be derived from reviewing regional plans. As provided by the result of the scalogram analysis.

**Island-Mainland Spatial Interaction.** Several angles of spatial interaction could be identified such as (1) Socio-cultural Synergies, (2) Political Synergies and Economic

Synergies. In this study, the focus will be the spatial linkages related to economic synergies and material resources outflows (Table 4.1).

Spatial linkages are those aspects related to livelihood context, ecotourism and transportation. These inputs are important in understanding the spatial linkages especially related to islands experiencing physical isolation and situational accessibility issues.

Economic Synergies are linkages that form the economic connection or association of the two interacting spatial systems and consequently their disassociation. The parameters that were explored are: (a) the input market (selected primary raw material goods among the small island cases flowing from the natural environment reflecting the livelihood activities); (b) the product market (those economic goods directly sold and use as source of income, within the island system and the regional economic landscape); (c) the economic transport facilities (the support facilities that facilitates the movement of resources); and (d) Economic support services (the stationary facilities that attract the movement of economic resources due to the processing services it offer). If sustainable interaction of these parameters is weak, not available, dysfunctional, or inefficient, there is a high likelihood of an economic synergy malfunction between the two spatial systems. On the other hand, the economic synergy could be said as good and working if the above mentioned connection among the parameters are existing and functioning well.

To establish the spatial interaction between the spatial units (island-mainland), these economic synergies will be translated into linkages to see the product flow and other possible economic links that can spatially identified. This process, in turn, creates a physical manifestation of the linkages between spatial systems.

**Regional Growth.** The outcomes for analyzing the spatial interaction will directly imply the small island (province) and regional economic growth. Such growth, as emphasized crudely by the following indicators: (a) Natural Resources Sufficiency, underscoring the sustainable use of natural resources base; (b) Trend in Population Concentration and (c) Services Centralization, denoting that economic activities thrive thus facilitating the movement of goods and services; (d) Employment Generation and (e) Livelihood Regeneration, focusing on the spill-over and distribution of the economic advantages in the system; (f) equitable per capita income, this indicator reflects the distribution of income to the people; and (g) product diversification and (h) Efficient product flow are indicators that show the stability of the municipal/ regional market that could support further growth.

Significant as it is, the centrality index derived from these outcomes will provide links the character and types of issues and challenges faced by the island-mainland system. Further integration of these results will directly impact regional growth such concerns will be carefully integrated in the larger spatial planning concerns and regional development planning.

**Table 4.1 Aspects of Spatial Interaction dealt in the Small Island Study.**

| Main aspects* | Potential indicators* | Research Limitations | Final Indicator/s | Research Analysis Tools |
|---|---|---|---|---|
| **Spatial Interaction measured through flows and barriers** | Goods transport flows, Inter-regional migration flows, Barriers to trade flows, Flows of goods, Residential migration flows | Some indicators will be more descriptive and will be dealt as a narrative discussion | Resources Outflows Regional Policy Environment | Materials Flow Analysis |
| **Spatial patterns: Homogeneity, Discontinuities and Multi-scalar Position** | Wealth differential between neighboring regions, Multi-scalar profile and Dynamics of regions (based on GNP per capita) | Limited to the agriculture and tourism aspects as small islands offer these economic activities | Agriculture and tourism data<br>Listing of existing industries | Scalogram Analysis and Centrality Analysis |
| **Spatial cooperation** | National financing of the Inter-regional programs, town and city twinning activities | Regional and provincial plans review on small island development | Regional, provincial and municipal plans | Regional/ Provincial Plan Review |

*Source: Boe, D. – Grasland , C– Healy, A. et.a.,1999

The inputs for regional growth could directly impact regional planning by providing such inputs as recommendations. Enhanced economic linkages, provided as inputs for regional development, will favor regional growth could trigger the larger regional development in the long run. Also, suggestions for proper integration of economic linkages to the larger regional development planning will make the regional plans more reactive of the existing regional situation. Ultimately, this feedback mechanism could steer the sustainable management of small islands.

### 4.2.3 Analytical Framework

The different tools used in the study as summarized in the study approach (Figure 4.3) is discussed in this section. Several tools were combined and used to properly address the research agenda, these analytical tools are identified as aspects used in processing the data gathered as inputs to achieve significant outputs helpful for realizing the research goal. The corresponding outputs from the collected inputs are also expressed in the diagram (Figure 4.3).

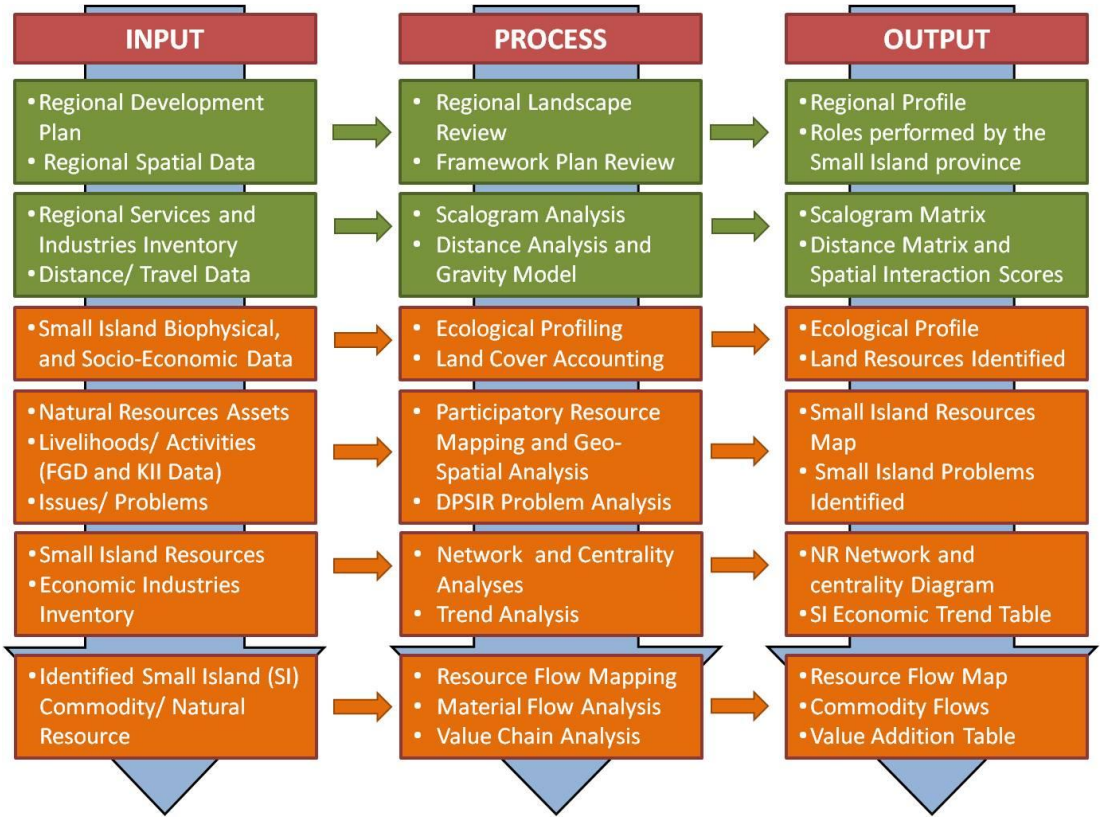



**Figure 4.3 Input-Process-Output Approach used in the Study**

Also, this framework provides the summative procedural approach to arrive to specific outputs relevant to the research objectives. Generally, the framework works with two related processes differentiated in the framework with color coding. The first two rows (Figure 4.3) contextualize the regional landscape where the small islands are located. Through this, better understanding of the general conditions affecting the small islands is perceived. The succeeding rows of the framework tackle the small island profile and analyzing its natural resources endowment as such impact spatial development.

**Regional Landscape Analysis.** These set of planning analysis tools provides the descriptive underpinnings of the regional biophysical, economic and social environment where small islands interact. Through these analysis tools, the character of the surrounding environment

and the distribution of services can be better imagined. Also, through this set of tools, the actual movement of raw material goods coming from small islands are traced and valued providing the general outflow of small island resources at the same time showing the spatial distribution of the resources and the economic values attached to it, which further infers the impacts of small island resources in the regional landscape.

(a) *Regional Landscape Review* includes the textual analysis of the existing biophysical, administrative, economic and socio-cultural environment at the region its impact to small island provinces. This aspect of analysis will provide historical bases for the socio-economic conditions influencing the small island economy and livelihoods. Existing regional development plans are necessary inputs. Also, this analysis may inform the larger natural resources use as it is greatly affected by the surrounding cultural and economic activities in the area. A concise regional profile is an output of this analysis focusing mainly on the regional landscape where small islands operate.

(b) *Framework Plan Review* means the comprehensive review of the existing roles of small islands provinces in relation to the economic regional landscape they belong. Such information from the regional development plans and regional spatial data show the current outlook for small islands, at the same time, the future directions for small island development. The congruencies and differences of the regional policy making bodies take on small islands in terms of its consequent development affecting its general outlook were also compared. Policy reviews supporting these results can also be used as complementary assessment tools in clearly tackling small islands concerns in the regional policy environment. Identifying the spatial roles of small islands in the regional landscape is among the outputs of this review.

    Also, though this review, the policy analysis for the bases of the physical framework planning for the Philippines will also result to how the small islands can be more sustainably managed by suggesting thematic framework alterations favoring the context of small islands. These will be further tackled in chapter 8.

(c) *Scalogram Analysis* shows the presence or absence of a certain service in a spatial unit. These services are indicative in expressing the level of service and economic interaction happening in an area, other studies made use of this planning analysis tool primarily in this context (Filipinas Foundation, Inc, 1079). In addition, this planning technique expresses the attraction of other service institutions and population concentration maximizing its availability. Alternatively, scalogram analysis can also be used to cluster human settlements into functional groups; this has been one of the most used tools in regional development planning in assigning roles of different groups of settlements in the regional economic landscape. Furthermore, this tool is used in this research to link the present economic services, through industry formation, with the kind of ecosystem is thriving in the small island. As such, the tool has utilized relational analysis of the raw material input from the natural environment impacting the economic industries present. As a direct input include a collection of regional services and industry directory for the past five years. This could provide a direct link on how communities use their natural resources and translate such into workable and economically profitable.

    Contrary to the belief that this tool is obsolete and crude, in the research methodology, the outputs that can be gathered using this tool is relevant enough to describe the situation of the economic region through the scalogram matrices. Also, this tool's use and significance lies on the local capacities and information database, which still fits to the developing contexts of small islands.

(d) *Distance Analysis*. This tool tabulates the relative distances of one settlement from the others, for this matter, the relative distance of the small island province to other provinces within the region. As a result, the distance matrix generates a general understanding of the physical distance among settlements that may connote distance concepts related to accessibility, isolation, and ease of movement of goods and services- all important aspects to consider in studying small island context and its sustainability. Distance and travel data are the simple requirements for this analysis.

Although crudely, this tool may also inform about the distance factor in terms of the strength of networks or relationships among settlements under study, the gravity model for spatial interaction, as a complementary tool will provide scores for the strength of interaction among between settlements. Through this tool, quantitative measures can be derived complemented by qualitative explanations (aspects of natural environmental, institutional, infrastructure, political and socio-economic constraints) on the context wherein which small islands operate. These scores provide a comprehensive understanding of the distance dynamics among settlements, especially the underlying connections or isolation faced by small islands. The gravity model follows a simple notation (Kincses and Toth, 2014).

$$D_{ij} = g\left(W_i \times W_j \middle| d_{ij}^2\right)$$

The formula stands for the demographic force ($D_{ij}$) or the attraction force between two objects, for this case, between two human settlements. The weight factor (W) assumes the population of two human settlements divided by the square of the distance ($d_{ij}$) between the settlements.

Gravity model has been used in many other aspect of spatial interaction especially in physical geography and economic geography (Puu, 2003; Kincses and Toth, 2014; Chen and Huang, n.d; and Arkolakis, 2017), however, the classical gravity model provide enough insights to highlight the notion of small island interaction/ isolation.

**Small Island Province Analysis.** In the comprehensive analysis of small island cases, some relevant tools in Philippine Spatial Planning System is used with the addition of some other planning tools to provide analysis that will emphasize the context of small islands. In Figure 4.3, the tools pertaining to the analysis of small islands are those included in the first three sets of input-process-output diagram. Due analysis for small islands provide bases for its unique concerns, especially related to environment and local economic activity (livelihoods) continuum.

(a) *Ecological profiling* is a basic undertaking in any spatial planning activity. In this research, the ecological profiles of the small island provinces will be used to highlight the "islandness" or isola effect uniquely experienced in small islands. Through this, establishing the context of small islands as special planning unit could materialize.

Although ecological profiling follows a stepwise procedure using a set of planning tools, still the methodology allows flexibility in using other equally relevant tools to specifically match the actual scenario that needs to be considered. For this reason, the ecological profiling applied in this research could be formalized to complement the desired outcomes needed for highlighting the concerns of small islands in the context of spatial planning. Similar datasets were used in the ecological profiling including socio-

demographic and economic data, natural and physical environment datasets, and infrastructure and institutional mechanisms to name a few as salient inputs.

In support to this, the land use policy and review body for every local government in the Philippines do not necessarily limit the LGUs in providing the information allowed as input to local planning unit's profile. Thus, this notion could be supportive for addressing the specific needs of small islands as a unique spatial planning unit. This process eventually results to the creation of a small island province profile.

(b) In land use planning, *land cover accounting* is an important step to provide the actual areas of land suitable for development and management purposes. For this research, land use/cover accounting will be used to further analyze the relationship between the potentials of apparent ecosystem within the land cover and livelihood activities in the small islands. The listing of resources found in these ecosystems accounted through land area measurements could accrue to the resources benefits and potential values. All these datasets will be provided by the local environment and natural resources office through their natural and biophysical datasets. Although a crude measure, still, the ecosystem value, in terms of the resources can be compared to the actual outflow of resources distributed, in monetary terms to the islands.

Such accounts (land resources identified) will provide an appreciation of the actual benefits the local community gathers from the ecosystems through land cover/use accounting. Also, this step in the methodology will provide concrete bases on how small island ecosystems contribute significantly in the region in terms of the actual resource outflows in the regional material flow analysis.

Finally, it would be a strategic action in terms of Small Island planning to determine which particular ecosystems should be protected or prioritized for consequent management and planning.

(c) Community participation is integral in this research as locals practically know more about their local situations and resources; thus, *participatory resource mapping* was used to emphasize data collection from the locals. Also, this tool validated and updated the existing/ documented resources profile managed by the local authorities through the natural resources assets being provided by the locals. Combined with the already existing community resources through the local government profiles, this exhaustive procedure resulted to small island resources maps that were harmonized through computer-based mapping activity. Ultimately, a very apparent output is the small islands problems being identified along the process of KIIs and FDGs.

Following closely to participatory mapping is the *geospatial analysis*, through computer-based mapping activities. Simple geospatial analysis was done to support and concretize the concepts employed in participatory mapping. With this geospatial processing tools (*e.g.* proximity analysis, buffer analysis, etc) and other basic spatial plotting and mapping tools, through the geographic information system (GIS), consolidated and spatially relevant maps were made.

(d) Driver-Pressure-State-Impact-Response (DPSIR) is an approach showing the causal framework for describing the interactions between society and the environment (EEA, 2006). Although this tool has its disadvantages, especially in relation to quantitative analysis, still, it was able to reveal the relational and qualitative linkages of the problems felt in the socio-economic environment and the natural ecosystem. This created a holistic

picture of the case-based situations faced by small islands. The identified small islands problems as an output of the previous process provide the richness of data that will be generated using this framework. The diagram (Figure 4.4) shows the general approach for the DPSIR as used by Smeets and Weterings (1999).

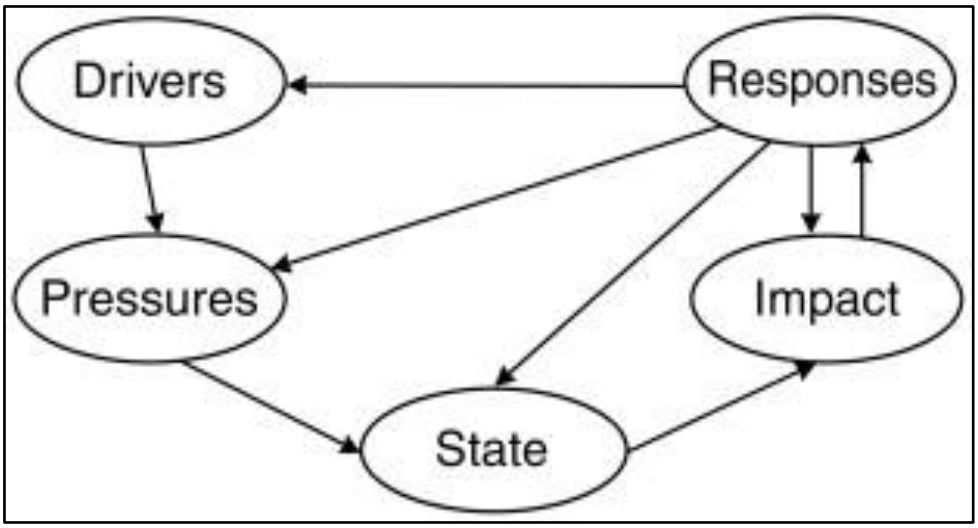



**Figure 4.4 DPSIR Framework** *(Smeets and Weterings, 1999)*

Also, this approach can potentially create the picture of how small islands should be considered given the multifaceted and complex interrelations of problematic issues present in small islands. This is also revealed by University of Siena (2011) wherein the DPSIR framework is used in several studies to represent the conceptual procedures for understanding, modelling and managing the decision issues associated with water resource management. This has been found useful especially for planners and decision makers, and policy makers, alike, as DPSIR approach allows the easier understanding of environmental problems (Maxim, Spangenberg, & O'Connor, 2009).

(e) *Network and Centrality Analyses.* Used complimentarily, these two analytical tools could provide the relative importance of natural resources assets within the small islands. Through this, identification of common and abundant resources in the island can be achieved. Also, implicitly, it could infer which resources are unique and critical for conservation and management, thus having a big impact in the ecosystem in which they belong and ultimately underscoring the stability of the whole small island ecosystem stability. Network analysis is commonly used in social research to provide a broader understanding of the relationships knitted among a concerned group. As such, the varying concepts of relationships, positive or negative, are identified. In this case, Network analysis will be used to show the direct relationship of natural resources as assets of small islands and their relationships highlighting the systems perspective applied in ecosystem analysis. The relationships among these identified natural assets provide the context of resources impacting significantly to the small island stability by affecting other assets as consumption as a measure of use is taken into consideration. As a result of this analysis a natural resources (NR) network diagram is achieved.

*Centrality Analysis*, on the other hand, has traditionally been used to compute for the existing services that human settlements offer in relation to other settlements. This is in parallel with the central place theory of Walter Chrystaller. For this purpose, centrality analysis was used to define the existing services (inventory of economic industries) offered in small islands local communities. Through this, the major settlements offering the type of services sought in the small island provinces were identified and to potentially be informed for better enforcement of development planning for better island management. Furthermore, this tool will result to a Centrality Index, a benchmarking

measure of the centrality or concentration of economic services or activities in relation to other services provided by nearby settlement/s. This index, as an output, formed the bases for considering the functional role being portrayed by the settlements involved. In another light, centrality analysis (Baxter, Hastings, Law, & Glass, 2008), establishes the relationship of basic ecosystem goods to the existing local industries since linking these factors provided bases on the direct association of resources use in small islands and their livelihood and economic bases. This could show how the small island ecosystems sustain the continuous survival of the communities living in small islands.

(f) Simple graphical method to provide for the *trend analysis* was also applied to interpret the extent of use and dependence of the small island communities to certain services/ industries present. Through this, the general trend and future resources use can be projected. Careful analysis of the apparent trends in the industries present in the small island province may also reveal future resources use in terms of future demand-supply balancing with the information on the growth needs of the existing population in the small islands. The trend analysis used a five-year dataset for various existing local industries occupying much of the local economic and resources extraction activities happening within the small islands. Inferences on the future services could be highlighted through the trend and developments of resources use within the small islands and the created demand on the local and regional scale.

(g) *Resource Flow Mapping*, this tool will analyze the pathway or movement of the basic commodity under study. With the help of this tool, the clear identification of the direction and flow of resources was traced from one point to another. The use of a participatory mapping to spatially locate and trace the flow of economic resources was also used to derive and validate the exact movement of such resources in the region. The material flow analysis was used to map the actual goods and subjected them into consequent analysis. Representative resources (agricultural commodities), those abundant, critical and have huge impacts in the economic activities of the small island province were used to assume to the direct link of resource use to economic activities controlling the small island. As a result, a resources flow map is generated showing the direction of the resources moving along the regional economic environment.

(h) *Materials Flow Analysis (MFA)* is the quantification and assessment of matter and substances mass flows and processes, in a system during a defined period (Yiougo and Spuhler, 2018). A standard MFA gives an overview of the current, or even historical, material status in a country (or economy). But in order to approach issues like sustainable development, there is also a need to analyze possible future developments of material flows. This is especially true when analyzing how different policies (environmental and others) may affect the material flows in a society (Ibenholt, 2002).

Similarly, the datasets (representative natural resources) that were used in the commodity flows and resources mapping will be subjected to material flows. Taking the commodity as a unit of analysis, the materials flow analysis could provide a more detailed result on how natural and agricultural resources are being produced, moved and transformed in within and outside the small island provinces.

There is a number of material flows used in several researches, Table 4.2 summarizes these types of material flows. For this research, Material flows will be focusing on type II (b) material flows.

**Table 4.2 Types of Material Flow Analysis**

<table>
<tr><th>Type of analysis</th><th colspan="3">Objects of Analysis</th></tr>
<tr><td rowspan="3">I</td><td colspan="3">Specific environmental problems related to certain impacts per unit flow of:</td></tr>
<tr><td>a</td><td>b</td><td>C</td></tr>
<tr><td>Substances<br>(e.g. Cd, Cl, Pb, Zn, Hg, N, P, C, CO2, CFC)</td><td>Materials<br>(e.g. wooden products, energy carriers, excavation, biomass, plastics)</td><td>Products<br>(e.g. diapers, batteries, cars)</td></tr>
<tr><td colspan="3">within certain firms, sectors, regions</td></tr>
<tr><td rowspan="3">II</td><td colspan="3">Problems of environmental concern related to the throughput of:</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Firms<br>(e.g. single plants, medium and large companies)</td><td>Sectors<br>(e.g. production sectors, chemical industry, construction)</td><td>Regions<br>(e.g. total or main throughput, mass flow balance, total material Requirement)</td></tr>
<tr><td colspan="3">associated with substances, materials, products</td></tr>
</table>

*Source: Adapted from Bringezu and Kleijn (1997).*

This type of material flows is devoted to certain industrial sectors or fields of activity such as the agricultural sector where much of the raw material resources of small island cases flows outward the small island to the regional economic landscape. Focusing in the sector of agriculture and choosing some of the resources found in the small islands flowing through the region will be the limitations of the research. However, these resources are considered as primary making the resources flow very critical in underscoring the notion of sustainability.

(i) *Value-Chain Analysis (VCA)*, an analytical tool that will assess the monetary flow of the commodity or service being considered. This tool allowed the proper analysis (sharing, distribution, value addition) of selected materials (commodity) flowing from the small islands to the economic regions. The values for each of the commodity units were then used to analyze the material outflows in terms of its monetary value. This tool further showed the values of the resources moving throughout the system. It provided assumptions on how small islands contribute in the larger regional economy and their consequent benefits from such interaction. Furthermore, the results filled in the gap in terms of the economic condition in the small islands and also their context of resources use and poverty.

Value chain tables showing all the monetary value addition for each of the commodities (representative natural and agricultural resources) are generated through this analysis (Appendix C).

### 4.3 Methods of Data Collection

This section tackles the data collection approaches done in the research. Setting the limitations for the research is one aspect but selecting the right dataset in another equally important aspect. Carefully laid data collection methods from site selection to the actual means to gather data are specified below.

### 4.3.1 Study Sites Selection

The selection of small island cases has been based from the reviewed characters of the small islands as defined in the previous chapter. However, the greater focus of the small islands here is those pertaining directly to small island geographies having the local population governed independently and has its local autonomy. Through this assumption, small island provinces are relevant and robust cases possible to accrue to the needs of the research perfectly aligning to the context of the Philippine archipelagic setting.

The archipelagic landscape of the Philippines points one of the basic reasons why island studies are relevant in the Asia-Pacific region. The selection of small islands was drawn from several assumptions to limit the aspects to be considered in the study. Small islands have been defined comprehensively in a study of Wong, *et.al (2009).* The definition spans from the indicators such as size, population and relative distance to another island resulting to the "Isola effect" or islandness. Given such conditions, out of the 81 provinces in the Philippines, only 16 are considered island provinces. Then the defining measure of island size, location, population size, and poverty incidence are the succeeding factors used to refine the selection into three representative island landscapes. Below is a table showing the selection process and indicators used (Table 4.3).

The location as an indicator suggests that each island groups within the Philippine archipelago must have one representative. Hence, a small island province must represent the island group of Luzon, Visayas and Mindanao. The size of population and the physical size of small island province, as defining factors were also ranked so as to arrive to the selected small island provinces (Table 4.3). Although the UNESCO Man and Biosphere program defined "Small Islands" as having a land area of 10,000 $km^2$ or less with a population of 500,000 or less (Hess, 1990). This crude definition might subject all the small island provinces in the Philippines as small, except for the case of Palawan island. With this, the selection of the small islands was based on which has the smallest comparable land areas in which the provinces of Batanes, Camiguin and Siquijor rank as the top three smallest island provinces. Consequently, similar observations were gathered as these three island provinces have the least number of residential populations (Table 4.3).

Provided that the location, land area and population size of the three island provinces in the Philippines, it can be safe to assume that these selection criteria were able to provide the context for the cases in this study. As Batanes, Siquijor and Camiguin small island provinces ranked first ($1^{st}$) among the small island provinces in the selection process (Table 4.3), the special context of biodiversity and poverty as intervening factors were also considered.

**Table 4.3 Selection Criteria for the three Representative Small Island Provinces in the Philippines**

| Location | Province | Land Area ($km^2$) | Number of Municipalities/ Citites | Population | | | | | | Poverty Incidence | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1990 | 1995 | 2000 | 2007 | 2010 | 2015 | | |
| Luzon | Batanes | 230 | 6 | 15,026 | 14,180 | 16,467 | 15,974 | 16,604 | 17,246 | 0.00 | **1st** |
| | Catanduanes | 1,492.16 | 11 | 187,000 | 202,464 | 215,356 | 232,757 | 246,300 | 260,964 | 16.9 | 3rd |
| | Marinduque | 952.58 | 6 | 185,524 | 199,910 | 217,392 | 229,636 | 227,828 | 234,521 | 2.80 | 2nd |
| | Masbate | 4,138.56 | 20/1 | 599,355 | 653,852 | 707,668 | 768,939 | 834,650 | 892,393 | 14.8 | 5th |
| | Palawan[1] | 14,649.73 | 23 | 528,287 | 510,909 | 593,500 | 682,152 | 771,667 | 849,469 | 3.50 | 6th |
| | Romblon | 1,533.45 | 17 | 227,621 | 244,654 | 264,357 | 279,774 | 283,930 | 292,781 | 8.50 | 4th |
| Visayas | Biliran | 536.01 | 8 | 118,012 | 132,209 | 140,274 | 150,031 | 161,760 | 171,612 | 8.10 | 2nd |
| | Bohol | 4,772.52 | 47/1 | 948,403 | 994,440 | 1,139,130 | 1,230,110 | 1,255,128 | 1,313,560 | 9.60 | 4th |
| | Cebu[2] | 4,943.72 | 44/6 | 1,709,621 | 1,890,357 | 2,160,569 | 2,440,120 | 2,619,362 | 2,938,982 | 8.00 | 5th |
| | Guimaras | 611.87 | 5 | 117,990 | 126,470 | 141,450 | 151,238 | 162,943 | 174,613 | 0.00 | 3rd |
| | Siquijor | 318.13 | 6 | 73,932 | 73,756 | 81,598 | 87,695 | 91,066 | 95,984 | 20.50 | **1st** |
| Mindanao | Basilan[3] | 3,453.42 | 2/11 | 179,230 | 227,008 | 259,796 | 408,520 | 293,322 | 346,579 | 7.20 | 3rd |
| | Camiguin | 238.63 | 5 | 64,247 | 68,039 | 74,232 | 81,293 | 83,807 | 88,478 | 10.9 | **1st** |
| | Dinagat Islands | 817.47 | 7 | 98,865 | 100,537 | 106,951 | 120,813 | 126,803 | 127,152 | --- | 2nd |
| | Sulu | 4,547.16 | 19 | 469,971 | 536,201 | 619,668 | 849,670 | 718,290 | 824,731 | 7.40 | 5th |
| | Tawi-Tawi | 3,626.55 | 11 | 228,204 | 250,718 | 322,317 | 450,346 | 366,550 | 390,715 | 0.00 | 4th |

[1] Excluding the Independent City of Puerto Princesa
[2] Excluding the Independent Cities of Cebu, Lapu-Lapu, and Mandaue
[3] Excluding the City of Isabela

Given the geographic peculiarity of the Philippines, and such representative small island provinces came from three major island groupings in the country, the aspect of biodiversity and poverty added critical layers to the analysis. These island groupings are primarily dictated by the population character and geographic location of small islands. The three island groups in the Philippines are the Luzon Islands Group, Visayas Islands Group and Mindanao Islands Group, which are located in the north, central and south of the Philippine archipelago, respectively (Figure 4.5) also connote diversity in terms of ecosystem function and services provision. It is as characteristically unique, like that of the special case of Palawan group of islands, having its geologic features diverging from the origins of the Philippine island groups.

The comprehensive discussion of the biodiversity and ecosystem assessment of the selected small island provinces is tackled in the latter part of the results chapter. Philippines is among the mega diverse countries in the world, owing to its Indo-Malay biogeographic regional classification (Uvardy, 1975). It is known to be the planet's most diverse shallow marine area (UNEP, 2004) and is considered as the center of marine biodiversity in the world (WWF, 2009).

Adding to this set of criteria is poverty incidence. The context of the selected three island province cases also forms a good comparative analytical case with Batanes having a very low incidence of poverty report, Camiguin lying in the middle and Siquijor having a high score. (Table 4.3). Interestingly, this context can be a comparative aspect in terms of the actual cases as to how poverty is approached in terms of the sustainability concepts integrated in small islands planning and development. Livelihood context and its regional administrative environment can be factors influencing the poverty context of the selected small islands; nonetheless, the comprehensive analysis for poverty conditions among these small island provinces is discussed in the results chapter.

As already mentioned, another aspect that could be interesting to look at in the selection of these three small island cases is the livelihood context of the island provinces. As agriculture has continuously been the backbone of Philippine economy and tourism as a service-oriented economy is flourishing in the recent decade, so as for the cases of small island provinces. These economic sectors are the driving forces for the economic and livelihood activities controlling the resources use within the small island.

The selected small island provinces of Batanes, Camiguin and Siquijor, therefore share similar characteristics owing to the selection criteria used in the study. Representation of the Philippine archipelagic case in terms of the population character, socio-cultural and economic aspects can also be reflected through additional defining criteria of the small islands used as cases for the study.

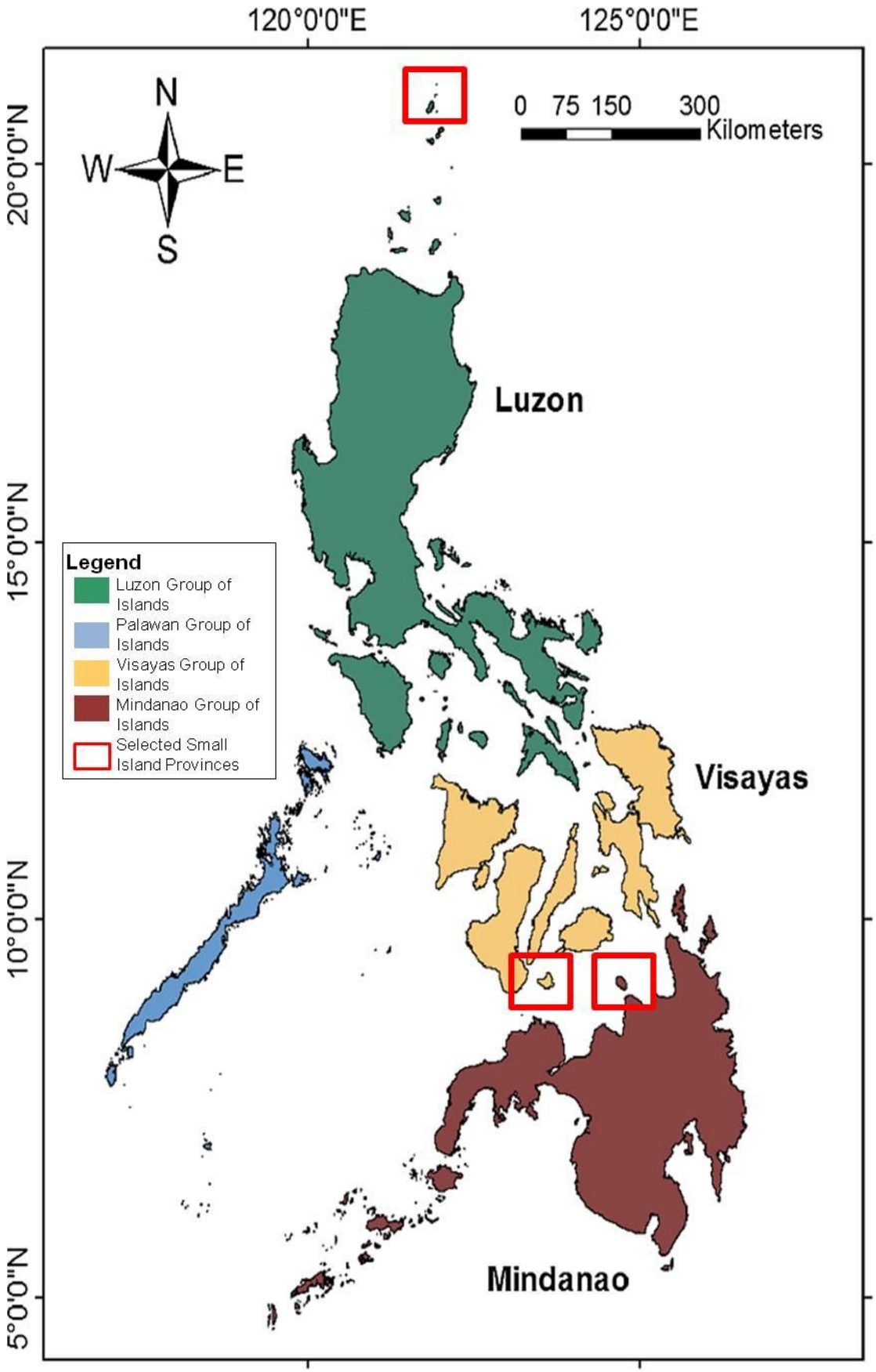



**Figure 4.5 The Philippine Archipelago and the Selected Small Island Provinces**

### 4.3.2 Data Gathering

Small islands studies require an in-depth analysis and a variety of methods to attain the desired outputs needed to address the research questions. Here, primary and secondary data gathering tools were used. Key to the data gathering tools is the principle of maximum community participation and use of readily available data to provide an understanding for the island communities and authorities of their ownership of the data. This creates a sense of empowerment and importance in the same dataset that they maintain and work for.

As participation is highly encouraged, partnerships with the local governments were done to assure that representation of the island community members and local authorities.

The correctness and relevance of datasets gathered were triangulated with actual published reports certified at the regional and national offices. Also, backing up from the local authorities through actual validation and interviews were done.

**Primary Data Gathering.** The study areas used the expertise and experience of the people. Through the local island communities' knowledge of their own area, salient information were gathered through Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), Experts Interviews and participatory resource mapping (Annex A). Targeted groups were also asked to provide better contexts of the theme being analyzed.

(a) Focus Group Discussions (FGDs) were done to gather information from specific groups critical for this study. Among the groups included local island community members, fisher folks, farmers, the coast guards (*Bantay Dagat)*, the tourism officials, environment officers, and tourist guides. Discussions centered on the customs and knowledge of the different groups on the basic economic resources they have, as well as its uses and its movement across settlements. Also, problems, issues and concerns regarding these economic resources were discussed in terms of the communities' daily survival cycles.

Through FGDs, information on the importance of the actual livelihood resources, its impacts to the local communities and the challenges faced in relation to the use of these resources were sufficiently delivered. The actual guide questions used for the FGDs are in Annex A.

(b) The Key Informant Interviews (KIIs) were employed to gather data and validate information from written documents. Among the key informants are the local planning and development officers, Local Fisheries Officers, Local Tourism Officers, Local community leaders, and local policy makers. As sources, their extensive knowledge and experience in the field are the benchmark for the interview.

Also, through key informants, some political and larger economic issues and concerns often not highlighted in the local community discussions were also revealed. This information enriched and provided a more robust understanding of the context of the challenges faced along the themes discussed in relation to the study.

(c) Experts Interviews, on the other hand, were useful in providing deeper understanding of the challenges faced by small island communities. Local experts on the ecosystems management, community dynamics, tourism reception, fisheries, agriculture, etc. were interviewed. Also, at the regional level, the regional policy framework advisers and planners were asked on their expert analysis and understanding of the situation that exists in the island context. This provided the triangulation aspect that further validated the data gathered from the local communities, local officials and secondary data. Significantly, as these experts tackle the local knowledge and experience, the information that they provided further enriched the existing datasets and explained further the experience of the local community members in

the context wherein the small island works. With this, the academe and some local field researchers were asked on the interpretation and validation of the data gathered. Expert opinion on matters of economic linkages and the tools to be employed were sought. Researchers working on the same area also provided relevant inputs on the larger context of the resources, especially the coastal –marine resources.

(d) Participatory Mapping served as a tool to gather first-hand information from the people on the resources and its flows or movement within the island system and the larger spatial system. The results were mapped-out and translated into digital format using the Geographic information System (GIS).

The participation from representatives of the local community, fisher folks, farmers, local agriculture officer, local planning and development officer, local tourism office among others were critical as this pool of participants provided the salient information on the resources of small islands.

All the above-mentioned participants and selected tools used in primary data gathering ultimately provided the necessary information to effectively analyze the island context and the resources flow in the spatial systems (island and the mainland counterpart). Much of the processed data are discussed in the results including the large volume of datasets found in the addendum (Appendices and Annexes).

**Secondary Data Gathering.** Several documents, reports, records and plans were considered as relevant sources of information in this study. Such documents provided bases for the analysis and interpretation of results since it gave factual spatial-temporal information important in the study. The secondary data gathered and its sources are summarized in Table 4.4.

The information gathered from three cases were organized and summarized in Table 4.4, the information includes the type of data and the possible sources for such information. All these datasets were reviewed and formed bases in validating the problems, issues and concerns of the island cases. Also, by reviewing all these documents, specific contextual small island experiences relevant to the study were asked and clarified in the expert interviews.

Another aspect sought in the secondary data gathered is the timeframe of the actual dataset available. Since the data gathering lasted for two years, in the whole three small island province cases, harmonizing these datasets to come up into generalizable information for small islands were necessary.

Differences in the computed values of land area, employment, income, etc. were some concerns from the datasets. The local offices which provided the datasets validated these discrepancies and clarified the actual values written. Discrepancies are also seen from the reports obtained from the local offices, regional and national data. Here, the researcher opted to use the published national dataset and were then echoed to the local officials for information purposes. Other datasets require specific timeframe, therefore, reports and relevant datasets with a five-year range were collected to provide proper analysis and to reveal trends to effectively characterize the small island cases.

**Table 4.4 Secondary Data and their Sources**

| Source(s) of Data | Secondary Data Gathered |
|---|---|
| **Local Agriculture Office** | Municipal Agriculture Production Report<br>Municipal Fishery Production Report<br>Inventory of Fishery Infrastructure/Services/Facilities<br>Provincial Commodity Investment Plan |
| **Bureau of Fisheries and Aquatic Resources** | Fishery Production Data<br>Inventory of Fishery Infrastructure/Services/Facilities<br>Profile of coastal Resources and communities |
| **Local Environment Offices** | Physical Environment Profile<br>Protected Areas Management Plan<br>Map and natural resources report<br>Key Biodiversity Areas Report<br>Coastal Resources Management Plan |
| **Local Tourism Office** | Tourism Annual Report<br>Tourism Master Plan<br>List of Tour Operations<br>Tourist Arrival Data<br>Inventory of Tourism Infrastructure/Services/Facilities |
| **Local Planning and Development Office** | Comprehensive Land Use Plans (CLUPs) / Comprehensive Development Plan (CDP) / Ecological Profile (EP)<br>Community Based Monitoring System (CBMS) |
| **Local Licensing Office** | List of registered businesses and economic activities |
| **Regional Spatial Development Offices** | National Spatial Strategy<br>Regional Physical Framework Plans (RPFP)<br>Regional Development Plans (RDP) |
| **Local Treasury Office** | Tourism/ agriculture related Income distribution<br>Local government income and expenditure |

Given all the voluminous datasets gathered, streamlining and culling out those necessary were also done. Further processing of datasets to fit in the actual needs for the study was carefully done to provide unaltered datasets to ensure the right results upon data reprocessing.

Validation and consequent confirmation from the local officials and academicians were deemed necessary to assure that the data and other outputs produced were just and were processed correctly. Participatory maps, for instance, were revalidated with the actual existing resource datasets and actual field visits (ground truthing) to assure the relevance and accuracy of the data inputs.

All these tedious data collection strategies were done to assure that the information in the research were correct, updated and conformed to legal and ethical issues.

# CHAPTER FIVE

*“We are like islands in the sea, separate on the surface but connected in the deep”*

*-William James*

# 5. THE PHILIPPINE SMALL ISLANDS PROFILE

An archipelago with 7,641 islands, the Philippines is, among others, considered as a mega diverse country ranging from natural and ecological wonders down to the socio-cultural richness. It is no wonder why it is known as the Pearl of the Orient seas. However, with such resources comes also the challenges, as the nation is among the most hazard prone countries, given its location and geography in the Pacific - where typhoons, earthquakes and volcanic activities usually occur. No wonder why the Philippines still sits as among the most vulnerable and risk prone countries in the world.

This chapter presents the profile of Philippine island provinces. Looking closely at their characteristics, uniqueness and similarities that can be drawn as to link with the notion of "islandness" (isola effect) that further describes the vulnerabilities of small islands in the world as situation as a lone country (SIDS) or as a part of a larger spatial landscape (small islands in archipelagic countries). Also, this chapter addresses spatial planning status quo to firm up the discussion on the first of the two-pronged research areas in this study. The small island character relevant to the regional landscape where they interact with and their role assignments in complementing the regional development are discussed here.

## 5.1 Overarching Policy Environment for Small Island Province Development in the Philippines

Socioeconomic development has always been the primary goal of every state. The Philippines, an archipelagic state, follows the idea of the central government taking charge if its vast resources and population to achieve development. However, such central-periphery concept did not fully realize this initiative until the early 1990s where the devolution of government power has been passed on to local government units. It was soon enough that the Local Government Code (LGC) of 1991 was passed into law empowering the local governments, including small island provinces, to direct their own development path.

The LGC of 1991 provided two distinct powers to the local governments- as a political entity and as a corporate body. As a political entity, the local governments, acts as a distinct body representing the national government and all its power. All central agencies at the national level were devolved at the local levels as well as the policy translations. Services provision, as well, is directed towards the local government population, stemming from the mandates at the national level. As a corporate body, the LGUs, including the small island provinces, are tasked to manage their own resources for their own development. Such power enables the LGUs to tap its resources at ease for the local needs transcending the social, economic and environment sphere.

This landmark legislation provided so much powers to the LGUs, still, some were not capacitated enough to serve its own development path resulting to further mismanagement (Legaspi, n.d). Although the LGC of 1991 details all means of implementation powers through plans and supporting policies, local development problems persists. Among the LGU requirements in updating its desired development path includes the creation of Comprehensive Development Plan (CDP), which handles the sectoral (social, economic, environmental, infrastructure, institutional) development perspectives of the local government. This plan, however, lacks the spatial dimension and is not well coordinated with the national physical framework plan leading to the creation of a complementary plan, the comprehensive land use plan (CLUP). Several local offices are created to provide information and bases for

planning at the LGU level that also directly coordinates with their provincial, regional and national counterparts (Table 5.1). Here direct information can be gathered and accounted at the local level. The national level agencies, provide general policy to be able to consolidate similar datasets that will be representative of the different spatial level.

**Table 5.1 National and Local Agencies involved in Spatial Planning in the Philippines**

| Development Sector | National Agency | Local Agency |
|---|---|---|
| **Social** | Department of Health | Provincial/Municipal Health Office |
| | Department of Social work and Development | Provincial/Municipal Social Work and Development Office |
| | Department of Education | District/ Division of Education Office |
| | Philippine Statistical Authority | Population Office |
| **Economic** | Department of Agriculture | Provincial/Municipal Agriculture Office |
| | Department of Trade and Industry | Provincial Trade and Industry Office |
| | Department of Tourism | Provincial/Municipal Tourism Office |
| **Environment** | Department of Environment and Natural Resources | Provincial/Municipal Environment Office |
| **Infrastructure** | Department of Transportation | Provincial/Municipal Engineering Office |
| | National Disaster Risk Reduction and Management Council | Provincial/Municipal Disaster Risk Reduction and Management Office |
| | Department of Information, Communications Technology | Provincial/Municipal Engineering Office |
| **Institutional/ Spatial Planning** | National Economic Development Authority | Provincial/Municipal Planning and Development Office |

Through the comprehensive land use plan, all the project and development coordination at the local government level has been well equipped with the spatial dimension, bringing forth a more targetted and specific development agenda transcending socioeconomic and environmental spheres. Since the CLUP came as an afterthought, only an executive order from the republic of the Philippines in 1993 (EO 72) mandates every local government, including small island municipalities and provinces, to enact their own land use plan wherein all development undertakings will be held accountable which will include the projects emphasized in the CDP and will be backed up by the locally initiated policy measure- the zoning ordinance (ZO) and funded at the local government through the executive legislative agenda (ELA) and its annual investment program (AIP).

Futhermore, the CLUP usually consists of a 10 year planning period, making it very relevant for long range planning activity. The CDP, as a more sectoral development strategy fills up the CLUP making the CLUP an all-inclusive and exhaustive local development planning activity of every local government. As a measure to link the local spatial development plans (municipal or city) to the regional and national plans, the provincial development and physical framework plan (PDPFP) connects the local development goals to the regional and national spatial developments (Figure 5.1).

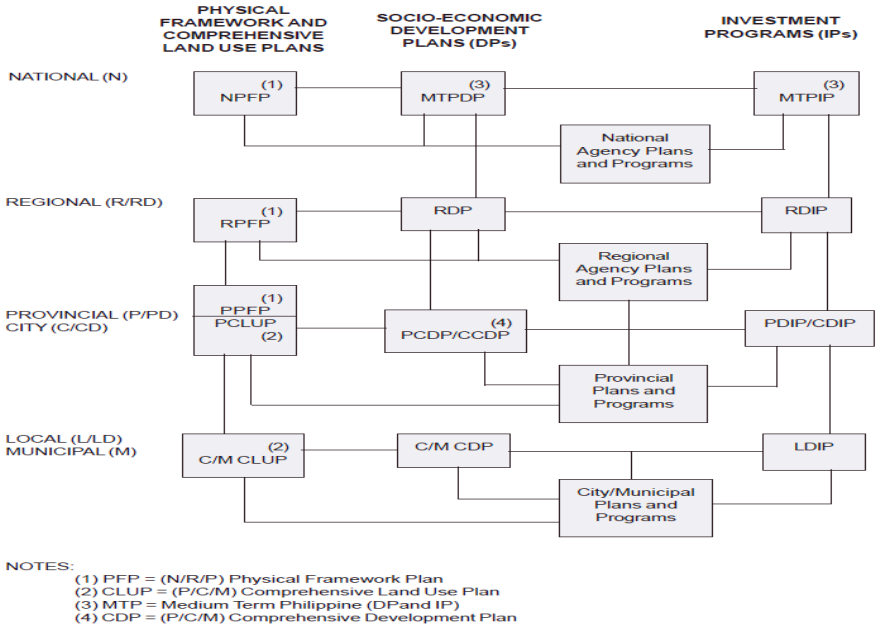



**Figure 5.1 Vertical and Horizontal Linkages of Development Plans in the Philippines (Serote, 2008)**

Such interlinkages of development perspectives transcends through the social, economic, environmental and infrastructural and institutional sectors making the ideal scenario of vertical coordination from the local to the national agenda. Administration follows the same ruling, however, the regional level only provides an oversight mandate and still the local governments (provincial and municipal levels) have the implementation powers as per the LGC of 1991.

The regional administrative environment shows the organizational and political relations along the region where small island provinces work. Nevertheless, small island provinces, through its government, allows for the enforcement of these policies and plans for its self development.

### 5.2 The Regional Landscape Overview for the Selected Small Islands in the Philippines

Following closely to the Philippine Islands stories from the previous discussion, this chapter presents the larger environment where small islands work. The archipelagic landscape of the Philippines points that small islands form part of a cluster of other small islands or combined with a large mass of island (mainland) where significant interaction occurs.

Understanding the larger context where small island provinces operate provides a background that will explain the different characteristics observed within the small islands. Such understanding shows how similar or different the socio-demographic and physical features present in small islands or how small islands influence or being influenced by the regional landscape are among the relevant aspects that this chapter will discuss.

Nonetheless, some of pertinent issues that will be directly conferred here in relation to the research objectives include the character of the regional landscape environment and how it impacts the small island cases, the role performed by the small island in the regional landscape environment and aspects of sustainable management and planning for small islands as interaction among spatial units contained within the regional landscape is natural, policy driven and necessary.

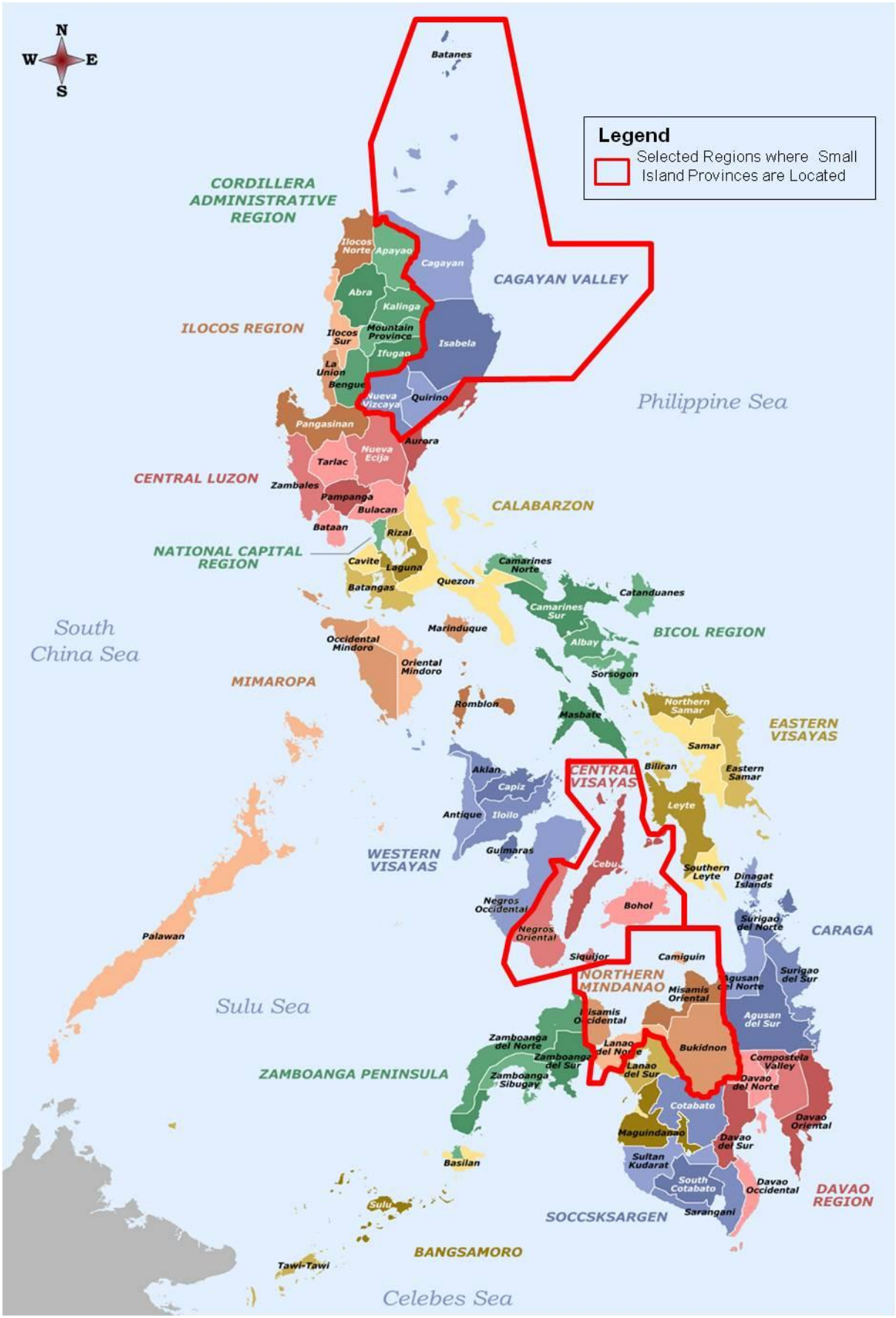



**Figure 5.2 Administrative Regions in the Philippines and the Island Provinces**

The Philippine islands have been organized into administrative regions on the bases of socio-cultural, economic and political linkages (Figure 5.2). Three of these regions hold one of each small island province cases. It is important to consider a short description of the general landscape of the regions where these small islands operate to see the larger picture where small island provinces interact.

Among the 17 regions in the Philippines, only two do not have islands on its administrative boundaries. These regions are the National Capital Region (NCR), where the capital city Manila is located, and the Cordillera Administrative Region (CAR), which is the only land-locked region. Also, ten regions have the small island provinces, the rest have small islands but either are uninhabited or just forming a town or forming part of a village which does not qualify in the criteria set for the research.

These administrative regions however are not politically governed. Such regional administrative groupings work for policy environment setting up only, which provides framework for the local governments (provinces, cities and municipalities) in harmonizing the national level and local government spatial development goals. With this, the regional administrative grouping functions only in policy framework congruence between the local government and the national level goals.

### 5.2.1 The Cagayan Valley Administrative Region and Batanes

Cagayan Valley (Region II) lies in a large valley in north-eastern Luzon, between the Cordilleras and the Sierra Madre mountain ranges. Considered as the second largest region in the Philippines in terms of land area, Cagayan Valley only has five provinces, namely: Batanes, Cagayan, Isabela, Nueva Vizcaya, and Quirino. Batanes, one of the small island cases, is the lone island province.

Also, the region has four cities, Cauayan City (industrial hub), Tuguegarao City (the regional center), Ilagan city (investment hub) and Santiago City (Premier city). Batanes, on the other hand, has six municipalities only. Cities and municipalities differ in terms of national legislative assignments and arrangements based from the population, local government income and potential significance in running the national economy.

Geographically, Cagayan Valley region has the Cagayan River, the country's longest river. Also, the Babuyan and Batanes island groups that lie in the Luzon Strait also belong to the region (Figure 5.2). On its east is the Philippine Sea and the Pacific Ocean and is bordered through the other regions by mountain ranges.

Even though the Cagayan Valley occupies a huge land area compared to other regions, its population count is not as high as other regions. The relatively stable population growth rate at 1.35% is lower than the national population growth rate at 1.72% (Table 5.2). Even more, Batanes, as the island province has the least population count in the whole region.

The ethno-linguistic character of this region includes *Ilokano* and *Ybanag* as the major groups of locals. Others are isolated ethnic groups, especially those residing in the islands, where inter-cultural mixing had been difficult. This fact points to the reason why the *Ivatans* in the island group of Batanes has been culturally different from the others in Cagayan region.

**Table 5.2 Socio-Demographic Characteristics of the Selected Regions with Small Islands**

| Region | Provinces | Land Area ($km^2$)/ Share in the Region (%) | Number of Cities/ Municipalities | Population Characteristics | | | Poverty Incidence[4] (%) | Subsistence Incidence[7] (%) |
|---|---|---|---|---|---|---|---|---|
| | | | | Size | Growth Rate (%) | Ethnicity (Language/ Dialect) | | |
| **Cagayan Valley** | Batanes | 230.0 (0.77) | 0/6 | 17,246 | 0.72 | Ilokano, Ybanag, Ytawes, Irraya, Ivatan, Gaddang, Tagalog, others | 0.0 | |
| | Cagayan | 9,398.07 (31) | | 1,199,320 | 1.29 | | 15.9 | |
| | Isabela | 13,102.05 (44) | | 1,593,566 | 1.36 | | 15.2 | |
| | Nueva Vizcaya | 4,813.88 (16) | | 452,287 | 1.43 | | 13.6 | |
| | Quirino | 2,319.66 (8) | | 188,991 | 1.34 | | 26.5 | |
| | **Total** | **29,836.88 (9.95)** | **4/89** | **3,451,410** | **1.35** | | **15.8** | **1.8** |
| **Central Visayas** | Bohol | 4,772.52 (30.07) | | 1,313,560 | 0.91 | Cebuano, Boholano, Porohanon, Kinamiguin | | |
| | Cebu | 5,342 (33.66) | | 4,632,359 | 2.14 | | | |
| | Negros Oriental | 5,421 (34.15) | | 1,354,995 | 1.04 | | | |
| | Siquijor | 337.49 (2.12) | 0/6 | 88,478 | 1.04 | | | |
| | **Total** | **15,872.58 (5.29)** | **16/116** | **7,396,090** | **1.84** | | **23.6** | **9.8** |
| **Northern Mindanao** | Bukidnon | 10,498.59 (51.3) | | 1,415,226 | 1.73 | Cebuano, Manobo, Bisaya, Maranao and other minority dialects like Hocano, Ilonggo and Waray | | |
| | Camiguin | 291.870 (1.43) | 0/5 | 95,984 | 1.01 | | | |
| | Lanao Del Norte | 3,824.79 (18.7) | | 1,019,013 | 1.83 | | | |
| | Misamis Occidental | 2,055.22 (10.04) | | 602,126 | 1.19 | | | |
| | Misamis Oriental | 3,515.70 (17.18) | | 1,564,459 | 2.01 | | | |
| | **Total** | **20,458.51 (6.82)** | **9/84** | **4,689,302** | 1.92 | | **30.3** | **13.8** |
| **COUNTRY** | | **300,000.00** | **146/1488** | **100,981,437** | **1.72** | | | |

[4] Poverty and subsistence incidence among families based from Population Census data (2015)

### 5.2.2 The Central Visayas Region and Siquijor

The Central Visayas Region (Region VII) is an islands region in the Visayas (Figure 5.2). It is comprised of four island groups (Cebu, Bohol, Negros, Siquijor) forming four provinces namely: Cebu, Bohol, Negros Oriental (forming half of the island of Negros) and Siquijor. Since the region is comprised of islands, maritime and air transportation propels the regional dynamics. The region is among the others in the country having much of its member provinces as island provinces, unlike the rest of the other regions in the Philippines that share with other regions in terms of the land area it occupies.

Central Visayas, considered as the sixth smallest region in the Philippines, has a total land area of 1.49 million hectares (14,951 square kilometers) (Table 5.2) constituting about five percent of the Philippines' total land area. Geographically, this region assumes an archipelagic landscape that is connected through the Visayan Sea (North); Camotes Sea and Canigao Channel (east); Bohol Sea and Dipolog Strait (South); and Sulu Sea (West). Tañon Strait on the other hand provides the majority of maritime linkages among the island provinces in Central Visayas. Siquijor, on the other hand, is located on the southern part of the region; however, the island province is not well connected to other regions and only forms a mere boundary for the central Visayas region.

Also, the coastal-marine waters are approximately 31,498 sq. kms, which is 211 percent bigger as compared to the ratio of land in the region. Given this fact, the potential for the coastal-marine resources in this region is really high. Fishery activities, port activities and coastal tourism are very much viable in the region owing to its coastline length amounting to 1,988 kms. According to the Regional Physical Framework Plan of Central Visayas (2003-2030), the region's total reef area is also estimated at 1,560 sq. km. of which 41 percent is located in the Danajon Bank within the coastal waters of Cebu, Bohol, and Leyte.

The regional landscape terrain is characterized by highlands with narrow coastal strips of arable land; however, for the case of Bohol Island, a considerable portion of flat arable lands are available. The general landscape of Siquijor, nonetheless, is different from the rest of its neighbouring island provinces as the physical size of Siquijor is not as comparable with the rest of the island provinces in Central Visayas. Also, the incidence of disasters due to natural calamities affects the region less than the other regions due to its strategic location at the central part of the Visayas Group of islands.

The Central Visayas region is among the highly urbanized areas in the Philippines. It includes the Cebu-Mandaue-Lapu-Lapu cities the urban core cities forming a conurbation in the region (Metro Cebu) that facilitates international trades. The region is considered as the most populous in the three regions under review (Table 5.2). This results from the population pull of the Metro Cebu area contained within the region. Given this fact, the Metro Cebu area acts as primate city and it takes much of the urban attention and leaving other municipalities as rural areas (that includes all the municipalities of Siquijor at the bottom of settlement ranking).

Also, the region is known as among the premiere tourism area boasting sites which includes both heritage and natural wonders. With business, industrial and services present in Metro Cebu, facilitation of international trades is possible. The other major urban cities are Tagbilaran City located in Bohol and Dumaguete City in Negros Oriental. However, due to the relative size of Siquijor province as compared to other island provinces in the region, still the context of islandness persists, as Siquijor deals the other larger islands as its mainland counterpart. This perfectly supports the notion explained by Dahl and Depraetere (2007) on the context of small islands and its mainland counterpart.

The close relationships among these islands in the Central Visayas region are evident in the ethno-linguistic character in the area, where Cebuano is spoken by the majority. Also, this region is considered as the seat of Roman Catholic religion where the first Spanish conquest was recorded within these areas impacting significantly in the cultural-heritage in the region. Siquijor, for one, houses one among others the oldest monastery and churches.

### 5.2.3 The Northern Mindanao Region

The Northern Mindanao Region (Region X) occupies the north-central part of Mindanao Island groups (Figure 5.2). Bukidnon, Camiguin, Lanao del Norte, Misamis Occidental and Misamis Oriental are the provinces that comprise this region. The region, forming part of the greater Mindanao Island, is bounded by other regions such as Western Mindanao region (west), CARAGA region (east), Regions XI and XII (south) and the only marine water bounding the region is the Mindanao sea (north), wherein the island province of Camiguin lies.

Geographically, the Northern Mindanao region lies on the large island of Mindanao, except for the island province of Camiguin. Expectedly, much of the activities happening in this region occur in the mainland area characterized by flatland to gently hilly to mountainous areas on the central part of the region. The region is also considered practically as typhoon-free; however, other natural disasters could impact the region. Agricultural activities thrive in the gently rolling areas of the south of the region.

The population character of the Northern Mindanao region depicts a trend that is highly skewed towards increasing population relative to other regions, as the latest population growth trend at 1.92% is even higher than the Philippine Average (Table 5.2). This could impact positively on the population concentration in the region which is evident in the existence of two urbanized cities, namely, Cagayan de Oro City and Iligan City and seven component cities: El Salvador City, Gingoog City, Malaybalay City, Oroquieta City, Tangub City, and Valencia City. Given such urbanization trend in the region, it is eyed as the economic propeller of growth in the whole Mindanao area.

A mixed of ethnic groups is found in the Northern Mindanao Region (Table 5.2). Although the people commonly term themselves as “Bisaya” (which pertains to the local language spoken by the majority of people), other clearly recognizable ethnic groups are still found in the region.

Known as the Gateway to Southern Philippines, the Northern Mindanao Region has the facilities and networks making it viable for international trades. Having a deep harbour, the region could eventually facilitate sea navigation internationally. Road networks connect Region X to the rest of the regions in Mindanao making it also strategic for economic activities. All other activities related to the marine waters and island living are concentrated in its lone small island, the Camiguin island province.

## 5.3 The Role of Small Islands in the Regional Administrative Landscape

The regional physical planning frameworks in the Philippines provide the guidelines for any spatial unit under its administrative boundaries about the spatial development trajectory of a specific region supportive of the Philippine spatial strategy. Roles of the provinces, cities and urban centers are defined to steer up and lead the spatial development in their respective areas of influence. Small islands are no exemption to this; however, with their general rural character, its role has always been in support for the growing regional or urban centers.

This common notion for small islands has been among the concerns of small island provinces in addressing their own spatial development concerns. Nonetheless, without proactive action, such conditions will remain the same in the coming decades.

Based from the Philippine National Spatial Strategy (2012), human settlements were classified according to their functions and development potential though a scalogram analysis (Figure 5.3). Here it was emphasized that the overwhelming majority (75%) of the country's settlements are in the last tier, comprised of local or rural centers. The characteristics of these settlements are explained in details below (Table 5.2).

**Table 5.3 Categories of Philippine Settlements**

| Category | Description | Number of Settlements |
|---|---|---|
| **Metropolitan Regions** | Serving as the economic and administrative core of the three main island groups of the country<br>Primary international gateway (airport and port) | 3 |
| **Regional Centers** | Regional markets and service centers<br>Most have direct linkages to the metro regions<br>Include existing administrative regional centers | 26 |
| **Subregional Centers** | Relatively large settlements that form the market catchments of regional centers<br>Connect to and serve as service centers of smaller provincial and local centers<br>Minimum population size of 120,000 (ca. 2010), similar to the existing hierarchy, is used as the primary criterion for identifying these centers<br>Expected to grow and merge with adjacent regional centers to form even larger metropolitan areas | 70 |
| **Provincial Centers** | Settlements that are typically a major city or municipality of a province<br>Similar role to regional centers but in a smaller and more limited scale<br>A minimum 2010 population size of 50,000 served<br>These centers have an extended city or municipal service coverage but not beyond the province of their location | 336 |
| **Local centers** | Settlements that form the lowest level of the hierarchy<br>Cater to one or two local government units | The rest of the LGUs |

The table (Table 5.3) shows that only one, among the 17 municipalities distributed in the three island provinces qualify as a provincial center (Siquijor, Siquijor) although the other two municipalities are functioning as provincial capital towns (Mambajao, Camiguin and Basco, Batanes), still, these were not considered as such in terms of the actual services it provide
.
All the other 16 municipalities belong to the local centers category. As described further in the same document, local centers may have the presence of some form of food retail and restaurant and a local health clinic or similar facility. Those larger settlements may also have secondary airports, branches of national banks and some form of a local retail center and/ or some Business Processing Outsourcing (BPO)-IT service facilities or even tertiary educational facilities and community airports. All falling to the exact services offered by the small island municipalities within the three small island province cases.

The population as the main factor points the reason why almost all of the municipalities of the three small island provinces did not qualify as a provincial center. Usually having around 50,000 to 120,000 residential populations for a municipality or city to become a provincial center, none among the 17 municipalities even get close to such number (Figure 5.3). The reason for the inclusion of one municipality within the small island province of Siquijor is that the number of services it provides to the community is at the level of a provincial center, even if it did not meet the population requirement for a provincial center.

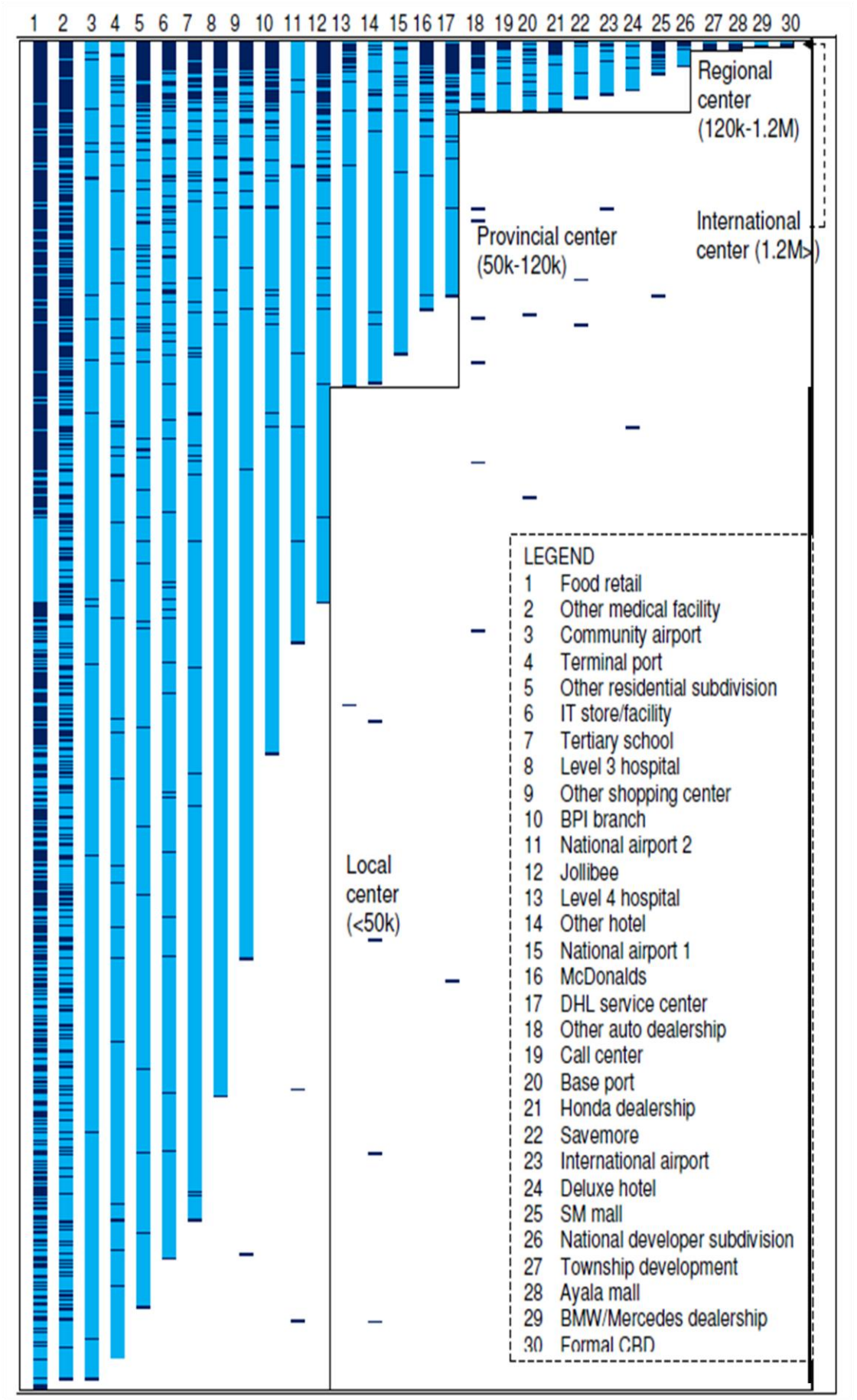



**Figure 5.3 Existing Hierarchy of Settlements in the Philippines (Source: NFPP, 2012)**

Also, much of the municipalities lie on the bottom part of the diagram (Figure 5.3), especially for the case of the municipalities of the small island province of Batanes. Even the capital town of Batanes (Basco, Batanes) has very limited services and ranks low in the hierarchy of settlements in the Philippines that even other municipalities of other small island provinces not fulfilling the functions of a capital town surpass. The capital towns of the other two small island province though (Figure 5.3), perform considerably better as these two municipalities top the 17 municipalities distributed among the three small island provinces.

The diagram (Figure 5.3) also implies that even the cumulative set of services present within the small island province do not fully actualize the notion of being a center for spatial development in the national perspective. Even more, these municipalities within the island province remain as rural or local centers functioning as support to the flourishing settlements placed higher in the settlement hierarchy in the Philippines.

Further assessment of the roles of the small island cases are discussed in the succeeding sections of this chapter. Small cities and their regions are also shaped and reshaped by different regulatory arrangements and socio-cultural imaginaries (Jayne, et.al, 2010).

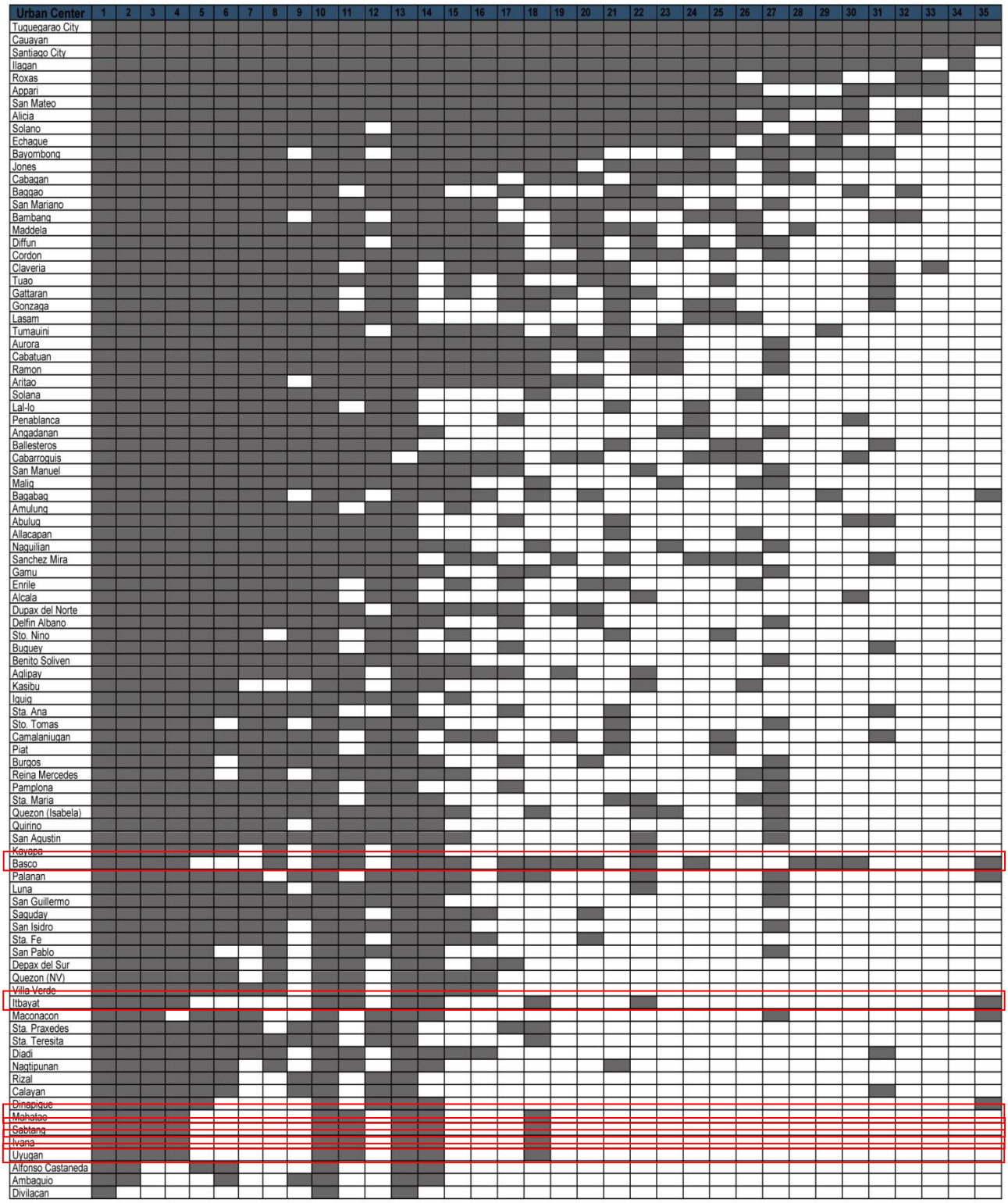
### 5.3.1 The Role of Batanes Group of Islands in the Cagayan Valley Region

Batanes is a unique island landscape and seascape with high potential for large scale commercial production of fish and fishery products and has pristine beauty and unique cultural heritage. It is tagged as the Cagayan Valley region's Marine Fisheries and Eco-Tourism Core owing to the natural and heritage resources it has to offer.

The huge task which is given to Batanes as the region's marine core, however, puts pressure on its natural resources. Through this assumption, the coastal-marine resources is in major stress to be able to provide for the needs of the region, adding to the innate need for Batanes to feed its local communities.

Still an isolated landscape, Batanes fishery resources is limitedly supported by the services available within the island. Batanes has six municipalities considered as rural settlements as compared to the other cities and municipalities in the region. The closest human settlements that could provide support in the role assigned to Batanes is far and has limited linkage. Tuguegarao city, as the regional center, and all other urban centers offering greater number of services are not coastal human settlement areas either (Figure 5.4). This puts greater interaction efforts and pressure to the Batanes group of islands. In terms of resources exchange, the nearest ports connecting Batanes to the Cagayan Valley region (mainland) are the ports in Aparri and Irene in the province of Cagayan. The closest fish landing site is the one in Sta. Ana, Cagayan.

Basic services on the other hand is available (forming the first columns of Figure 5.4) showing that much of the survival needs and government actions are available. Nonetheless, complementary and support services, are still lacking and limited in other aspects making the ranking of the six municipalities of Batanes as low. In terms of services available, much of the municipalities of Batanes occupy the latter part of the diagram, making their status as human settlements more of supportive and not as a leading entity that further limits the small islands to design their own development perspective but to attest to the realized role imposed to them by the region. Furthermore, occupying the bottom portion of the hierarchy of settlements (Figure 5.4) also implies less services provision, as targetted projects and national government assistance often look at this aspects as well.




| Legend | Indicators | Legend | Indicators | Legend | Indicators |
|---|---|---|---|---|---|
| 1 | Post Office | 13 | Elementary School | 24 | Public /State Universities, Colleges |
| 2 | Rural Health Unit | 14 | Pre-school | 25 | Secondary Hospital |
| 3 | Secondary School | 15 | Banking Institutions | 26 | Technical-Vocational School |
| 4 | Cooperative | 16 | Bar/Night Clubs | 27 | Public Emp. Service Center |
| 5 | Barangay Health Station | 17 | Resort | 28 | Radio Station |
| 6 | Public Market | 18 | Level III Water Supply System | 29 | Internet Server |
| 7 | Gasoline Station | 19 | Video Center | 30 | Private College |
| 8 | Cellular Phone Site/ Signal | 20 | Hotel and Restaurant | 31 | Ice Plant/ Cold Storage |
| 9 | Slaughter House | 21 | Bus Terminal | 32 | Movie House |
| 10 | Power | 22 | Primary Hospital | 33 | Mall/ Supermarket |
| 11 | Telephone | 23 | Fast Food Chain | 34 | Tertiary Hospital |
| 12 | Welfare Institutions | | | 35 | Airport |

**Figure 5.4 Scalogram Analysis for Cagayan Valley Region** (Cagayan Valley RPFP 2001-2030)

Also, the greater tendencies of Batanes sea transport to establish route through the western seaborg is more apparent as the eastern seaborg (facing the Pacific Ocean) is more perilous for small vessels. Although financial efforts were made for the improvement of the Aparri and Irene ports, the well established western route is currently a more popular sea transportation link between Batanes and Mainland Luzon. This western sea transportation routes are: a) Basco, Batanes – Currimao, Ilocos Norte link and Basco, Batanes – Manila link. Although the routes are longer in terms of traveltime, still, they provide safer and easier access and larger market for the inflow and outflow of resources to and from the island province of Batanes.

Further analysis on the ports of the region, supporting the role of the small island province of Batanes shows that only air transport services were considered (Figure 5.4). It must be highlighted that for the realization of the roles assigned to small islands, its significant interaction to other human settlements, by all means, should be well established. The usual challenges to these integration purposes are environmental and political in nature. The former can be addressed with proper technilogical and engineering implements, however, the latter requires an empowered and cohesive community action and assertive leadership.

The small island of Batanes, with its six municipalities are all flocking the bottom part (lower third portion of the settlements) of the diagram in the hierarchy of settelemnts in Cagayan Valley (Figure 5.4) showing a very limited number of critical services to foster huge developmental changes in the region. Here, it is very clear that the role assigned for Batanes, although it has been very explicit in the physical framework plan, is hard to realize.

Given this entire situation, the role assigned to Batanes could only be realized if massive attention would be coursed through agro-industrial development, especially fisheries and the exceptional positive growth of tourism.

### 5.3.2 The Role Assigned to Siquijor Island Province as part of Central Visayas Region

Central Visayas took the assignment of spatial development roles in a rather pragmatic way - assignment of roles were coursed through its provincial capitals to catapult the growth. Establishing Integrated Area Development (IAD) through the provincial capitals is the region's strategy. This has been coordinated at the provincial planning, through its provincial vision seeing the province as an agro-industrial and ecotourism center in Central Visayas.

The Integrated Area Development (IAD) is expected to facilitate the economic, socio-cultural, and physical development of the whole province. For this matter, Siquijor, Siquijor is designated to function for this in the island province as a capital town. Since this region is geographically islands in nature, assurance that each island unit's spatial development is an advantage. Consequently, linking these IADs (capital towns) and the urban centers are the means to address inter-island and regional development.

As IADs, development of provinces will not be limited into assigned roles, however, the danger on this is that similar development strategies could be taken by different IADs where options could be taken differently. For example, Siquijor island had taken similar IAD approach as their neighboring island province; however, the contextual situation of the other island is entirely different. Due to this danger, still the regional physical framework environment provided a guide to direct the spatial development growth through the sub-Integrated Area Developments (Sub-IADs).

Siquijor Economic District/Zone or the Sub-Integrated Area for Development (Sub-IAD), acts reference point for specific tasks of project planning, identification of programs and projects, determining special action / program areas, and product (industry) specialization. As such, it

was designed that for the island province of Siquijor, the creation of Urban Service Center/Urban Service Corridor will be made possible.

This area development provides a range of urban services. Strategic Siquijor-Larena corridor will be promoted as the province's industrial area due to the existing services available in the area. This role assignment however, did not input any specific role for small islands to perform in the region, unlike for Batanes case, where a clear role, based from its resources endowment were classified.

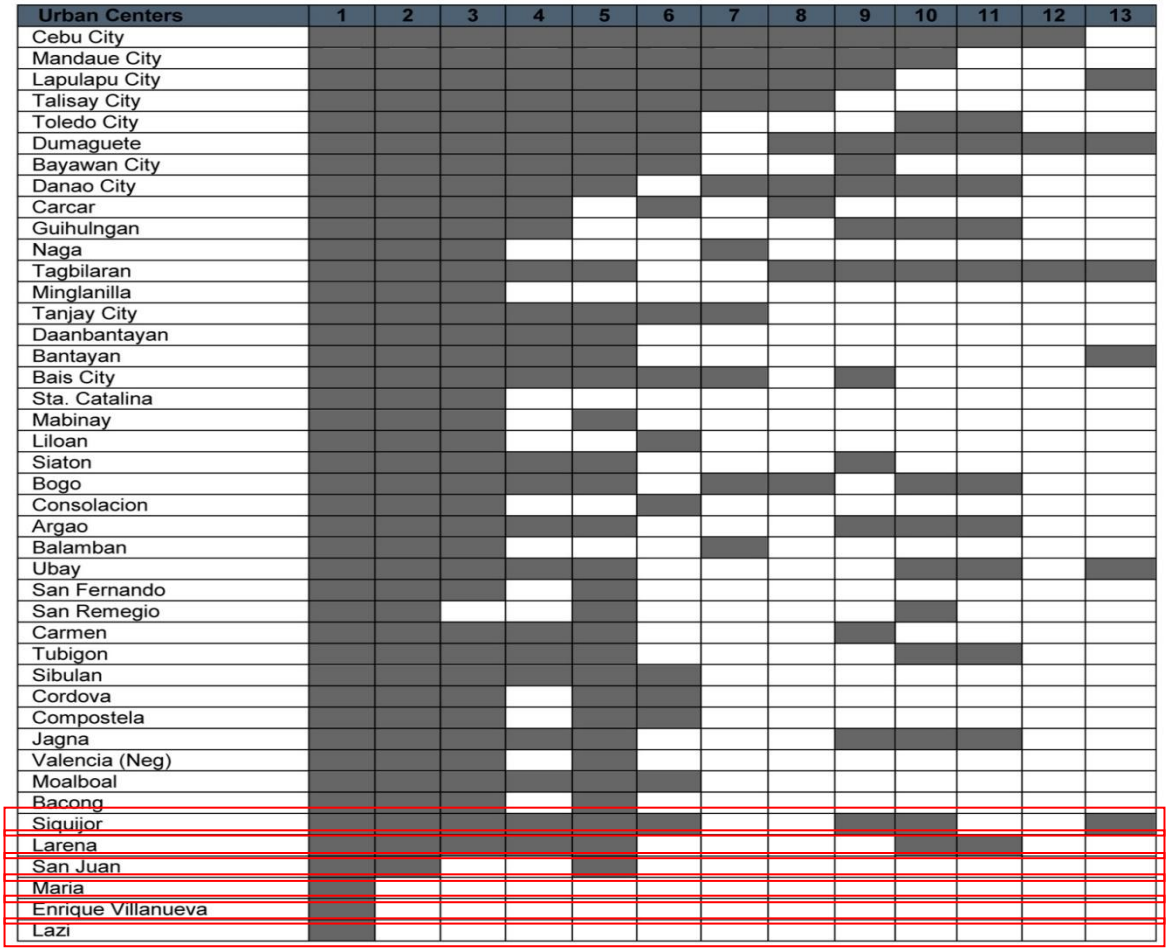
Looking further, such role assigned to the province of Siqujor can be further analyzed using the scalogram or hierarchy of settlements in the Central Visayas region (Figure 5.5). Here it is obvious that the earlier mentioned urban center and metro region Cebu City fulfills all the settlement functions identified for Central Visayas. Furthermore, these services availability in the urban centers imply a great disparity especially to the small towns in the island province of Siquijor. The size (land area and population) of the island province of Siquijor is not even comparable to the existing urban centers of the region, making the disparity of human settlements (in terms of the services provided) wide.

Also, the services offered in the other four municipalities, are considered basic. Basic services often occupy the first few columns of services identified in the scalogram (Figure 5.5). The other two municipalities, Larena and Siquijor (provincial capital town), also must form a cluster to be able to provide the desired role dictated at the regional level. Here it is clear how the island province tries to strategize to be able to be at par with the level of services of other settlements in the region.

Needless to say, all the municipalities of the island province of Siquijor occupied the last tier of the scalogram (Figure 5.5) showing that majority of the services required for fostering greater economic growth is skewed positively towards the upper portion of the scalogram forming an inverted pyramid shape. Thus, with the existence of the other settlements in the region, it would be really hard for Siquijor to realize its potential as a growth area. Not unless all these small towns of the island province work collectively.

Although some important services are also available in the small island, such as ports (air and water), still, these are not sufficient and comparable enough to the other services in the other human settlements (Figure 5.5). This fact has been seconded by the National Spatial Strategy (2012) owing all of the municipalities of the small island cases as part of the local centers (or rural centers) except for the case of the municipality of Siquijor in the island province of Siquijor.

Inter-island linkages within the Central Visayas region is not a great problem as the context of access and physical distance is not as harsh as compared to Batanes. There are daily travels and exchanges of goods and services in two workable ports in the island province of Siquijor, making this possible. However, the aspect of established linkages in Siquijor towards the other larger island systems posts a threat on market competition especially for the case of the role assigned to the island province of Siquijor to practically compete with the IADs of the larger island provinces within the Central Visayas region.




| Legend | Indicators | Legend | Indicators | Legend | Indicators |
|---|---|---|---|---|---|
| 1 | Electric, Telecom | 5 | Accommodation | 10 | Port |
| 2 | Police station | 6 | Water District | 11 | Roro facilities |
| 3 | Banks | 7 | Economic zone | 12 | University |
| 4 | College | 8 | Malls | 13 | Airport |
| | | 9 | 2nd/3rd Hospital | | |

**Figure 5.5 Scalogram Analysis for Central Visayas Region** (Central Visayas RPFP, 2001-2030)

### 5.3.3 The Role of Camiguin Island Province in Northern Mindanao Region

The Regional Development Plan recognizes Camiguin's role as the leading Tourism destination for Northern Mindanao. The Northern Mindanao Development Plan (1993-1998) envisions the region to the south linking resource-rich Mindanao to the rest of the country and the world. Similarly, the role of Camiguin island is to attract tourism activities as designed to propel the growth in the whole region.

Here, the role of a small island province has been explicitly highlighted unlike for the case of the other two small island province. It is clear that the physical size and population counts for development to be pursued but this do not discount the fact that small islands, like Camiguin, contribute so much in the development of the region. Only a clear and carefully laid policy on regional environment is necessary for such to be fulfilled.

As an emerging growth center, the capital town of Camiguin (Mambajao,Camiguin), will spur development to the whole island. However, in the remaining four municipalities are included the remaining small to medium towns which provide support to the economic activities in the

region. Still in terms of raw material goods provision for addressing agricultural sufficiency is crucial. This is especially true in terms of the high value commercial crops (HVCC) and other agricultural surplus of Camiguin adding to its fishery production.

Furthermore, linking the small island of Camiguin through the Gingoog-Camiguin Tourism Adventure loop, in the regional spatial development strategy, provides an additional context of the subordination seen for small island. These ideas are strategic as support to the larger regional centers is sought, but looking at the small island's own resources in terms of the carrying capacity issues are lacking. The Gingoog-Camiguin Tourism Adventure loop, is a clear example of island-mainland linkage, through tourism provision. Through this, better implementation of regional tourism efforts can be made possible. Also, among all the three regions containing the small island province cases, only the Northern Mindanao region clearly inputs the equally important contribution of the small island of Camiguin important both for the regional development and the small island development.

In terms of the hierarchy of settlements, the five towns in the island province of Camiguin, had a similar ranking with the other towns of the island province cases. Occupying the bottom third portion of the scalogram (Figure 5.6) except for the case of Mambajao, Camiguin's capital town has occupied a part in the first third cut of the scalogram diagram.

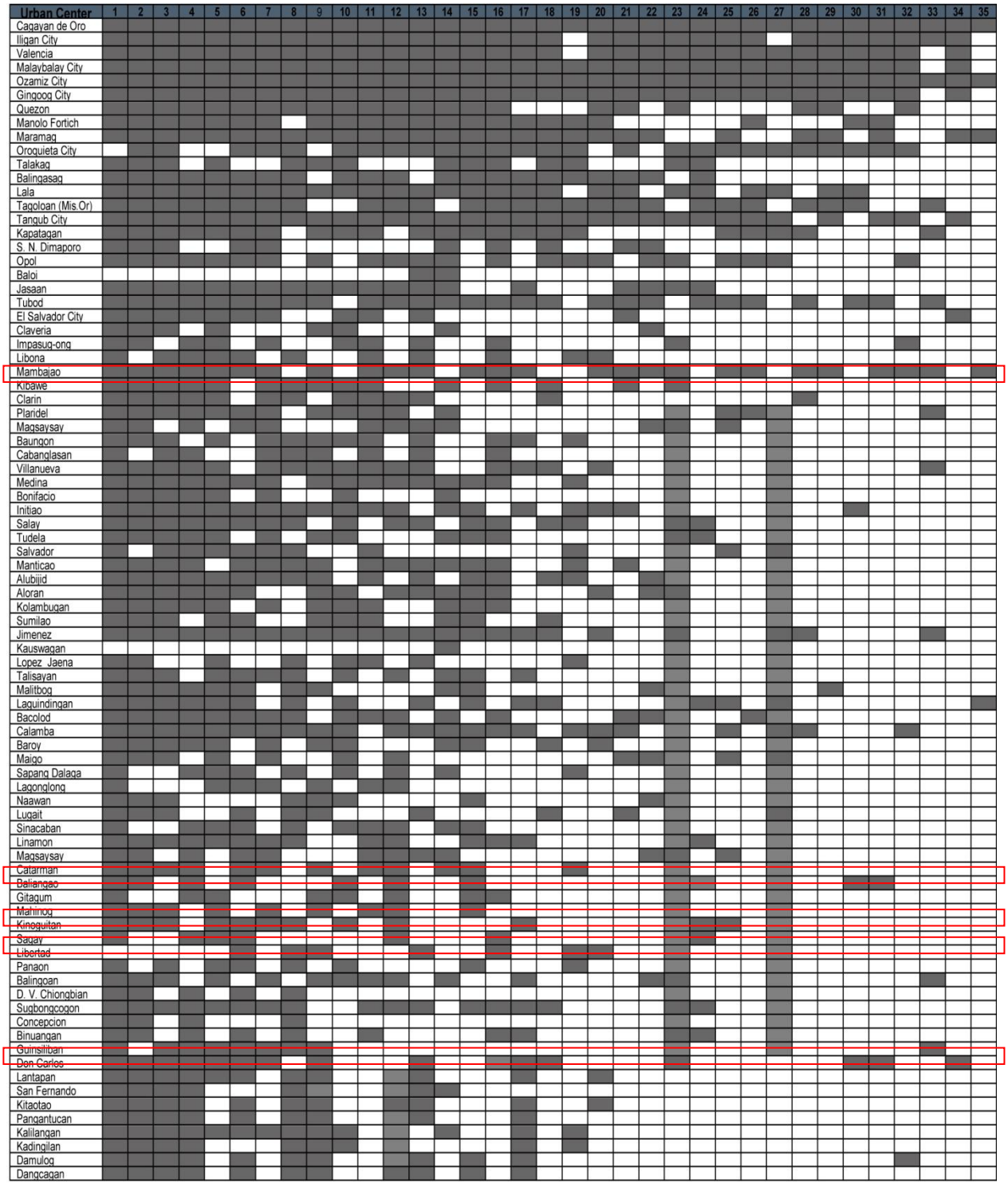
Similar reasons could be attributed to the prominence of the four municipalities of Camiguin island province occupying the latter tier as services are down to the basic on these four human settlements. The services available in the capital town (Mambajao), however, are similar to the special services offered in the capital towns of other island province cases.

As per the national spatial strategy, although Mambajao had a fairly good standing at the regional scale, still, its placement in the national spatial strategy did not manifest significantly. This could impact the existing role provided to the island of Camiguin as mismatch in the analysis from the regional and national level spatial planning was manifested.

Camiguin province has a similar role assigned like that of Batanes. Tourism has been directly identified for small islands as per the unique geography it offers. However, looking closely to the services offered by the human settlements in the Northern Mindanao region (Figure 5.6), in relation to the strategic spatial link between Ginoog and Camiguin, this role is seemingly not directly integrated to the existing services. The island province of Camiguin is linked with the mainland Northern Mindanao region through sea transport via Benoni – Balinguan port, then by land transportation to the city of Ginoog.

The municipality of Mambajao in Camiguin has several services to offer, especially those related to tourism – from accommodation facilites to restaurants. However, fostering a continued growth based from the identified spatial link between Camiguin and Ginoog city, this must be also backed up with tourism services linkages such as tour packages, services connection, etc, which the spatial plan implies. Nonetheless, this role is still taken by Cagayan de Oro (the regional center) acting as a primate city in the region.

Small island provinces' role in spatial development is determined by its resources endowment and the regional understanding of their capacities, a sort of top-down assessment approach. Small islands are seen as resource rich areas in fisheries, thus assigning small islands for fisheries development zones is a usual consigned alternative; however, due consideration on small island province's actual capacity to stand for such role assignment is still a question. Also, the ratio of coastline of small islands to its actual land area coverage made small islands very suitable for coastal-marine production feeding the region, or even the country.




| Legend | Indicators | Legend | Indicators | Legend | Indicators |
|---|---|---|---|---|---|
| 1 | Telephone/Cellular Mobile Access/Cell Sites | 13 | Manufacturing/Industries/Mining | 24 | Memorial Parks/Gardens (Private) |
| 2 | Other Financial Business Firms (Cooperatives/Loan facilities) | 14 | Secondary/Primary Hospital | 25 | Tech-Voch School (Govt) |
| 3 | Beauty Parlors | 15 | Funeral Parlor | 26 | Massage/Spa Centers |
| 4 | Emergency Clinics/Lying-in | 16 | Dental Clinics | 27 | Tech-Voch School (Private) |
| 5 | Internet Café | 17 | Commercial/Trading Centers/Shopping Mall | 28 | International/National Delivery/Freight Services |
| 6 | Tourist Attractions/Adventure Parks | 18 | Apartments | 29 | Tertiary Hospital |
| 7 | Lodging Houses/Inns | 19 | Local Community College/Satellite Branch (Govt) | 30 | Insurance companies |
| 8 | Green Parks/Areas | 20 | Commercial/Private Banks | 31 | Government Banks |
| 9 | Bus/PUJ Terminals | 21 | Appliance Center | 32 | Major Fast-food Chain |
| 10 | Rural Banks | 22 | Higher Education Institutions (Govt) | 33 | International/Commercial Seaport |
| 11 | Housing/Residential Subdivisions/Condominiums | 23 | Higher Education Institutions (Private) | 34 | Central Business Districts |
| 12 | Hotels/Resorts | | | 35 | National/International Airport |

**Figure 5.6 Scalogram Analysis for the Northern Mindanao Region** (Northern Mindanao RPFP, 2013)

## 5.4 Getting into the Characteristics of Selected Philippine Small Islands Provinces

As previously discussed in the former chapter, the selected small island provinces are located in various areas in the Philippines (Figure 5.7), representing all the Philippine island groups (Table 5.3). These three island provinces show unique individual spatial characteristics different from other provinces in the Philippines but at the same time, common small island spatial characteristics unifying and embracing the fact that elicit special concerns in spatial and development planning.

In an archipelagic landscape such as the Philippines, small islands are very common; however, discussing its character as small islands themselves is very limited. Often, the description ends with describing its relative size and distance from one another and commonly rehashed as another spatial unit of no special interest.

Among the small islands in the Philippines are three representative cases of small island provinces, which possess the same character as a single unit island with fragile resources but has primary impact on the growth of the region. Treated with some special concerns, this section provides bases why attention should be given to small island cases in terms of spatial analysis and planning.

### 5.4.1 Geographic and Geologic Characteristics

The three small islands identified are the smallest provinces in the Philippines. Having much of the same geographic origin and characteristics (Table 5.4), they are however, individually unique in terms of biodiversity.

Generally, the Philippine islands are geologically formed from movements (collision, uplift and subduction) of the lithospheric plates of Eurasian, the Indo-Australian and the Philippine Sea millions of years ago. With this movement of lithospheric plates come the formation of small land masses, including Philippine small islands through volcanic activities, coral uplift and sedimentation. The small island cases are either formed from the same scenario resulting to a unique landscape involving different folds of mountains, hills, volcanoes, valleys and flatlands.

The geologic origin primarily explains the topography of small islands having the complex nature of both the ridge (mountainous) to reef (coastal-marine) environment rolled into one whole unit. In addition, the general topography and landscape condition builds from mountainous to hilly and flat lands affecting the type of ecosystems that could thrive and at the same time the kind of spatial planning activities that must be done. Also, the land areas described in table 4.1 shows that these small islands in terms of size and shape is a product of the continuous shaping and reshaping of the natural environment that had happened for millions of years.

Considered as small islands, still, Batanes and Camiguin are composed of several islets under its administrative jurisdiction (Table 5.4). Although much of these smaller islands are not inhabited, its significance as fishing grounds and tourist attraction manifests significantly in their small islands livelihood context. Only Batanes has its population spread throughout its three largest small islands. Camiguin on the other hand, has some seasonal inhabitants in the island of Mantigue.

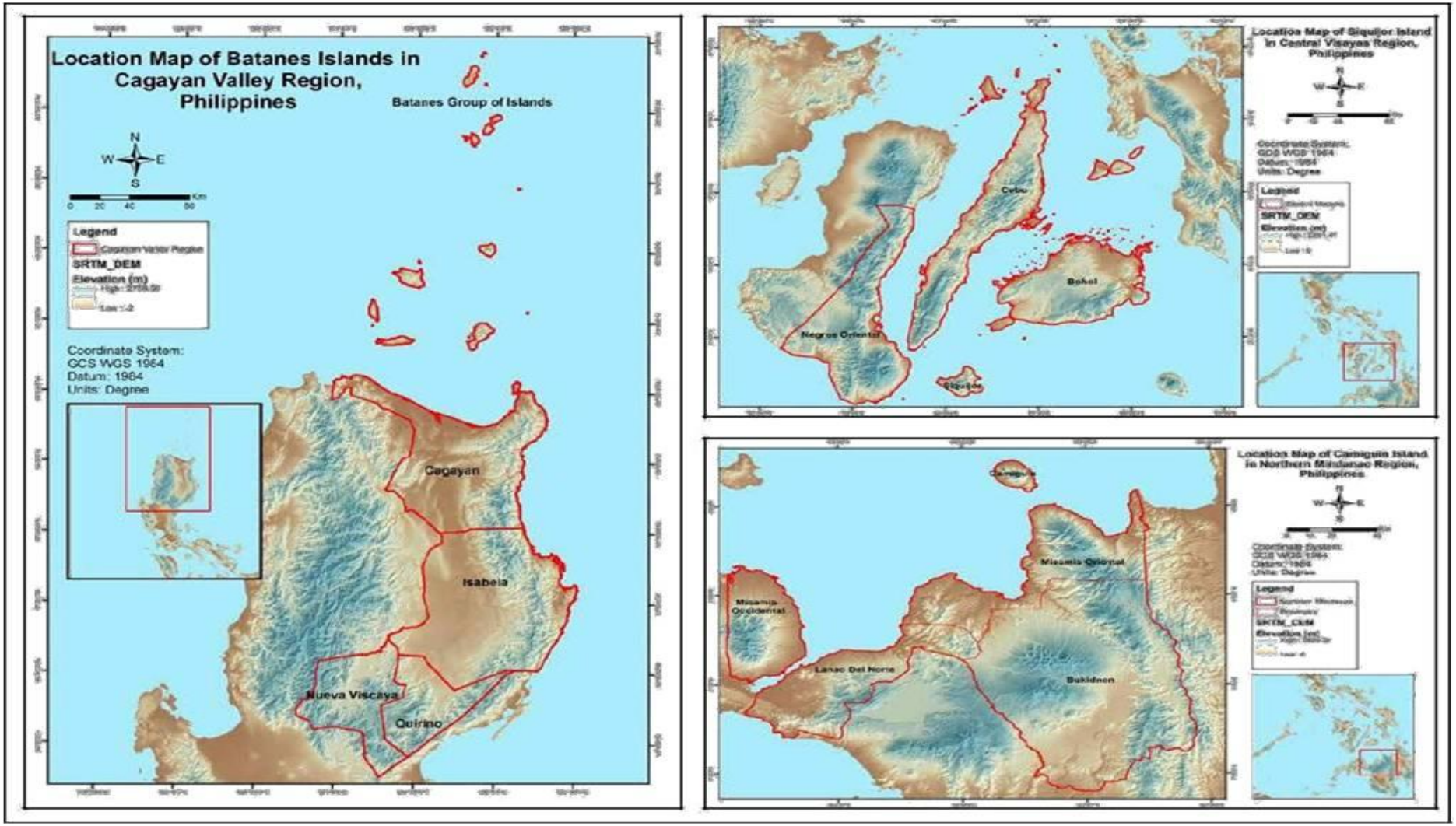



**Figure 5.7 Location of the Small Island Cases in the Philippines**

**Table 5.4 Geographic Characteristics of the Small Island Provinces**

| Small Island Province | Land Area[5] ($km^2$) | Geographic Location[4] (Latitude/ Longitude) | Geologic Origin | Coast-line[6] (km) | Topographic Character | Type of Climate[7] | Highest Elevation (masl) | Islands/ Islets within its Administrative Boundary | Geographic Boundaries |
|---|---|---|---|---|---|---|---|---|---|
| **Batanes** | 230.00 | $20^o$ 15'- $21^o$ 15' / $121^o$ 45'- $122^o$ 15' | Volcanic, Coral/ Limestone Uplift | 150 | Mountainous and Hilly | IV | 1009 | 10 (Batan, Itbayat, Sabtang, Ditarem, Misanga, Mavidis, Siayan, Ivuhos, Dequey, Dinem) | Pacific Ocean (East), West Philippine Sea / China Sea (West), Bashi Channel (North), Balintang Channel (South) |
| **Camiguin** | 238.63 | 9°06'00" - 9°16'00" / 124°37'00" - 124°48'00" | Volcanic | 74 | Mountainous and Hilly, very few flat lands | IV | 1713 | 3 (Camiguin, Mantigue, White Island) | Bohol Sea (North), Macajalar Bay (West), Gingoog Bay (Southeast), Butuan Bay (East) |
| **Siquijor** | 318.13 | 9°05.76'00"– 9°18.19'00" / 123°26.51'00" – 123°42.02'00" | Volcanic, Coral/ Limestone Uplift | 102 | Mountainous, Hilly to relatively Flat | III | 628 | 1 (Siquijor Island) | Bohol Strait (Northeast), Bohol Sea (East), Mindanao Sea (South) |

[5] Land Area and Geographic Location information are based from the Provincial Profiles

[6] Approximate Distance including all the administrative boundaries (islets)

[7] Based from the Modified Coronas Classification adopted by the Philippine Atmospheric Geophysical and Astronomic Services Administration, Department of Science and Technology (PAGASA-DOST): **Type I**- there is a distinct dry and a wet season, wet from June to November and dry, the rest of the year; **Type II**- there is no dry period at all throughout the year, with a pronounced wet season from November to February; **Type III**- there is a short dry season, usually from February to April; **Type IV**- the rainfall is almost evenly distributed during the whole year.

The Philippines is surrounded by ocean and seas, and lies on the Pacific ring of fire and Pacific typhoon belt, affecting the atmospheric condition of the country. Since the Philippines lies on the tropics, there are only two pronounced seasons, the wet (rainy) and dry season, respectively. However, to localize the exact climatic character based on the amount of rainfall received in any parts of the country, the Modified Coronas Classification (MCC) is used, showing four distinct rainfall patterns (Table 5.4). Also, there is an approximate of 20 typhoons passing by the Philippines yearly, five of which are very destructive. Given such conditions, small island provinces' context is becoming more complex with this geophysical character.

The island province of Batanes for instance, located at the northernmost part of the Philippines experiences a relatively unique climatic character due to the impacts of the prevailing winds and the direct action of the Pacific Ocean and the West Philippine Sea surrounding it. This is not as much pronounced with the other two small island provinces as it forms an archipelagic landscape in the central part of the Philippines (Figure 5.7). Nonetheless, since the cases are small islands, it generally follows that it is physically isolated by surrounding waters (Table 5.4). This has significant influence to accessibility and connectivity of the small island provinces to the rest of regional administrative area and the rest of the country.

Small island provinces face more drastic environmental conditions due to this locational character of the Philippines. This has immense impacts (can use negative effects) to the context of small islands in analysing its islandness/ *"isola effect."*

### 5.4.2 Small Islands Accessibility

The small island cases are physically isolated from the rest of the island groups in the country (Table 5.5). Distance as a factor of isolation informs about the type of economic services and socio-cultural character that is formed in these island provinces.

The accessibility among the small island cases, through air and water transport, varies in terms in accessibility. Batanes is more accessible through air transport than by sea. On the other hand, Camiguin and Siquijor are more accessible through water/ sea transport. Still, isolation issues batter these small island provinces especially due to the variability of weather conditions. This is especially true with Batanes as the nearest regional center is the farthest compared with the other two provinces.

Land transportation is technically impossible as are no land bridges that connect the islands to one another; however, there are some services that allow land transportation vehicles which are carried through ships making it still possible to be navigated.

**Table 5.5 Location and Access for the Small Island Provinces**

| Small Island Province | Distance from the Regional Capital (km) | Distance from the National Capital (km) | Accessibility |
|---|---|---|---|
| **Batanes** | Tuguegarao City (415) | Metro Manila (667) | Air and water transport |
| **Camiguin** | Cagayan de Oro City (90) | Metro Manila (728) | Air and water transport |
| **Siquijor** | Cebu City (128) | Metro Manila (565) | Air and water transport |

The existing sea transport route for Batanes is mainly for cargo transport from Manila, which takes up to three days of travel time and is scheduled once or twice a month, depending on

the weather condition. Although, there has been a well-established link between Batanes and the Cagayan Valley region and also with Taiwan in the last century through big traditional ships that have now been limited and eventually stopped due to modernization. Camiguin is increasingly accessible through air and water transport as regular transport services are increasingly available in the last five years. However, for Siquijor, although there is a feeder airport, still the most preferred means of transport is through sea as it would only take roughly 30 minutes to reach the next big island where varied means of transportation in and out of the region are available.

The air transport to Manila is only available commercially with Batanes and Camiguin. Also, Batanes is well connected to the regional capital by air transport but not to any other destinations in the country unlike Camiguin that is well connected to other regional centers.

With this, it is evident that the context of physical isolation is very relevant in small islands, owing to the factors related to proximity and accessibility issues dues to natural environmental limitations.

### 5.4.3 Socio-Demographic Profile of Small Island Provinces

The relevance of spatial planning is measured in terms of the population it caters in a given spatial unit. For small islands, it is clear that management and planning always look at the affected communities living within the small islands for it to become important.

As defined indicator for selecting small island cases, the recent population of the representative small island cases in the Philippines is good enough to consider for local planning activities to foster. Composed of five to six municipalities, each of these small island provinces form a congressional district in the Philippine government representation. As such, it is clear that its significance is sought due to the population it caters. 2015 population census shows that Siquijor has the most population with 95,984 inhabitants, followed by Camiguin (88,478) and Batanes has the least population of 17,246 inhabitants (Table 5.6). These three island provinces have the least number of island dwellers in all of the small island provinces in the Philippines as well (Table 4.3).

**Table 5.6 Socio-Demographic Characteristics of Selected Small Island Provinces in the Philippines**

| Small Island Province | Municipalities | Land Area ($km^2$) | Number of Villages (Urban/ Rural) | Population Characteristics[8] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Size | Density (person/ $km^2$) | No. of Families | Average Household Size | Growth Rate (%) | Literacy Rate (%) | Ethnicity (Language/ Dialect) |
| **Batanes** | Basco | 35.5 | 6 | 8,579 | 241.66 | 2,327 | 3.70 | **0.72** | **99.3** | Ivatan, Itbayanen |
| | Itbayat | 92.9 | 5 | 2,867 | 30.86 | 831 | 3.40 | | | |
| | Ivana | 11.8 | 4 | 1,327 | 112.46 | 371 | 3.50 | | | |
| | Mahatao | 12.9 | 4 | 1,555 | 120.54 | 443 | 3.50 | | | |
| | Sabtang | 40.7 | 6 | 1,621 | 39.83 | 431 | 3.80 | | | |
| | Uyugan | 15.5 | 4 | 1,297 | 83.68 | 358 | 3.60 | | | |
| | **Total** | **230.0** | **29 (1/28)** | **17,246** | **82.00** | **4,761** | **3.60** | | | |
| **Camiguin** | Catarman | 53.75 | 14 | 16,798 | 313.00 | 4,060 | 4.14 | **1.04** | **99.3** | Bisaya, Cebuano, Kinamiguin |
| | Guinsiliban | 18.52 | 7 | 6,281 | 339.00 | 1,459 | 4.30 | | | |
| | Mahinog | 36.04 | 13 | 14,038 | 390.00 | 3,135 | 4.48 | | | |
| | Mambahao | 89.00 | 15 | 38,735 | 435.00 | 8,547 | 4.51 | | | |
| | Sagay | 44.13 | 9 | 12,626 | 286.00 | 2,879 | 4.38 | | | |
| | **Total** | **241.44** | **58 (3/55)** | **88,478** | **366.00** | **20,080** | **4.40** | | | |
| **Siquijor** | Enrique Villanueva | 28.60 | 14 | 6,104 | 213.00 | 1,476 | 4.12 | **1.01** | **98.8** | Cebuano |
| | Larena | 49.81 | 23 | 13,847 | 278.00 | 3,115 | 4.31 | | | |
| | Lazi | 70.64 | 18 | 20,490 | 290.00 | 5,011 | 4.08 | | | |
| | Maria | 53.37 | 22 | 13,828 | 259.00 | 3,164 | 4.37 | | | |
| | San Juan | 44.37 | 15 | 14,854 | 335.00 | 3,579 | 4.15 | | | |
| | Siquijor | 90.70 | 42 | 26,861 | 296.00 | 6,392 | 4.18 | | | |
| | **Total** | **337.49** | **134 (9/125)** | **95,984** | **284.00** | **22,737** | **4.19** | | | |

[8] Based from 2015 Population Census; Growth Rate is the percent change from censal year 2010 to 2015

As observed, the population of small islands is maintained to a small number with several reasons attached to this. Either some family members are seasonal island dwellers or some migrated out of the small island to find better fortunes in other places. Also, almost every family in small islands either has one or two of their family members abroad to support their increasing needs.

Given this population in each of the island provinces, much of the settlements are still considered rural. This notion expresses that small tropical islands are almost always tackling similar rural development issues contextualized in physically isolated spatial unit. Also, methodologies used in describing what settlements/ villages are considered urban and rural, affect the small islands. Countries vary in terms of the indicators used addressing urbanity/ rurality; however, population and the populations' access to present basic services are always considered, which are often not strong characteristics of small islands. Furthermore, the only considered urban areas in the three small island cases are those in the *Poblacion* where the center of services is usually held.

Evidently the population growth rate for the small island provinces are somehow maintained at low levels (Table 5.6). This growth rate is far lower than the national growth rate at 1.72% in the last census (PSA, 2015). Population growth in the small islands are growing but at a very slow rate unlike the other provinces.

In terms of the literacy rate, the small islands are at par with other provinces having little to no difference in the ratings. However, the translation of this into workable technology and knowledge-based transfers has been limited to education and communication skills.

The ethnicity of the small island dwellers is also affected by their physical isolation. Much of the local dwellers are indigent in small islands. The Philippines has several groups of indigenous communities and small islands are home to these indigenous people. Batanes is the home of the Ivatan group and Camiguin is on its way for their claim for recognizing the indigenous communities who are living in the small island. The other aspects of small islands province ethnicity are brought about by usual inter-island migration. Inter-island migration has manifested significantly with the majority of small island dwellers being seafarers. This is the case of Siquijor where much of the local population traces itself in the neighbouring larger islands of Cebu, Bohol and Negros (Figure 5.6). In addition, the small island of Camiguin also shares some of the inter-island migration character as Siquijor with some of the local dwellers are from the island of Bohol and the larger Mindanao landmass (mainland) (Figure 5.6). Only Batanes maintained a relatively homogenous indigent origin paying attention to the relative physical isolation of the small island province compared to the other two. Such physical isolation of the small island province of Batanes is made even more complex by the distance and the natural environmental constraints dealt by the small island.

Furthermore, the small island of Batanes, together with the other smaller island groups within its provincial administrative unit, had to deal with intermigration alone and limited interaction with the larger mainland Luzon Island often limited to economic related exchanges of goods and services.

### 5.4.4 The Economic Character of the Small Islands

Local economic conditions in small islands are generally dictated by the type of resources found and also the significant human activities that control the movement of these resources. In a closed system, the local resources are the ones used primarily for all survival and major

economic activities. This is the case of small islands before the advent of modernization, integration and globalization.

The recent character of small island economies is a combination of local resources use and import of goods and services, where the extent for both activities results primarily from the human activities and decisions affected by both the locals and also the larger affecting regional economic environment actors.

The general context of the local economy of small-island cases is characterized by its reliance to agriculture for survival and raw material goods production and high importation of goods and services. Service provision in small island cases is driven heavily by tourism and tourism related activities.

**The Agricultural Context.** Agriculture is the Philippine's economic development backbone, so is true for small islands. Although the agricultural context of small island cases is more rigid and heavily attuned to the type of natural resources and ecosystem (with all its functions and services) available, still, the general survival context of small island communities is tied to the sustainability of their local production.

Looking into small island cases' agricultural activities, the production of primary goods is paramount. Due to the nature of small-island environment, where flatlands suitable for large scale crop production is limited, small islands communities tend to do the crop production activities as backyard gardening or farming activities and substantially use the pocket spaces suitable for crop production. Such conditions resulted to scattered and uncontrolled expansion of crop lands often affecting other critical ecosystems.

Although survival in nature, the subsistence context of small island cases is similar to other local governments in the Philippines where local commodity self-sufficiency is an important factor in driving the local economy.

Agriculture plays a critical role in driving the local economies of small islands, aside from minimal requirements it asks for locals to do such activities, agriculture related employment in small islands are survivalist in nature. Much of the agricultural activities contained within small islands are related to fishing, as the seas or the waters are a natural extension of small island living. All of the families in small islands have at least one member directly engaged to fishing. Another employment type related to agriculture is farming of crops and livestock herding. Also, subsistence in nature, however, the usual case is that extra harvests among these agriculture related activities are directed towards the local economy providing the context of raw material resources exchange through buying and selling.

The employment of local island communities from the three cases is characterized by a huge percent of the local populations of the small islands which is directly linked to agricultural related activities.

Although agriculture accommodates much of the local employment possible in small islands, its contributions to the local economy is not much felt, as agricultural goods production in small islands is a function of the ever-changing environmental conditions. Also, agriculture in small islands are subsistence in nature, thus, much of its production should occupy the demands created by the locals only. However, with the advent of local and international tourists, local production has been altered significantly.

Families involved in agriculture as their main source of living are often tied to the daily subsistence activities and seasonality. Other small island dwellers involved in agriculture take

advantage of the seasonal nature of agriculture production thus allowing themselves in several productive activities to keep up with the increasing survival needs of the families.

Other employment related to agriculture involves limited/ minimum processing activities. The rest of the other employment activities are a result of the industrial clustering of several differentiated economic activities.

Local governments of these small island provinces cases rely primarily on the volume of production of commonly held crops to assume for the agricultural production. This is however, limiting as other agricultural resources are not being considered. Also, the exact flows of these resources are not even tracked owing to the limited capacities and “filling up the table” attitude of the local offices dealing with these datasets.

**The Tourism Industry.** As local industry clusters proliferate in small island cases, tourism activities are catered through various industry clusters identified. Accommodation and food service top the industry cluster that leads on this aspect. Much of the accommodation facilities are resorts and villas directly attuned to providing a dwelling place and tourism related services. This goes the same with the food services available in small islands, where restaurants and cafe' bars are also available catering to the needs of the tourists.

The other aspects of tourism services are related to administrative support and facilitation where business operates as liaison to the different tourism sites within the small island. These businesses act as "one-stop shops" offering services that will ease the tourists’ efforts in locating the areas to visit, travelling in the area, identifying tour guides, finding vehicular renting services and also availing tourism tour packages.

Employment related to this industry sector is skills based; however, these jobs are also seasonal and very much dependent on the tourist arrivals. Unlike with the large resort facilities and restaurants, which are only a few in small islands, which offer stable jobs and income for the locals. Other related support businesses can be attuned to the spread of tourism related activities as supportive services industry cluster follows, which includes laundry services, repair shops, few entertainment facilities, wellness services (e.g. spa, salon, etc).

On a similar note, tourism is seen as an alternative means, due to its unique geography, for small island provinces to complement its agricultural production as sources of economic stability for small island provinces.

The tourism aspect usually considered at the regional level spatial development is the comparative advantage of small islands as usual sites for economic development. Small islands’ lure for tourism development is very common and effective as tourists’ understanding and concept for islands circulate to its promotional marketing strategies as paradise and vacation spots. However helpful and advantageous on the first glance, still, if no significant development strategy is taken by small islands, the seemingly good service-oriented role assignment (through tourist promotion) could be a double-edged sword cutting through the fragile natural resources of the small islands. Table 5.7 shows the tourism roles assigned to the small island cases and the possible threat it has to the fragile island ecosystem it has.

**Table 5.7 Coastal-Marine Comparative Advantage of the Island Province Cases Relevant for Tourism Development**

| Province | Comparative Advantage | Challenges | Threats to the Natural Island Ecosystem |
|---|---|---|---|
| **Batanes** | Batanes cultural heritage (stone houses, Ivatan Culture, etc)<br>Batanes Landscape (Rolling Hills, Protected Mountain)<br>Batanes Seascapes (Boulder beach, Caves, Cliffs, etc)<br>Islands/ islets<br>Fishing Village | Tourist access going to the island province is via air transportation<br>No carrying capacity studies on the intake of tourists<br>Ecotourism as flagship activities not mass tourism<br>Improve the tourism facilities | Gearing towards unsustainable agriculture<br>Unmanaged influx of tourists<br>Waste management |
| **Siquijor** | White sand beaches<br>Two (2) famous dive sites located in E. Villanueva and San Juan.<br>Sites for mountain climbing, trekking and spelunking<br>The 201-year old stone church convent, and other old Hispanic heritage sites | Island Stigma (Witch craft and Black Magic)<br>No carrying capacity studies on the intake of tourists<br>Overshadowed by the booming tourism industries of neighbouring larger islands<br>Improve the tourism facilities | Limited ecosystem safeguards<br>Waste management |
| **Camiguin** | Island Adventures (Mantigue and White Island)<br>Waterfalls and hot springs<br>Giant Clam sanctuary, Dive sites<br>Lanzones/ Langsat (*Lansium domesticum)* and Lanzones Festival<br>Mountain Trekking<br>Underwater cemetery | Tourism promotions should be improved<br>No carrying capacity studies on the intake of tourists<br>Local involvement on tourism activities<br>Improve the tourism facilities | Integration of tourism activities to the spatial development plans<br>Waste management<br>Destruction of dive sites |

### 5.4.5 Poverty and Food Security Context of the Small Island Provinces

Poverty is a very stringent limit of human development; it can be contextual and may vary according to cases under study. Food subsistence, on the other hand, is a relatively direct means of looking at the context of families' living conditions in terms of the money distribution (through basic consumption) going down the family, and also the survival capabilities of locals to use the indigent resources for their survival.

Although food subsistence and self-sufficiency scores are crude measures, they can be a defining factor for the direct use of natural resources through foraging patterns of locals and at the same time, the consumption of goods through monetary values of the bought items of a family.

For the small island cases, there is evident insufficiency of rice and corn supply. The heavy reliance of small island communities on carbohydrate sources especially the island provinces of Siquijor and Camiguin are evident. Batanes, on the other hand, has similar dependence on rice and corn as the communities' carbohydrate source; however, it was only in the last decade, since Batanes was once consuming root crops as the primary source of carbohydrates.

The major protein source for small islands is the fishery resources. With the surrounding marine waters abounding the small island provinces, it is no surprise that small islands have fishery self-sufficiency scores more than 100% (BFAR, 2015). Moreover, given such surplus of fishery resources, small islands often export these resources outside the small islands to provide for the needs of the region (mainland).

Other protein sources available in small islands include cattle, swine and poultry; however, these are primarily for the consumption of the local communities. Cattle production in Siquijor, nonetheless, is starting to gain significance due to the increasing need for cattle meat especially related to the booming tourism activities within the small islands. Batanes, also, is on its road to improving their cattle production to serve for the growing needs on cattle meats directed by increasing tourism activities.

**Food and Nutrition Index in Small Islands.** With physical isolation as a defining character of small islands, Health and Nutrition aspects of food poverty is expected. Although resources are available, unavailability of circumstantial food items happens especially during disasters, and that the regional/ national agencies abilities to provide access to important survival resources are limited.

Also, the limited purchasing power of small island dwellers due to the income differences and survival nature of living adds up impacting further the health and nutrition status of the island communities.

Contrary to the problems experienced by the other two small island provinces, Batanes has performed well in the incidences of malnutrition among its population members. Population size and the relative government programs could be an intervening factor to this, in addition to the well-documented and working sustainable and indigenous agricultural practices in the small island of Batanes.

Distance and physical isolation can also play as factors in this positive result in Batanes, as options provided by the regional and national level agencies are very much limited. Self-reliance and local indigenous knowledge on food has helped the locals survive the apparent odds provided by natural hazards on small islands.

**Food Consumption and Subsistence Pattern.** Like some of the traditionally available carbohydrate, protein as well as vitamins and mineral resources of the local island dwellers are naturally growing in their local ecosystems. Small island communities usually have a staple carbohydrate source- rice, corn, banana or cassava or combination of these; fish and wild animals as the sources of protein; and fruits and vegetables for their vitamins and minerals nutrient sources.

For long, this foraging character of small island dwellers has significantly helped and maintained its thriving population in the small islands. This pattern has been continuously changing in a fast phase as integration and globalization themes have continuously shape the phase of human development and consequently spatial development. This phenomenon has been changing the small islands as well, in a span of two decades changes in food consumption and preferences has change the landscape of local economic character in small islands. Increasing demand on food items and commercialization has impacted the food consumption patterns of local island dwellers. As more competitive and regionally/ nationally supported food items enter the local island economy, changes are deemed necessary (Table 5.8). In addition, subsistence agriculture has been threatened by shifting work preferences (especially the youth), migration, food imports and pressure on land resulting in reduced diversity and food security (Connell 2012, 2015b, McCubbin etal. 2017).

**Table. 5.8 Available Food (Carbohydrate, Protein, Others) Sources in Small Island Cases**

| Food Group | Traditional/ Indigent Nutrient Sources | Commercially Available Nutrient Sources |
|---|---|---|
| **Carbohydrate** | Root crops, Cassava, Upland Rice | Rice, Corn |
| **Protein** | Fish, Cattle, Carabao, native chicken | Swine, Poultry |
| **Others** *(Vitamins, Fiber, etc)* | Tropical fruits and vegetables | High Value commercial crops (Lettuce, Brocolli, *etc*); Fruits (Apple, Orange, *etc.)* |

There are two apparent reasons for the changes among local island community's food consumption pattern: (1) preferential bias on commercially available food items import counterpart, which resulted to changes in the crops to produce by the local farmers; (2) tourism impacts to local food items' market demand.

The first notion is explained by the changing food preferences of locals as influenced by massive commercialization of readily available imported food items, influences from local government programs (e.g. seed dispersal, commercial farming, etc), and media and tourist's food concerns/ preference. As such, decisions of the local island communities to change such food consumption preferences are critical in this factor. Also, agricultural work has lost prestige, hence retaining agro-ecology and biodiversity becomes difficult and even unwelcome, following market demands and migration (Christensen, 2011; Connell, 2013; Hair et.al., 2016), lest influx of tourism adding to these pressures.

The second factor translates the larger regional/ national factors that enter the small islands in terms of tourism influx, regional food value chains, regional-national/ inter-island movement of goods and services, etc.

# CHAPTER SIX

*“Each man is an island unto himself. But though a sea of difference may divide us, an entire world of commonality lies beneath”*

*-James Rozoff*

# 6. RESULTS AND DISCUSSIONS ON SMALL ISLAND RESOURCES

Small islands are known to hold some of the most unique and bio-diverse species and ecosystems in the world. It is with this fact that sees small islands are strategic development and management resources (UN, 1990). The potentials for development of small islands are limitless; however, its resources can be limited if not used properly.

As an outright initiative of the Department of Environment and Natural Resources (DENR), the Philippines' national environment agency, key biodiversity areas (KBAs) were identified in the whole archipelago to prioritize conservation and protection of the natural wonders of the country. This directive functions to properly manage the areas specially those under threats from irreversible human activities. Among the identified KBAs in the Philippines, all the three case sites which either has one ecosystem or is considered as a KBA in totality are listed in Table 6.1.

**Table 6.1 The Status of Key Biodiversity Areas of Small Islands in the Philippines**

| Key Biodiversity Area | Location | Status of Protection |
|---|---|---|
| Batanes Islands Protected Landscapes and Seascapes | Batanes | Protected **(NIPAS)** |
| Mt. Bandila-an | Siquijor | Not Protected |
| Eastern Coast of Siquijor | Siquijor | Not Protected |
| Camiguin Island | Camiguin | Not Protected |
| Timpoong and Hibok-Hibok Natural Monument | Camiguin | Protected **(NIPAS)** |

There are 228 identified KBAs in the Philippines, with the archipelagic landscape of the Philippines, around 50 identified areas are small islands and around 10 are protected landscapes and seascapes, while the rest are other types of ecosystems existing within larger masses of lands or even within the small islands (Figure 6.1). However, this identification at the national level must be reinforced with significant case-based resource use plan so the protection and proper management will be achieved. As such, the resources focused in this study are primarily coming from these identified ecosystems so as to form the greater bases for the direct benefits gathered from these natural resource bases.

The Philippines as a mega diverse country has a lot of endemic species which are already identified as part of the KBAs (Figure 6.1). However, it is also clear that still, a lot of areas, especially islands in the archipelagic landscape of the Philippines are not properly protected. The selected small islands for this research are no exemption. The selected small island provinces practically represented all the different categories of KBA protection.

The National Integrated Protected Area System (NIPAS) is a conservation and protection measure at the national policy level that identifies the areas critical for conservation (Table 6.1). It is worth noting that 80% of the total number remains inadequately covered by conservation-related legislation (Ambal RGR, et al, 2012). However, for the selected cases, each of the conservation status of the KBAs are well represented (Table 6.2). At such protection status, variability in terms of the profile of the ecosystems may be observed as well.

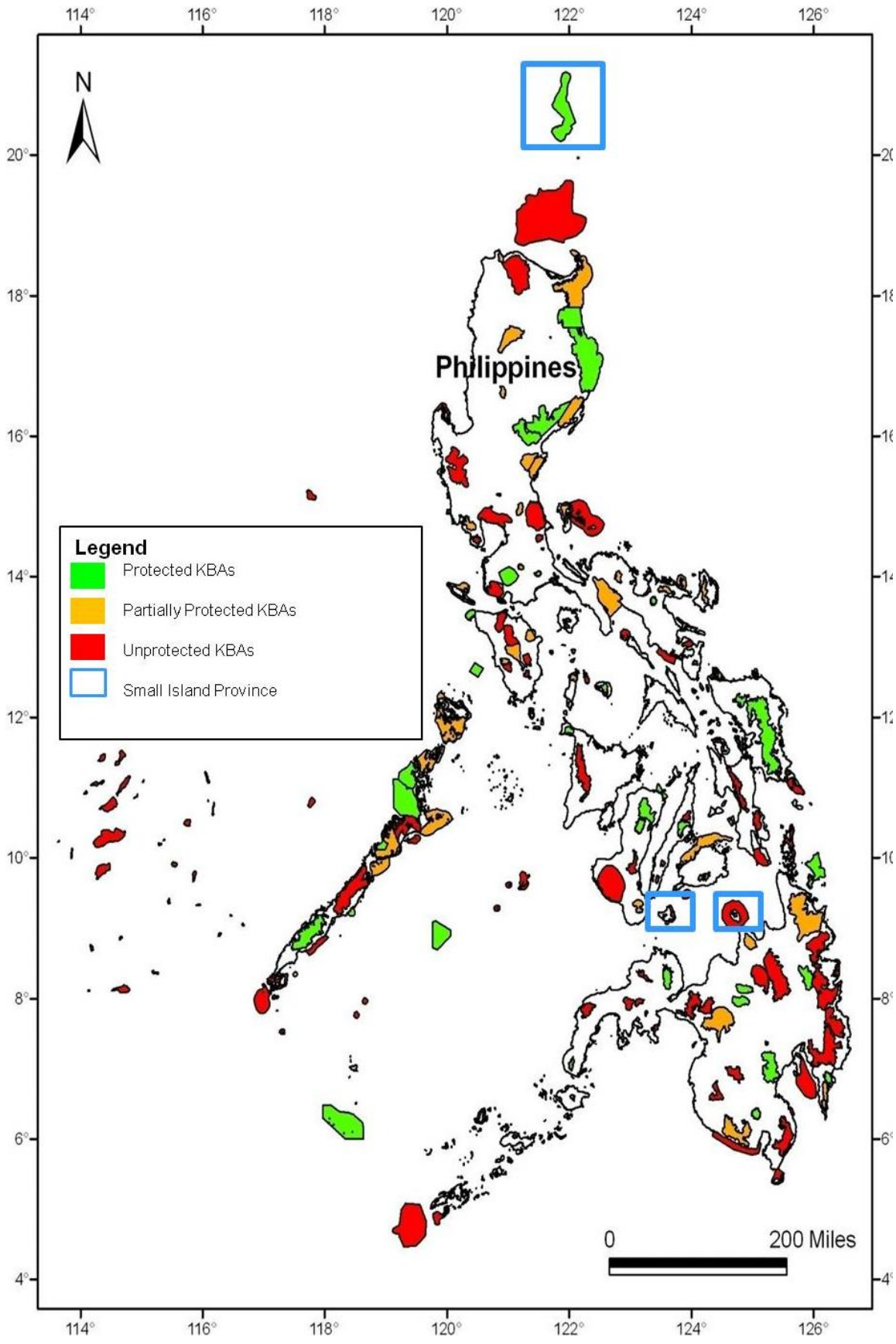



**Figure 6.1 The Status of Protection for the Philippine Key Biodiversity Areas**
Ambal RGR, et al (2012)

**Table 6.2 The Key Biodiversity Areas identified in the Philippines** (Ambal RGR, et al, 2012)

| KBA by Ecosystem Coverage | Area ($km^2$) | No. of KBAs / Percent Share (%) | Status of KBAs' Protection | | |
|---|---|---|---|---|---|
| | | | Protected | Partially Protected | Not Protected |
| **Terrestrial** | 51,249 | 101 / 44% | 27 | 25 | 49 |
| **Marine** | 19,601 | 77 / 34% | 8 | 6 | 63 |
| **Terrestrial and Marine** | 35,702 | 50 / 22% | 15 | 10 | 25 |
| **TOTAL** | **106,552** | **228/ 100%** | **50** | **41** | **137** |

The Philippine Key Biodiversity Areas (KBAs) are identified through the principles of species vulnerability and irreplaceability. These general concepts in biodiversity conservation can be explained further through the following criteria adopted from the Conservation International (n.d.):

*Globally-threatened species (vulnerable species)* - Locations that exhibit a regular occurrence of one or more globally threatened species, as identified by the IUCN Red List, are considered KBAs.

*Restricted-range species (irreplaceable species)* - In the case of the Philippines, where data for range and population sizes are still lacking, endemic species were used as reference for identifying KBAs based on restricted range species.

*Congregatory species (irreplaceable species)* - KBAs may also be defined according to an area's function as a site where at least 1% of the global population of species gather in large numbers during some stage in their life cycle (e.g. breeding).

Such criteria are important to consider especially in underscoring the context of conservation and planning of areas with the existence of the concerned species. These are also considered as indicator species that assures the general quality of the environment where it belongs. Thus, ultimately puts conservation at the center of human-environment harmonious interaction.

Protection under National Integrated Protected Areas System (NIPAS) act provides planning and development mandate from the national environment bureau down to the local environment bureau making natural resources extraction, as one thing, limited and protected. However, no protection from the national policy, such as NIPAS act, will mean the small island province has the sole authority in the development and management of the natural resources within the small island. Often, without such intervention, uncontrolled extraction and misuse of these critical resources, especially within the small islands, jeopardy of the critical habitats and ecosystems of the fragile small island system follows.

### 6.1 Ecosystems of the Selected Small Islands

Among the most vulnerable ecosystems in terms of the recent accounts from the impacts of disasters and climate change are small islands, especially those in the tropics. However, let alone, even without the context of disasters and climate change, small islands are still considered vulnerable in terms of significant human activities. Regardless of such recent developments in the global circulation of events, small islands still gain a spot in conservation, planning and management purposes.

The small island ecosystem is a unique complex ecosystem composed of a little of everything, such unique ecosystem structure encompassing the mountain down to the coastal-marine ecosystems and everything that exists in between makes it geographically different from other larger land masses/ formations. This is the very reason why small islands top the charts in terms of species endemism and species diversity density per square unit as

several species' habitat and niches can only be found in these types of ecosystems. Also, the perceived cumulative impacts of ecosystems failure are directly and immediately felt in small islands compared to relatively larger ecosystems having a larger threshold in absorbing shocks and pressures from natural processes and human activities.

### 6.1.1 Land Cover Accounting for the Selected Small Island Provinces

Generally, small islands include a mountain, lowland (and hilly areas) and the coastal-marine continuum. This ecosystem character encompasses the forest, riparian (fresh water), grassland, agricultural and human settlements, and coastal-marine ecosystems to mention a few. The extent of area coverage of these ecosystems is unique among others, as influenced by size and geography but such commonality among small islands made it unique as compared from large land masses in physical geography.

Such situation deems necessary to look at the small island ecosystem in terms of the individual ecosystems that exist in it and also the context of ecosystem continuum wherein all these complex ecosystems form another layer of complexity as these ecosystems are not isolated from each other but are ultimately connected and related to each other.

Through the land cover accounting, identification of the salient ecosystems was also done, Table 6.3 shows the type of ecosystems found in the small island province cases.

The types of land covers in small islands, although differently formatted, still follow similar contextual critical ecosystem translation. This shows, that every small island case, primarily has the same types of ecosystems thus experiencing relatively similar context in terms of the natural resources availability and its issues and concerns in terms of human use of these resources.

**Table 6.3 Small Island Land Use/ Cover Accounting and Resources**

| Small Island Province | Land Use/Cover | Land Area (Ha) | Type of Critical Ecosystem |
|---|---|---|---|
| Batanes | Agriculture | 1,646 | Cropland |
| | Grassland | 6,753 | Grassland |
| | Woodland | 11,494 | Forest |
| | Built-Up Areas | 156 | Human Settlements |
| | Marine Sanctuary | | Coral Reefs, Sea Grass Beds |
| Camiguin | Alienable and Disposable | 23,723.00 | Cropland, Grassland, Built Up Area |
| | Woodland | 5,464.00 | Forest |
| | Marine Sanctuary | | Coral Reefs, Sea Grass Beds |
| Siquijor | Agriculture | 16,555.006 | Cropland |
| | Grassland | 851.592 | Grassland |
| | Classified Forest | 1,188.497 | Forest |
| | Built-Up Areas | 384.784 | Human Settlements |
| | Agro-forestry | 6259.837 | Forest |
| | Mangrove and Swamp | 127.763 | Forest, Freshwater and Mangrove |
| | Secondary Growth Forest | 6,445.505 | Forest |
| | Marine Sanctuary | | Coral Reefs, Sea Grass Beds |

Technically, small islands have a variety of critical ecosystems from the upland (forest) ecosystem to the agriculture and built up environment and the coastal-marine environment

(Table 6.3). Although the coastal-marine ecosystem is not commonly emphasized in the land use planning, recent trends and this research opted to include the coastal-marine environment as small island continuum works from the mountain ecosystem up to its realized link to the coastal-marine environment.

In support to this, the sea is a natural extension of small island dwellers, the coastal-marine environment has always been a part of small island ecosystems. Also, the concept of ecosystem-based planning emphasized this aspect as the coastal-marine environment is a natural extension of land-based ecosystems, as much of the resources cycling throughout the system moves to the coastal-marine ecosystem in various forms.

The Philippine Fisheries Code of 1998 has defined areas for municipal waters for the small island province cases, as such, measuring the lines drawn perpendicular to the general coastline from points where the boundary lines of the municipality touch the sea at low tide and a third line parallel with the general coastline including offshore islands and 15 kilometers from such coastline is considered under the administrative policies of the municipality. With this, the natural extension of coastal-marine environment has been somehow addressed; however, such measures only apply for the economic sovereignty of the concerned municipality. With limited capacity to manage the seas, the extent of local government efforts to conserve the coastal-marine ecosystem is by putting marine protected areas or sanctuaries as nesting sites for coastal-marine species.

Also, much of the land cover pertains to both forest and cropland areas, and the share of land area coverage for each of the land use/cover in the small island cases (Table 6.3) are big. Clearly, small island economy is driven by agriculture. This sector includes fishing, farming and grazing, at the most basic. Almost all the local island communities are relying to this economic sector for their survival. Also, the continuously thriving tourism industry is more like related to nature tourism that directly draws its resources from the pristine state of the natural island ecosystems.

The following section will provide the small island resources context of the cases, which will further provide bases for the type of local economies thriving in small islands. Lastly, these island resources, given that they are coming from the small island ecosystems, are endogenous and is a factor of sustainable use of island resources.

### 6.1.2 Industrial Resources and Clusters Defining the Small Island Economies

Common resources, for instance, found in small island ecosystems are primary resource inputs for community livelihoods thus propelling the continued survival of the local island population aside from its reliance to importation.

In former times, the context of physical isolation is glaring and there is no choice but to rely perfectly in the small island resources for survival. On the same context, these small island resources are still used to feed for the human activities of islanders. Some of the identified common island resources from their respective ecosystem bases are listed in Table 6.4.

These common resources are those island resources from the cases that are usually found in abundance. For this reason, such raw material resources are valuable in generating local livelihoods and income for the families. Also, equally important to note, that the critical species or indicator species for these key biodiversity areas are not included as the common resources used in the small islands, thus making the use of the resources less destructive; however, the issue of over extraction still is a question of supply and demand.

Also listed in Table 6.4 are the identified resources industry clusters as the Philippine's major strategy under the Philippine Development Plan 2011-2016. These resources are selected due to their relative abundance and its probable role in helping achieve the Philippine's vision of a globally-competitive and innovative industry and services sector that contributes significantly to inclusive growth and employment generation (DTI, 2016).

Looking closely at the resources found in small islands, much of the prioritized resources clusters in the Philippine Development Plan are also found in the small islands (Table 6.4). Provision of raw material resources based from the identified common resources found in small islands like bamboo, tuna, livestock (dairy), seaweeds, mango, and tourism are much like comparable to what the national development strategy implies. Such results could imply that policy options for small island economic resources expansion are laid down and ready.

**Table 6.4 Common Raw Material Resources Found in Small Island Ecosystem**

| Island Critical Ecosystems | Raw Material Resources[9] | Industry Clusters[10] |
|---|---|---|
| **Forest** | **Fuel Wood**<br>**Lumber** *(Bamboo, etc)*<br>**Forest Litter**<br>**Herbs** *(Medicine, Tea, etc)*<br>**Honey**<br>**Mines**<br>**Forest Landscape** *(Tourism)* | Bamboo<br>Coffee<br>Mining<br>Palm Oil<br>Rubber<br>Wood |
| **Grassland** | **Grass** *(Livestock Feed)*<br>**Livestock** *(Cow, Goat,etc)*<br>**Shrubs**<br>**Meandering Hills** *(Tourism)* | Dairy<br>Poultry |
| **Freshwater** | **Sand and Gravel**<br>**Aquaculture** *(Tilapia, Milkfish)*<br>**Water**<br>**Falls/ River View** *(Tourism)* | Tourism<br>Milkfish |
| **Cropland** | **Fruit Trees** *(Mango, Lanzones, Banana, Coconut, etc)*<br>**Grains** *(Corn, Rice, etc)*<br>**Spices** *(Garlic, onion, etc)*<br>**Root crops/ Tubers**<br>**Legumes**<br>**Vegetables**<br>**Cut flowers** | Banana<br>Mango |
| **Coastal-Marine** | **Fish** *(Tuna, Flying Fish, Scad, Grouper, Dorado, etc)*<br>**Crustaceans** *(Shrimps, crabs, etc)*<br>**Seas Shells**<br>**Sand**<br>**Seaweeds**<br>**Coral**<br>**Coast line** *(Tourism)* | Tuna<br>Seaweeds<br>Tourism |
| **Human Settlements** | **Historical, Natural Tourist sites**<br>**Skilled local population**<br>**Indigenous Knowledge** | Health and Wellness<br>ICT<br>Wearables & Homestyle<br>Gifts/Decors Housewares |

[9] Island Ecosystems resources from the participatory mapping

[10] Identified Industrial Clusters in the Philippines

Loosely, this strategy could push for the creation of conditions conducive to the growth and competitiveness of private businesses (big, medium, small and even micro) that are also relevant and practical for small island economies. However, the local communities are tied to addressing their local survival needs and not necessarily moving towards the economic profits they could assume from these resources. Much of these aspects are dealt in the poverty context of small island communities.

Local resources found in small islands are usually used as a survival and/or economic goods. This has been shown in the resources and industry cluster network relationship analysis that is discussed in the next section. Also, employment related to this sector involves those secondary and tertiary jobs, often involving specific skills and educational backgrounds unlike the all-inclusive agriculture sector.

Further analysis on the local industrial clusters informs the kind of local economic condition that thrives in the small island provinces. Based from the registered business establishments from the small island cases for four years (Appendix A), the top industry clusters are shown in Figure 6.2 showing the industry cluster types that pre-dominate the small islands.

Trading of wholesale and retail goods is among the local industry clusters that dominate the small island economies. The primary type of businesses thriving in small islands under this industry cluster is the variety store, which sells retail goods. These retail goods are often processed goods, which are imported from the regional market combined with very limited and minimal local resources. This alone defines how relatively dependent to importation of goods is the local economies of small islands.

The proliferation of retail trading in small islands is a clear indication of Small Island's heavy reliance to the mainland processed products. In Figure 6.2 (G), retail goods, being the small islands main import, have been a defining character of every local small island economy.

The other apparent industry clusters (Figure 6.2) that follow include business establishments offering services such as renting and other administrative support. Renting (Figure 6.2-H) pertains to transportation vehicles rented out to provide mobility services within the small island provinces. Administrative support (Figure 6.2-N), on the other hand, pertains to manpower services supportive of marketing and other domestic activities.

In addition, the accommodation and food service industry cluster (Figure 6.2-I) further defines that the small island cases are areas for vacation among tourists. Services provision such as resorts, hotels and restaurants, among others, define much of the economic activities lining the built communities of the small island cases.

Manufacturing as an industry cluster (Figure 6.2-C) is also among the most prominent. However, this is primarily composed of bakeries, furniture making shops and handicrafts/souvenir making shops. It is important to note that, although manufacturing activities are essential, the type of activities remain basic and not much value addition is created in this industry cluster. Important as it is, all of these manufacturing clusters are only thriving at the local small islands level and providing for the local islands needs. Also, much of the raw material needs for the manufactured goods are also imported to the island. Although the island itself can produce such raw material resources (aside from water and firewood), the impact and influence of the regional neighbouring market in providing raw material goods for bakeshops and processed foods is still very strong.

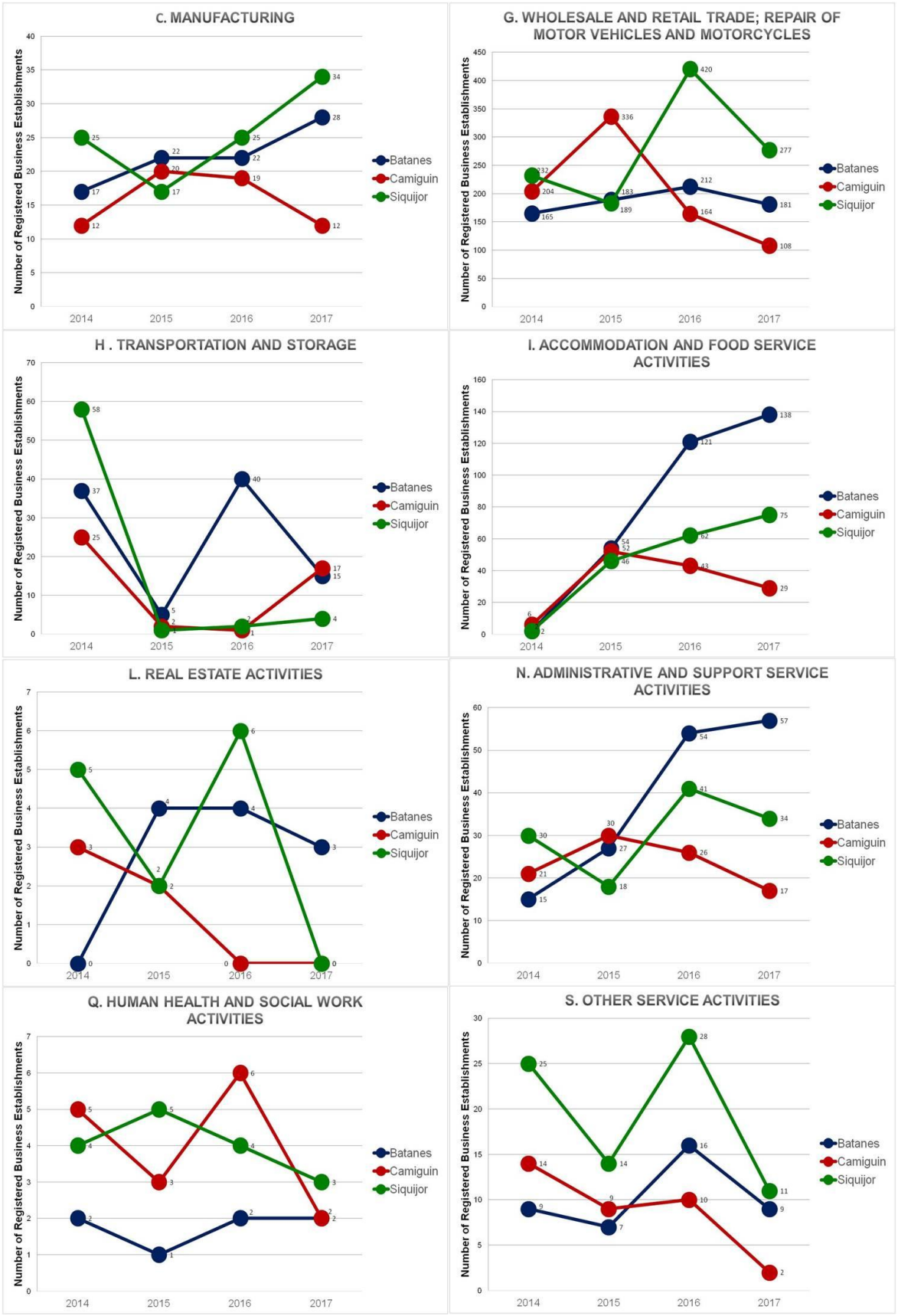


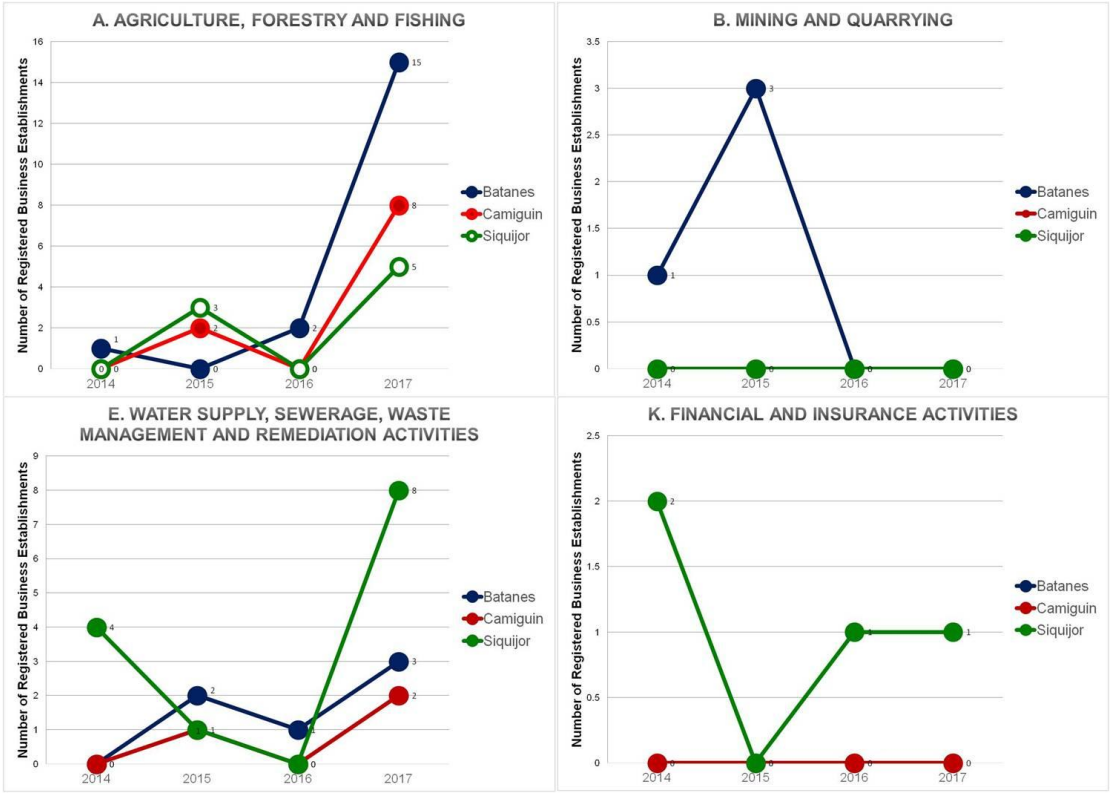

**Figure 6.2 Top Small Island Local Industries**

Other service oriented industrial clusters include those related to human health and wellness services and equipment repair, entertainment services and computer renting facilities (Figure 6.2 Q and S). These services provide a variety of options for the locals to venture on in terms of economic activity diversification. However, mismatch in the educational attainment and training of locals exists as these tradesmen job is not commonly taken by the students in the small islands.

Considering the number of industries involved among the top industry clusters, Siquijor province has more industry clusters offering manufacturing, retail and other services activities as compared to the other two small island provinces. Transportation and storage cluster, accommodation and food services and real estate activities are much appreciated in Batanes province compared to the other two. And Camiguin places second in almost all these top industry clusters, respectively (Figure 6.2).

Although agriculture (Figure 6.3) propels the local economy of small islands, in the industrial cluster, only a few are registered under this industry cluster. This further validates that only a few are able to transform the subsistence character of small island agriculture into a thriving economic industry. This can also be attributed to the very limited infrastructure support services and area for possible agricultural expansion. On the same note, limited industry formation, in general, can be expected as support services are also not sufficiently in place. Nonetheless, primacy of natural resources availability can be seen from the profile.

Other services consuming the basic small island resources also abound the industrial clustering (Figure 6.3), these include water related industries and mining adding to the agriculture. Although these extractive industries are not entirely present in the three small island provinces, such as the very destructive mining activities (Figure 6.3- B), initially the island province of Batanes have some recorded mining related activities; however, it stopped in 2016 when stricter implementation and enforcement of environmental laws were practiced.




**6.3 Small Island Local Extractive Industries**

Agriculture remains as a strength of the island province of Batanes, as the island boasts sustainable agricultural practices following the traditional farming culture of the small island. Water related activities have been very pronounced in Siquijor, as large-scale resorts and restaurants abound the area, adding to the large local population it caters compared to the other two small island provinces.

Financial related services (Figure 6.3-K) have been found to exist in the island province of Siquijor, wherein, the other two small island provinces do not have.

Spatial distribution of these local small island industries follows the Zipf's Law or the rank size rule. Capital towns of the small island provinces contain much of the economic industries in the whole island context. Industries are centralized in the capital town, taking more than half of the share of the total centrality scores for each small island cases (Table 6.5).

**Table 6.5 Summary of Centrality Scores among the Municipalities of the Three Small Island Provinces 2014-2017**

| Human Settlements | Centrality Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2014 | | 2015 | | 2016 | | 2017 | |
| | Score | % Share | Score | % Share | Score | % Share | Score | % Share |
| Basco | 8.06 | 89.57 | 4.94 | 61.81 | 4.98 | 49.76 | 6.33 | 63.28 |
| Itbayat | 0.42 | 4.70 | 1.53 | 19.10 | 0.72 | 7.17 | 0.78 | 7.80 |
| Ivana | 0.25 | 2.76 | 0.82 | 10.27 | 1.47 | 14.67 | 0.93 | 9.31 |
| Mahatao | 0.27 | 2.97 | 0.57 | 7.13 | 0.19 | 1.92 | 0.39 | 3.88 |
| Sabtang | 0.00 | 0.00 | 0.14 | 1.69 | 2.65 | 26.48 | 1.36 | 13.60 |
| Uyugan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 | 2.13 |
| **Batanes** | **9.00** | **100.00** | **8.00** | **100.00** | **10.00** | **100.00** | **10.00** | **100.00** |
| E. Villanueva | 0.49 | 4.91 | 0.25 | 2.52 | 0.37 | 4.14 | 0.28 | 3.14 |
| Larena | 4.19 | 41.85 | 1.95 | 19.45 | 0.19 | 2.13 | 0.93 | 10.31 |
| Lazi | 1.15 | 11.47 | 2.11 | 21.07 | 2.56 | 28.40 | 0.29 | 3.23 |
| Maria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.61 | 29.02 |
| San Juan | 1.37 | 13.70 | 0.94 | 9.41 | 1.29 | 14.31 | 0.83 | 9.18 |
| Siquijor | 2.81 | 28.07 | 4.76 | 47.56 | 4.59 | 51.03 | 4.06 | 45.12 |
| **Siquijor** | **10.00** | **100.00** | **10.00** | **100.00** | **9.00** | **100.00** | **9.00** | **100.00** |
| Catarman | 0.39 | 4.81 | 0.72 | 8.94 | 1.64 | 23.38 | 0.15 | 1.83 |
| Guinsiliban | 0.06 | 0.78 | 0.61 | 7.61 | 0.02 | 0.35 | 0.13 | 1.59 |
| Mahinog | 0.54 | 6.77 | 1.00 | 12.56 | 0.32 | 4.52 | 2.13 | 26.66 |
| Mambajao | 6.73 | 84.09 | 5.26 | 65.75 | 4.88 | 69.66 | 4.14 | 51.72 |
| Sagay | 0.28 | 3.55 | 0.41 | 5.14 | 0.15 | 2.10 | 1.46 | 18.20 |
| **Camiguin** | **8.00** | **100.00** | **8.00** | **100.00** | **7.00** | **100.00** | **8.00** | **100.00** |

The centrality index further informs that much of the other municipalities within the small island province retain its rural setting, wherein survival agriculture, fisheries and natural resources extraction are the primary economic activities. These activities, survival in nature, fail to progress as an enterprise to be categorized as an industry, thus, excluded in the measures for obtaining the centrality of economic industries for small islands. The detailed tables for the centrality results for each of the provinces are specified in Appendix B.

### 6.1.3 Small Island Resources Network Analysis

A simple relational network analysis was done to analyse how a particular ecosystem impacts a local industry in terms of their raw material input is summarized in Figure 6.4. In the provided common resources present in the small islands, it is evident that much of the

relationships created are related industries involving household undifferentiated activities (T), Accommodation and Food Service (I), Wholesale and Retail Trade (G), Manufacturing (C), Services Provision (S) and Agriculture, Fisheries and Livestock (A) - all related to translation of the raw material resources into basic survival products or direct reselling (trading) in small islands. All these local industry classifications are found in the central part of the relational chart (Figure 6.4) unlike the others that are farther away from centrality. This also suggests that although much of the resources are available in the small islands, still, much of which are not used as only 28.6% of all the industry classification found in small islands have strong relationship (networks/ connections) with the local common resources.

On the other hand, the rest of the local industries classified have limited relationships and four (*Industry Classification J, K, O, and U*) of which are not even related while three (*Industry classification E, H, and P*) occupy a single relational connection with the resources found in the local island ecosystems (Figure 6.4). These industries related to services provision and more sophisticated technological requirements remain unrelated to the small island natural resources, aside from the manpower (local population skills) involved.

This relational analysis only shows how significantly dependent is the local economy and the local population to the common raw material resources found in small islands. Although available, and some of which are in abundance, its translation into other products more valuable has been limited to food production and processing and few material goods (handicrafts) as products.

Among the common resources found in the small island cases, those items that can be directly consumed (as food) or used (as food ingredients) are the most connected to the local industries classified in small islands. These resources primarily come from the cropland or agricultural ecosystem and the coastal-marine ecosystem. These ecosystems provide much of the foods consumed within the island, both by local dwellers and tourists.

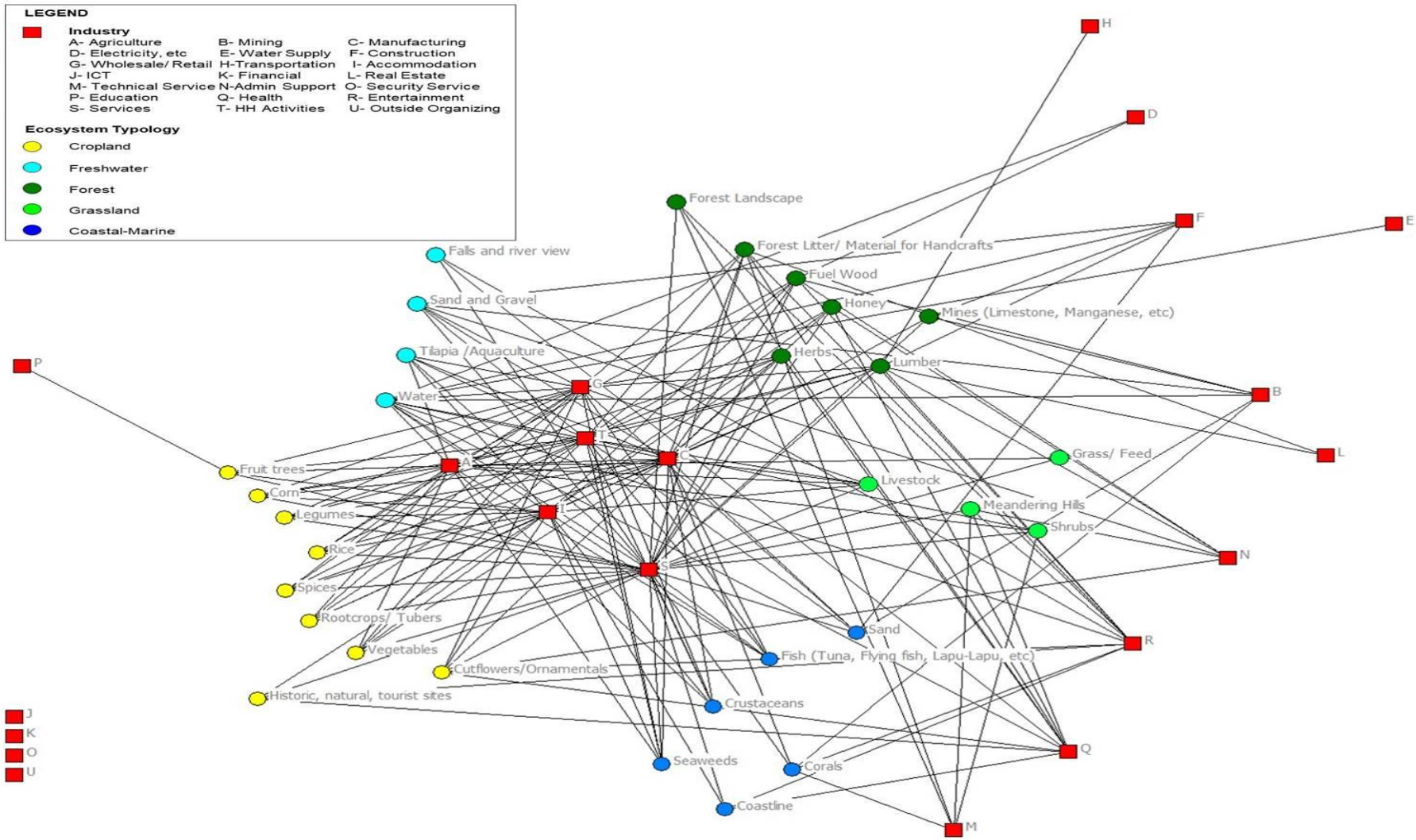



**Figure 6.4 Relationships of Small Island Resources and the Local Industries**

Furthermore, the relationships or connections in Figure 6.4 pertain to both survival and basic commercial and trading activities that facilitates the movement of goods and services within the small island cases. Here, it is also clear that all the common resources identified in small islands are utilized by the locals as part of their survival activities and also forming a huge part of their economic and livelihood activities.

### 6.1.4 Mapping for Small Islands Land Resources

Varied resources exist in small islands, all have corresponding uses and function to the human communities. The usual profile of resources is a good means of identifying these; however, those resources that community members see as more important due to its direct impacts to their livelihoods are equally interesting to map out.

Through participatory mapping, several resources were identified and analized base from its use to the human communities residing within the small islands. For the three small island cases, participatory mapping was done to locate the actual resources used as part of their livelihood. Classified into agricultural, mountain, cultural, and coastal-marine resources, several types of these resources were identified and analyzed.

**Batanes Group of Islands.** Resources found in Batanes are mapped in Figures 6.5a, 6.5b and 6.5c. Given the landscape of Batanes, with the prominence of meandering hills and mountains, the resources commonly identified by the local communities include livestock (grazing), patches of agriculture lands (crops and rootcrops), and human settlements where tourism areas (natural and heritage) are found.

Coastal-marine resources were also identified, these are through communities common fishing grounds, sea grass and coral reef areas. Since islands are separated by water from other islands or the larger spatial systems, the surrounding waters of Batanes are technically considered as their fishing grounds. The expanse of fishing grounds, however, are still limited to seasonality and restrictions through strict protection zones.

Infrastructure facilities such as sea ports (fish landing sites, terminal, etc) airports and other relevant utilities were also identified.

Strict protection zones are also identified for the island province of Batanes, although the whole island and its waters are considered protected by the National Integrated Protected Areas Networks (NIPAS) law and the Indigenous Peoples Rights Act (IPRA), still identifyable protection zones were mapped out. On a more important note, community members being able to recognize these protection zones can be an indication of their awareness of the environmental considerations of their area.


**Figure 6.5a Resources Mapping in the Island of Batan, Batanes**


**Figure 6.5b Resources Mapping in the Island Group of Sabtang, Batanes**


**Figure 6.5c Resources Mapping in the Island Group of Itbayat, Batanes**

Shown in the figures are the prominence of livestock, especially the grazing animals, this is in relation to the expanse of land suitable for grazing in Batanes. Other areas of grasslands are used for crop production. All are either backyard gardening or community-based.

Similar restrictions are also experienced in the coastal-marine resources, as the municipal fishing grounds form part of the protected seascape. Small fishing vessels and traditional methods are mostly allowed in the surrounding waters of Batanes.

Batan Island resources are administratively divided into four municipalities. These municipalities are Basco, the provincial capital town, and three other small towns namely, Mahatao, Ivana, and Uyugan. Grazing lands are commonly found in the whole island, however, the towering mountain of Iraya and Matarem (Figure 6.5a) are the highest points of the island. Mt. Iraya is under the jurisdiction of Basco, Batanes while Mt. Matarem is between the muncipalities of Ivana and Mahatao, Batanes.

However, it is worth noting to include some services available in the island such as the airport of Batanes and the ports that link the island of Batan to other islands of Batanes (Figure 6.5a). The airport links the whole island group of Batanes to the Cagayan Valley region and the country, through daily scheduled flights. The port in Basco, Batanes is servicing the island province's regional and national role. This port serves for the inflow and outflow of agricultural resources in Batanes and also the sea transportation to the island of Itbayat, the northernmost municipality of Batanes. On the other hand, the port in Ivana, Batanes serves as a seaport for the transportation of goods and services, including daily trips to the municipality of Sabtang, Batanes.

Tourism sites flocked the whole island of Batan, distributed along the four muncipalities. The usual tour activities offered to go over these sites are divided into two tour plans, the South Batan tour package and the North Batan tour package, respectively.

Coral reef areas abound the southwest portion of the island of Batan (Figure 6.5a), although other areas have scattered patches of coral reefs as well. These areas have relatively good number and well monitored coral reef sites underscoring the actual health of the coastal-marine areas of Batanes.

The island group of Sabtang (Figure 6.5b) has the same geography, but less of towering mountains and just rolling hills. Grazing is more prominent here in this island group as the other uninhabited island of Vuhus (Nakanmuan) (Figure 6.5b) is used solely for this purpose. The livestock here provides much of the protein consumption needs of the whole island province, especially the increasing demands of tourists.

The larger island of Sabtang (Figure 6.5b) contains all the tourism sites boasted in Sabtang, Batanes. These sites include a century old community of Ivatans will all the houses and other structures intact. All other human settlement activities are also held in the island of Sabtang.

Sea grass area abound the Vuhus (Nakanmuan) island (Figure 6.5b) where sitings of sea turtle species are found. The island of Sabtang on the otherhand has some wetlands where migratory birds are commonly seen.

The case of the Itbayat island group is much different in terms of its geography, much of the Itbayat inhabited island, the largest among the other small islets (Figure 6.5c), is bounded by towering cliffs. Beach areas do not exist in this island, thus several minor ports are

operational to connect the island to other islands of Batanes. The ports are usually located on rocky–slopy areas with less wave actions. Although locals are used to the ever changing waves in the area, still, the harsh conditions in the island of Itbayat and all its resources endowment are worth exploring.

The island also has an airstrip (Figure 6.5c) that connects the captial town of Basco in Batan island to the town of Itbayat. Other resources in the island include the mountains of Caroboban (North) and Riposed (Southeast). The island forms a basin like geography due to its high boardering cliffs and relatively flat to rolling hills island interior where much of the settlements and other resources are found.

The smaller uninhabited islets farther north of Itbayat is used for fisheries. The northernmost island (Mavulis) is used as an outpost for coast guards and temporary resting area for local fisherfolks with cold storage facility. Mavulis island, is even closer to Taiwan than mainland Luzon of the Philippines. However, not significant inter-country economic interaction is recorded aside from isolated encroachment of large fishing vessels of China and Taiwan to the exclusive economic zones of the Philippines, nearing the areas covered by the traditional fishing practices of Batanes fisherfolks.

The islets and some areas in Itbayat has the coconut crabs (*Birgus latro*). Formerly, harvesting coconut crabs are not controlled, however, due to its dwindling population a moratorium for its consumption is somehow controlled in the whole province. The coconut crab is also under the IUCN red list making the unpresidented harvesting of such species relatively unsustainable.

**Siquijor Island Resources.** The island province of Siquijor, unlike the Batanes group of islands, is a lone small island province together with the large islands of Cebu, Bohol and Negros forming the Central Visayas region. Resources also abound the island province of Siquijor, primarily on the crops planted and the tourism sites identified by the locals.

Siquijor island province's geography is flat to hilly and a peak at Mt. Bandilaan in Larena, Siquijor. The island province is blessed with a huge stretch of coastal beaches, majority of which are white sand (Figure 6.6). The lowland is occupied by agricultural land uses scattered into patches throughout the whole island province.

Crops planted such as rice and corn are usually intercropped with the naturally occuring coconut trees abounding the whole island province (Figure 6.6). Vegetable production is increasingly available especially related to the products supporting the tourism start ups in the island province.

Grazing and livestock production, although not reflected in the map of resources are scattered throughout the island province as well. These activities however, are accounted as backyard livelihood activities. Fisheries abound the whole island province waters. Some areas are considered as good dive sites for the rich coastal-marine resources such as coral reef formations.

Natural attractions such as falls, springs and rivers were identified as part of the tourist attractions in the map (Figure 6.6). The heritage areas, such as the century old church and convent and other old structures forming the Siquijor heritage were also identified in the map.


**Figure 6.6 Resources Mapping in the Siquijor Island Province**

Areas subject for protection include a forest area and several identified marine protected areas (MPAs). These MPAs are mapped-out to show the areas conserved as fish breeding sites for a more sustainable fish stocks in the island province. Other projects for coastal-marine environment preservation and restoration are on-going to uplift the quality of coastal-marine environment of the island province of Siquijor.

Other resources worth highlighting are the infrastructure facilities related to agricultural production and accessibility of the island of Siquijor, all these are identified in the resource map (Figure 6.6).

**Identified Resources in the Island Province of Camiguin.** Considered as the second smallest island province in the Philippines, Camiguin is teeming with productive resources as identified by the local island communities.

Similar geographic character can be found in Camiguin as a towering mountains are found here, the Mt. Timpoong and Hibok-Hibok complex. This peak and all its ecosystems is considered as a national monument under the NIPAS act. Several other hills and volcanoes abound the island, as it is known as the “island born of fire.”

The Camiguin island also includes two islets: the Mantigue Island and White Island, respectively which are known tourist attractions (Figure 6.7). Surrounding these islets and some identified areas of the coastal waters of Camiguin are coral reefs and patches of mangrove areas. Also, the giant clam sanctuary in Guinsiliban, Camiguin indicates a good quality of coastal-marine environment. The sanctuary has a collection of six out of seven giant clams known to occur the Philippine territories.

Some other natural features identified in the island province of Camiguin include waterfalls and springs which are also famous tourist sites within the island province (Figure 6.7).

Agricultural resources found in Camiguin include rice, coconut, banana and abaca. Fruit bearing trees such as cacao, mango and Lanzones *(Lansium domesticum)* also grow naturally in the Camiguin soils. The fertile soil of Camiguin is owed to its volcanic origin making it very suitable for the mentioned tropical fruits to abound the whole island province.

The common fishing grounds identified by the locals include the surrounding shallow waters of Camiguin. However, the activities are also closely monitored by the coastal resources managament office of the province to assure the improving quality of the coastal-marine resources in the island province. Also, the marine protected areas were mapped-out to show the areas that needed to be protected as a fish sanctuary for the continues fish productivity in the Camiguin waters.


**Figure 6.7 Resources Mapping in Camiguin Island Province**

### 6.2 Primary Resources Outflows of Small islands

Through participatory mapping, the general movement of goods and services from the small island cases to the surrounding areas were mapped. Many revealing facts can be generated in these maps. Upon the identification of resources within the small islands important in the communities' livelihoods, its usual movement throughout the system were also mapped out.

This section discusses the movement of economic goods and services from the small islands going to the region and also to other areas in the country. The raw material goods or resources identified can either move along the small island province and/ or outside the island province going through the region or farther.

Economic goods and services produced in small island cases are always sold as raw material products. Table 6.6 lists the top products sold per island province case. The related services on the other hand are in terms of local tourism offered.

**Table 6.6 The Raw Material Goods Produced by Small Island Province**

| Province | Natural Ecosystem | Economic Resources | Remarks |
|---|---|---|---|
| Batanes | Grassland | Garlic | Tagged as "organic" |
| | Grassland | Rootcrops | Tagged as "organic" |
| | Coastal-Marine | Fishery Resources | |
| Siquijor | Grassland | Cattle | |
| | Grassland | Banana | |
| | Coastal-Marine | Fishery Resources | Includes Seaweeds, Seashells and Sea Cucumber |
| Camiguin | Forest | Lanzones | |
| | Forest | Coconut | |
| | Coastal-Marine | Fishery Resources | |

The outflow of raw material goods is seen through the participatory maps generated. Clearly, the link of small islands to the region is established through these resources movement. The flow of raw material resources is primarily dictated by the demand created by the consumption of the products, either as raw material good or as input to a valued commodity.

Raw material goods such as agricultural products coming from the three small island provinces flow throughout the system in two forms: 1) Raw material resources flow within the small island; 2) Raw material goods outflow to Regional (or national) economic environment.

#### 6.2.1 Resources Flow within Small Island Province

Local raw material goods flow circulate throughout the island in terms of the local daily survival demands of the communities, these natural resources are usually in the form of survival goods such as daily food commodities. Among the top products of small island province include fishery resources and other meat products. The local demands either consumed as household goods and others are directed towards the local tourist lodges and restaurants.

The local resource exchanges usually happen among municipalities with some buying and direct selling are not even held in the market, but through common informal areas (fish landing sites) especially for fishery resources. Meat products exchange are most commonly held through the market, however, with its increasing demand, it can also be sold at sources as restaurants and lodges usually do pre-orders to assure stocks for their guests/ customers.

Crops and other agricultural products move throughout the small island also by land transportation taking advantage of the circumferential road connecting all the municipalities.

Local raw material products flow is not mapped out, but the flow usually goes surrounding the whole island province dictated by the capital town as the main economic hub for each of the municipalities in the small island.

### 6.2.2 Regional Raw Material Flows

The raw material flows at the region is more lucrative and engaging because the demand is usually higher, given such population and increased economic activities pulled off by the urban centers. Other aspects for a successful movement of these raw material goods are emphasized in a research conducted by Jayne, et.al. (2010) saying that cultural economic opportunities are part tied to location relative to metropolises, access to infrastructure networks and proximity to national/ international markets.

Since the population at the region is larger than the small island, the demand at the regional level is usually higher; however, such demand needs to also consider the competition among producers of goods that are sold. Only if the product of small island resources is unique or has preferential advantage due to established quality advantages, then the issue of competition is washed down. Nonetheless, in most cases, these raw material goods from small islands need to compete in the market dictated at the region.

Regional interconnectivity is a function of the physical implements or facilities available, these include ports, airports, trading posts, fish landing sites, etc. The following table (Table 6.7) shows the regional linkages connecting the small island province to other areas in the region.

The fish landing sites for the small island province cases are usually informal and small. Since the direct consumers are the families and some local restaurants and accommodation businesses. However, regional fish landing sites are also available showing the direct outflow movement of fishery resources from the island provinces water jurisdiction to the regional markets.

The table shows the regional/ national linkages of the small island province. Sea routes are the most common connections among the three small island cases followed by air transportation. Sea routes are usually held for the movement of people and goods. However, smaller ports are more likely to carry only those raw material goods from the small islands. Specialized trips are also linked to specific goods and not for public transportation. This is very common to the case of Siquijor were goods are directed towards the highly populous tourism areas and regional hubs of Cebu and Bohol.

The regional context of transport linkages is primarily derived from the established daily route. Interestingly, historical linkages of local population movement also created additional linkages, which extend the regional supply-demand influences to national or inter-regional scale. This is seen through the Bohol-Camiguin link, Siquijor-Dumaguete link, Siquijor- Iligan link, and Batanes-Ilocos link (Table 6.7). These spatial linkages open up the small island provinces into additional outflow areas (sink) for the raw material goods aside from a well-established linkage within the regional administrative boundaries from which the island province usually belongs.

**Table 6.7 Economic Facilities and Services Connecting Small Islands and the Region**

| Island Province | Economic Facility | Type of Service[11] | Goods/ Services Delivered[12] | | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | | FI | NFI | CA | P | |
| **Batanes** | Seaport | | | | | | |
| | Basco Port | Non-RORO | X | X | X | X | Inflow of resources to the island province Manila-Basco and Currimao-Basco; Inflow/outflow of resources to Aparri and Sta. Ana, Cagayan; Passenger transport (Basco-Itbayat) |
| | Itbayat Port | Non-RORO | X | X | X | X | Passenger transport; food and non-food items from Basco |
| | Airport | | | | | | |
| | Basco Airport | Domestic | X | X | X | X | Passenger and limited items movement to/from Manila, Tuguegarao city, Cagayan, Itbayat |
| | Itbayat Airport | Community | X | X | X | X | Passenger and limited items movement to/from Itbayat |
| **Siquijor** | Seaport | | | | | | |
| | Larena Port | RORO/ Non RORO | X | X | X | X | Inflow/Outflow of resources to Larena from Cebu and Bohol; Passenger transport (Cebu-Bohol-Siquijor) |
| | Siquijor Port | RORO/ Non-RORO | X | X | X | X | Inflow/Outflow of resources to Siquijor from Cebu, Bohol and Dumaguete City; Passenger transport (Cebu-Bohol-Siquijor/ Dumaguete City-Siquijor) |
| | Lazi Port | Non-RORO | X | X | X | X | Passenger transport (Lazi, Siquijor-Iligan City, Lanao del Norte) |
| | Airport | | | | | | |
| | Siquijor Airport | Community | X | X | X | X | Passenger and limited items carrier to/from Cebu City and Dumaguete City |
| **Camiguin** | Seaport | | | | | | |
| | Benoni Port (Mahinog) | RORO/ Non RORO | X | X | X | X | Inflow/Outflow of resources to Camiguin province from Misamis Oriental; Passenger transport (Balingoan-Benoni/ Macabalan-Benoni) |
| | Balbagon Port (Mambajao) | RORO/ Non-RORO | X | X | X | X | Inflow/Outflow of resources to Camiguin province from Bohol; Passenger transport (Balbagon-Jagna) |
| | Guinsiliban Port | RORO/ Non-RORO | X | X | X | X | Limited use |
| | Airport | | | | | | |
| | Camiguin Airport | Domestic | X | X | X | X | Passenger and limited items movement to/from Cebu City |

[11] Non-RORO (Roll on roll-off, means that vessels only carry cargos excluding trucks and other heavy machineries); N- National, R- Regional, L-Local
[12] FI- Food Items; NFI- Non-Food Items; CA-Construction/Concrete Aggregates; P-Passenger

A more drastic impact can be seen if the linkage is seen at the national level, wherein the competition is higher and the costs are usually invariable. Such case is exemplified by Camiguin, wherein their infamous raw material produce (Lanzones) finds its way to the national market, however seasonal. In contrast to this, Batanes is experiencing the inflow of resources from the national capital (Manila) towards the island, in terms of rice production and other goods, as its physical isolation context is really a different case as compared to the other two small island cases.

**Batanes Group of Island Raw Material Resources Flow.** The island context of Batanes, compared to the other two island provinces, has practically the most isolation issues. Geographical character and accessibility as factors coupled with the regional disassociation through limited services linking the island of Batanes to Cagayan Valley make the island case more interesting.

Still, several resources are produced and considered valuable for the small islands that move outside Batanes. Among the top produce of Batanes (Table 6.6) include garlic, root crops and fishery resources. The general outflow of these identified resources is towards the Cagayan Valley Region and to Manila as an additional case for garlic (Figure 6.8).

The garlic produced in Batanes, termed as “organic” due to the traditional agricultural practices and land conservation strategies of farmers (PCIP-Batanes, 2016), is the primary resource export of the province. It moves from the island province to the region and also to the Philippine capital city, Manila.

The production of garlic surpasses the self-sufficiency for the province; thus, its market has grown to include that of the region and the nation’s capital. Although the regional market is closer to the island province of Batanes and is considered as more strategic, given the apparent turbulent waters, environmental limits and limited regional infrastructure support facilities, the garlic as a raw material resource is more directed towards Manila. Also, processing of garlic into garlic chips are made within the island of Batanes and also move along the same system as the raw material produce.

Root crops (specifically, Yam) as another island produce flows from Batanes to the Cagayan Valley region (Figure 6.8). Root crops as a raw material produce, however, are not much valued as an economic resource so its significance in increasing the income of local island farmers is not highlighted. Nonetheless, with its production trajectory over the past years, the supply could still impact if these resources are processed.

As the regional mandate, Batanes as a marine core for the Cagayan Valley, the fishery resources came to be a major resource exchange in the island province. The fresh harvest of these fishery resources moves along the region through established fish landing sites in Aparri and Sta. Ana, Cagayan (Figure 6.8).

The fish self-sufficiency of the Cagayan Valley region is on a downward trend in the last five years (BFAR, 2016). Only Batanes accrues 138% fishery resources self-sufficiency followed by Cagayan with 96%. The performances of Isabela, Quirino and Nueva Viscaya at 17%, 11% and 10%, respectively, have affected the total performance of the region. Nonetheless, this only shows the significant role Batanes island provides for the whole region. The region’s situation on fish self-sufficiency is attributed to the weather disturbance like typhoons and flash floods which have hit the region over the last few years (BFAR, 2016).

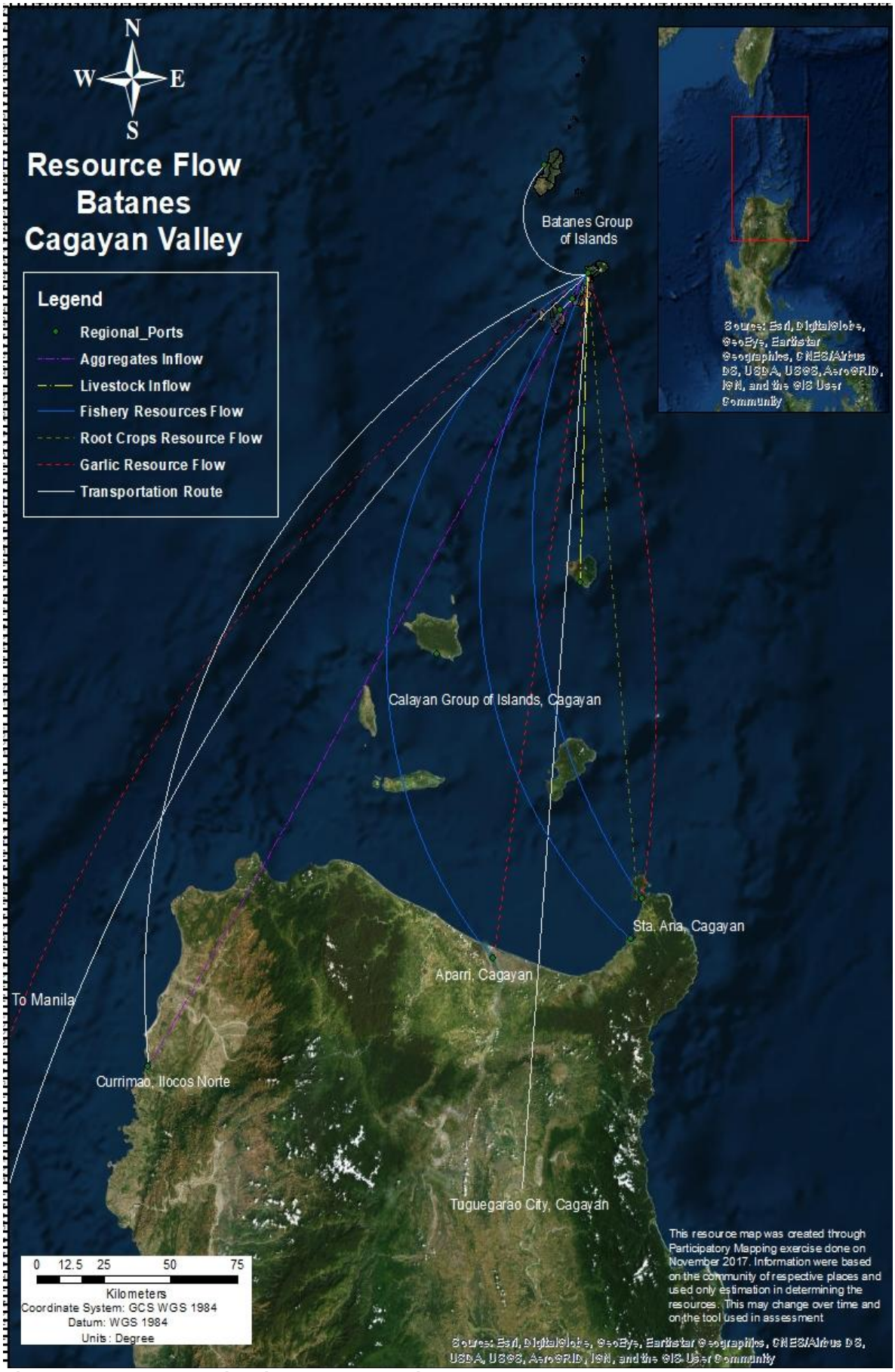



**Figure 6.8 Resources Flow in Batanes Province**

**Siquijor and Central Visayas Resources Flow.** The character of the Central Visayas region is somewhat different from the other two regions. Central Visayas is composed primarily of islands cooperating together unlike the other two cases where the small island is anchored towards a huge mainland area. With this, the regional resource exchanges are characterized differently.

Siquijor as the small island has varied resource exchanges within the Central Visayas region and also outside (Figure 6.9). Clearly, agricultural resources from various sources abound these resource exchanges as supported by established linkages of the small island province to other areas. The primary raw material resource exchanges of Siquijor moving outside the island are summarized in Table 6.8.

**Table 6.8 Summary of Raw Material Economic Resources Exchanges of Siquijor**

| Economic Resources | Destination | |
|---|---|---|
| | Regional | Other Areas |
| **Crops** | | |
| Banana | Negros Oriental, Cebu, Bohol | None |
| Copra | Negros Oriental | Lanao del Norte |
| Mango | Cebu | Lanao del Norte |
| **Fishery Resources** | | |
| Fish | Bohol, Negros Oriental | None |
| Seaweeds | Negros Oriental | None |
| Seashells | Negros Oriental, Cebu | None |
| Sea Cucumber | Cebu | None |
| **Livestock** | | |
| Cattle | Bohol, Negros Oriental, Cebu | Aklan, Misamis Occ. |
| Chicken | Cebu | None |
| Goat | Bohol, Cebu | None |

Much of the resources flows from the island province of Siquijor are moving within the Central Visayas region. As mentioned earlier, the region has a huge market especially the highly populated urban centers in Cebu. Also, tourism is a contributing factor to this as the main tourism areas in the region creates the market demand for these raw material products form Siquijor.

Strategic location and accessibility are the apparent reasons why the island of Siquijor is well connected to other areas outside the Central Visayas region. The areas like Iligan City, Lanao del Norte and Plaridel, Misamis Occidental are both in the Mindanao mainland; however, due to a huge demand on resources such as copra (dried coconut meat), mango and cattle and the well-established sea route, Siquijor found its market to deliver its goods. In addition, the huge tourism market in Malay, Aklan (Boracay) found its cattle supply in Siquijor (Figure 6.9).

Other cash crops available in the small island that has huge potential and slowly entering the island export market are vegetables (squash, bitter melon, eggplant, string beans and okra) and ornamental/ cut flowers (PDPFP-Siquijor, 2016).

Since fishery resources abound the surrounding waters of Siquijor, its exports to other island has also been significant, the self-sufficiency of the island province of Siquijor with Fishery resources is 100.76% amounting to 2,506.64 metric tons of fish harvest surpassing the provincial estimated consumption of fish at 2,487.63 metric tons. Normally, the surplus of fish is harvested during the peak months of February to April where the increased volume of harvest is directly transported to Bohol and Dumaguete City to be sold as fresh harvest.

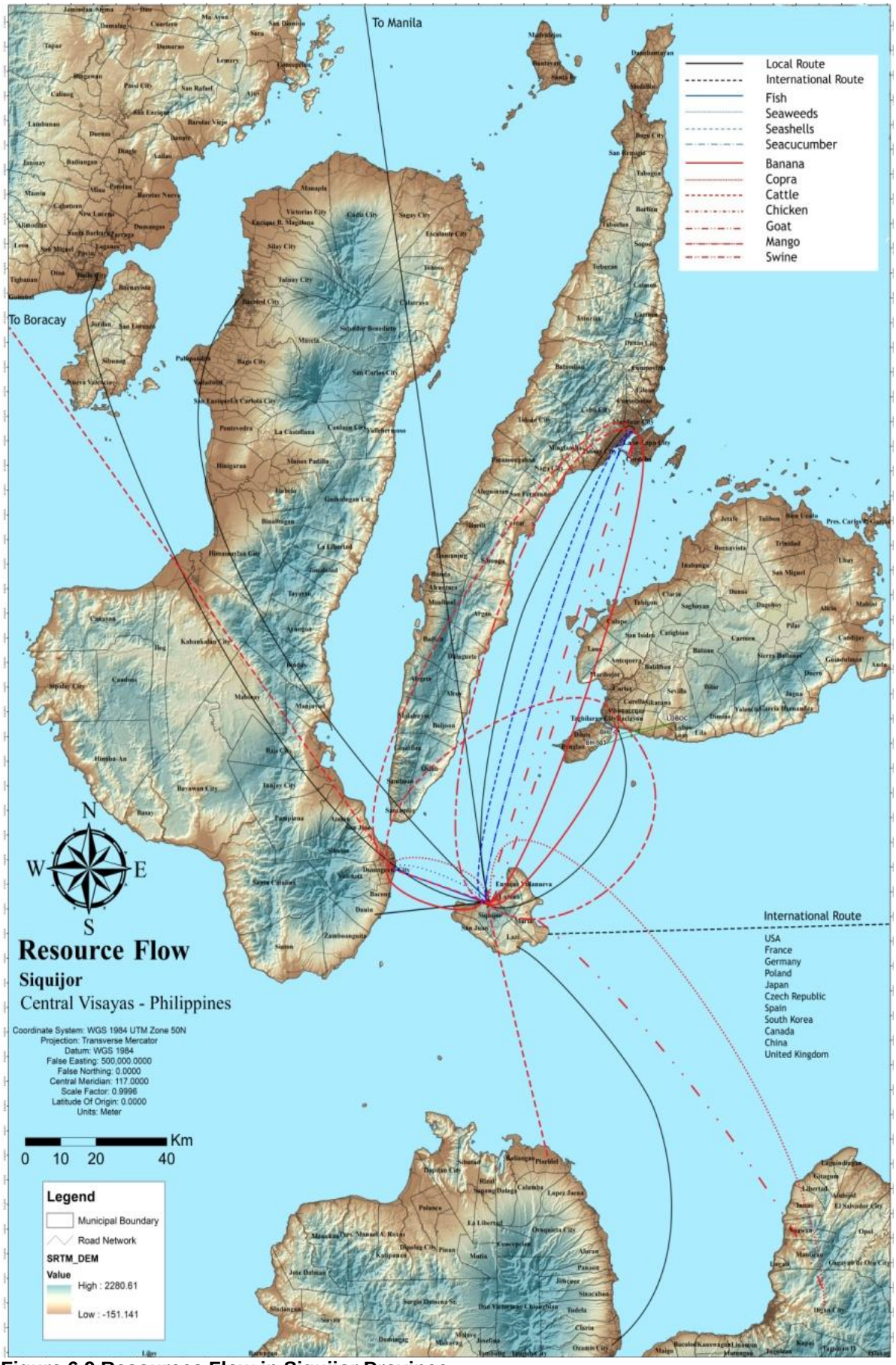



**Figure 6.9 Resources Flow in Siquijor Province**

The seemingly fluid resources movement in the island case of Siquijor only implies the impact of strategic location (distance) and accessibility of the small island province coupled by effective and working economic infrastructures favouring the continued exchange of resources.

**Camiguin Resources Flow.** The commonly identified natural resources flowing outside the island province of Camiguin are mapped out in Figure T0. Here, the primary export crops (Coconut and Lanzones) and fishery resources are identified.

The movement of resources from Camiguin island is similar to that of Batanes, where regional flows are strategically an important consideration and that the usual movement is going through the mainland Northern Mindanao region. Camiguin Island is the gateway to the Visayas group of islands, several resources flows are observable as well (Figure 6.10). The resources moving outside the Northern Mindanao region is Lanzones (*Lansium domesticum*), which is considered a high-value commercial crop (Table 6.9).

The economic significance of the increased demand of Lanzones *(Lansium domesticum)* fruits is its marketability as the sweetest and tastiest Lanzones in the country owing to the natural character of the Camiguin landscape and volcanic soil where the fruit trees naturally thrives.

**Table 6.9 Summary of Raw Material Economic Resources Exchanges of Camiguin**

| Economic Resources | Destination | |
|---|---|---|
| | Regional | Other Areas |
| **Crops**<br>Coconut (Copra)<br>Lanzones | Misamis Oriental, Misamis Occidental, Lanao del Norte, Bukidnon | Cebu, Bohol, Manila, Cotabato |
| **Fishery Resources**<br>Fish products | Misamis Oriental, Misamis Occidental, Lanao del Norte, Bukidnon | None |

Such recognition is also given to Camiguin Lanzones *(Lansium domesticum)* similarly to that of the organic garlics of Batanes. In return to such branding, the marketability and impact of the commodity to the local communities are essentially high. On a similar context, the manner of harvesting and growing of the fruits are traditionally and naturally made without much technological alterations, thus making the production of the fruits easier and requires minimal inputs.

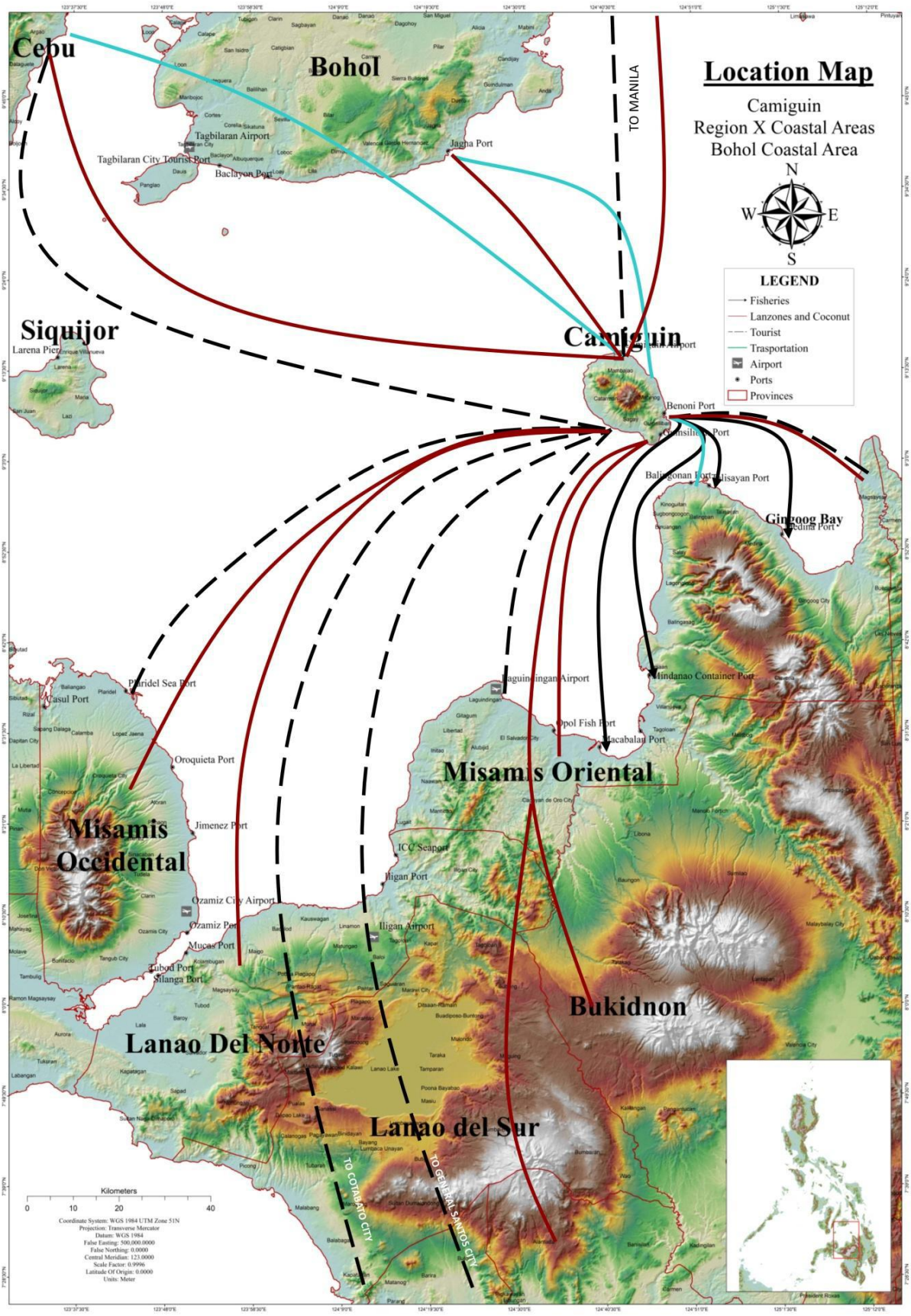



**Figure 6.10 Resources Flow in Camiguin Province**

### 6.3 Material Flows and Value of Economic Resources

Small island resources are abundant yet fragile to several shocks such as changing environmental conditions and unmanaged human activities. The latter, anthropogenic factor, impacts more due to its influence over natural resources extraction propelled by socio-economic and political underpinnings. Also, discounting the indirect cumulative impacts of such human actions to the already vulnerable island ecosystem, threats of continuously growing island population and increasing tourism activities are pushing the small island ecosystems into its limits.

#### 6.3.1 Material Outflows of Small Islands

The value of the resources moving throughout the island ecosystem is very important to highlight its sustainable management. The previous chapter proved that small island cases exhibit peculiarity and therefore needs specific spatial planning and management attention to better assess its situation, adding to the fact that small islands must also be seen as a part of a larger spatial system. Interaction of small island system then, is as important as its actual nature and context.

In doing so, assessment of the resources flow in small island provinces is important to highlight to better understand the small island behaviour in terms of extracted resources and the incentives to human populations doing the actual activities in the small islands putting the island ecosystems in stress. However, a complete inflow-outflow of resources is not possible due to data limitations in small islands. Nevertheless, resources outflows, in terms of small island natural raw material resources productivity, can be determined this allowing to potentially analyse the relative impact of small islands in the larger spatial system productivity and its consequences to the small island ecosystem where extractions of resources are significantly done.

The Material flow analysis provide a summative assessment on selected small island resources that move towards the larger spatial system and through value chain analysis, its financial value could be accounted to further look back on how such movement of resources return, in monetary terms to the small islands in improving the lives of the island communities and the island ecosystem as well.

The selected resources among the three island province cases come from the different ecosystems that exist in the small island. Table 6.10 summarizes the actual production for each of the raw material resources produced in each if the small island cases. These resources were chosen based on their relative contribution on the local communities' livelihoods, extent of impact to the natural island ecosystems in terms of the area it occupies, and the production perspectives that such resources move around and outside the small island system.

**Table 6.10 Selected Island Raw Material Resources Production**

| Province | Economic Resource | Average Production (2012-2017) (MT) | Assumptions | Data Source |
|---|---|---|---|---|
| **Batanes** | Garlic | 335.5316667 | Above the crop self-sufficiency accounts at the Provincial Agriculture Office (PAO) in Batanes<br>Only include the raw material garlic produced and exclude the processed ones.<br>Tagged as “Organic Batanes Garlic” occupying the market niche for organic garlic | PSA, PAO-Batanes |
| | Root crops (Yam) | 431.43 | Above the crop self-sufficiency accounts at the Provincial Agriculture Office (PAO-Batanes) in Batanes; the local consumption of the Yam actually decrease over time, thus, it is exported outside the island.<br>Only include the raw material yam produced and exclude the processed ones.<br>Although considered organic Yam, it has not gain enough marketing and branding as market outside the island province is not high. | PSA, PAO-Batanes |
| | Fishery Resources | 1009.711667 | Above the fishery resources self-sufficiency accounts at the Bureau of Fisheries and Aquatic Resources (BFAR-II)<br>Only include the freshly harvested produced and exclude the processed ones. | PSA, PAO-Batanes, BFAR |
| **Siquijor** | Cattle | 862.6666667 | Above the cattle self-sufficiency accounts at the Provincial Veterinary Office<br>Includes both sold live and slaughtered | PSA, PVO-Siquijor |
| | Banana | 14437.85667 | Above the crop self-sufficiency accounts at the Provincial Agriculture Office (PAO-Siquijor)<br>Only include the freshly harvested produced and exclude the processed ones. | PSA, PAO-Siquijor |
| | Fishery Resources | 1009.711667 | Above the fishery resources self-sufficiency accounts at the Bureau of Fisheries and Aquatic Resources (BFAR-VII)<br>Only include the freshly harvested produced and exclude the processed ones. | PSA, PAO-Siquijor, BFAR-VII |
| **Camiguin** | Lanzones | 2895.555 | Above the crop self-sufficiency accounts at the Provincial Agriculture Office (PAO-Camiguin)<br>Only include the freshly harvested produced and exclude the processed ones.<br>Considered as the “Best and sweetest” variety in the country | PSA, PAO-Camiguin |
| | Coconut | 103165.3217 | Above the crop self-sufficiency accounts at the Provincial Agriculture Office (PAO-Camiguin)<br>Include both the freshly harvested coconuts (with husk) and the dried ones (Copra) | PSA, PAO-Camiguin, PCA |
| | Fishery Resources | 2751.463333 | Above the fishery resources self-sufficiency accounts at the Bureau of Fisheries and Aquatic Resources (BFAR-X)<br>Only include the freshly harvested produced and exclude the processed ones. | PSA, PAO-Camiguin, BFAR-X |

Clearly, these raw material resources are the main exports of the small island provinces to the region and also at the national level. Varied resources can be inferred from the crops produced among the small islands. Such variety is entirely dependent on the natural capacity and suitability of soil present in the small islands.

For this matter, garlic and root crops (especially Yam) have been the primary crops of Batanes; Banana for Siquijor; and Lanzones *(Lansium domesticum)* and coconut for Camiguin (Table 6.10). Although other stable crops are produced in the small island provinces, such as rice and corn, these crops however, are not even sufficient for the local communities' self-sufficiency threshold, thus, selecting their comparative advantage is fitting for such resources flow assessment.

Cattle production in Siquijor is very much evident in terms of its annual production data. Although Batanes has organic local cattle production, its self-sufficiency is not yet attained due to sudden influx of tourists in the last five years. These insufficiencies have even led to importation of livestock products from Calayan municipality (Figure 6.7), the lone island municipality of Cagayan province. Camiguin has a limited cattle production since there is limited space for raising cattle.

Since small island provinces are surrounded by water, its marine fisheries production is a common advantage. The 15km maritime length from the island coastlines determines the locally managed coastal-marine waters of island provinces. Fishery resources self-sufficiency among the three small island provinces are all achieved (Table 6.10). In fact, the island province cases exceed the self-sufficiency levels and among the top regional performers, which make fishery resources an instant raw material good export of all the small island provinces.

Fishery resources self-sufficiency is determined by the population requirements of local island communities. With the relatively small number of island province population compared to the other provinces in their respective regions, self-sufficiency is easily achieved. For this reason, some provinces within the same region have higher fishery resources production but have not achieved fishery resources self-sufficiency compared with the small island provinces.

The actual number of raw materials produced by the small island provinces entering the larger spatial system (region) cannot be fully determined as records keeping and data management in agricultural resources are still inefficient. Therefore, assumptions were made to assure that these resources really move towards the larger regional spatial system (Table 6.10).

### 6.3.2 Value of Selected Raw Material Resources from the Island Cases

The volume of production for each selected resource in small islands implies the actual resources extracted in the island provinces. The corresponding monetary value in terms of the gross production of these raw material resources is summarized in Table 6.11. Also, some estimates of the actual land area where these resources were extracted per year (2012-2017) were summarized (Table 6.11).

**Table 6.11 Production of Selected Land Resources in the Small Islands, 2012-2017**

| Province | Economic Resource[13] | Year | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| | | Land Area Occupied for Production Purposes (Hectares) | | | | | |
| Batanes | Garlic | 85.26 | 89.55 | 92.53 | 97.22 | 95.75 | 75.6 |
| | Root Crops (Yam) | 63.03 | 58 | 61 | 51.2 | 38.12 | 37 |
| Siquijor | Cattle[14] | 851.592 | 851.592 | 851.592 | 851.592 | 851.592 | 851.592 |
| | Banana | 1280 | 1282 | 1285 | 1285 | 1269.5 | 1277 |
| Camiguin | Lanzones | 1296 | 1296 | 1296 | 1296 | 1279.3 | 1281 |
| | Coconut | 14860 | 14872 | 14872 | 14872 | 14870 | 14870 |
| | | Volume of Production (In Metric Tons) | | | | | |
| Batanes | Garlic | 317.46 | 342.60 | 350.59 | 388.15 | 350.44 | 263.95 |
| | Root Crops (Yam) | 629.66 | 557.42 | 565.55 | 358.30 | 241.05 | 236.60 |
| Siquijor | Cattle | 893.00 | 913.00 | 891.00 | 842.00 | 834.00 | 803.00 |
| | Banana | 17434.37 | 10877.39 | 15392.12 | 15039.27 | 13446.41 | 14437.58 |
| Camiguin | Lanzones | 3052.73 | 2971.64 | 3361.64 | 4618.54 | 2923.52 | 445.26 |
| | Coconut | 108006.43 | 106670.80 | 104325.20 | 102466.80 | 100504.11 | 97018.59 |
| | | Value of Production (In Thousand Philippine Peso[15]) | | | | | |
| Batanes | Garlic | 5,782,063. 48 | 6,243,647.53 | 6,372,256.65 | 7,070,001.13 | 6,347,146.54 | 4,773,612.74 |
| | Root Crops (Yam) | 20,149,120.00 | 17,837,440.00 | 18,097,600.00 | 11,465,600.00 | 7,713,600.00 | 7,571,200.00 |
| Siquijor | Cattle | 10,606,508.76 | 10,843,530.88 | 10,584,936.05 | 10,002,348.42 | 9,909,970.34 | 9,533,222.12 |
| | Banana | 15,342,584.00 | 9,934,839.51 | 13,030,803.75 | 12,484,814.92 | 10,702,432.35 | 11,208,904.82 |
| Camiguin | Lanzones | 106,845,550.00 | 104,007,400.00 | 117,657,400.00 | 161,648,900.00 | 102,323,200.00 | 15,584,100.00 |
| | Coconut | 55,282,059.72 | 54,863,925.15 | 53,395,479.51 | 52,439,259.25 | 51,518,362.81 | 49,143,939.20 |

[13] Values of resources were extrapolated from various sources: Garlic, Banana, Coconut and Cattle were computed based from the national accounts downloaded to the percent share at the provincial level; Fishery resources were computed from the national accounts disaggregated to provincial level; and Root crop (Yam) and Lanzones values were obtained from the provincial volume of production and the constant price.

[14] Obtained from the total area of grasslands& Shrublands found in the province

[15] Euro (€) to Philippine Peso (PhP) annual Average exchange rate at 1 Euro to 61.673 Peso.

**Land Resources.** Among the identified raw material resources come from either the grassland ecosystem or human built ecosystem or a good combination of the two. An excellent example of this is the agricultural ecosystem, wherein much of the activities related to such happen in grasslands, altered to fit to human needs.

Some of the noticeable resources in the small island cases were summarized in Table 6.11. Here the grassland as an ecosystem has been significantly used for production purposes. Much of the activities where these land resources were extracted are coming from grass lands and agricultural ecosystems. This is very common with the cases of Batanes and Siquijor island provinces as much of the resources like garlic, root crops and Cattle are coming from these areas.

Agro-forest ecosystem is where other selected land resources in Table 6.11 are coming from. The likes of Banana in Siquijor, and the Lanzones *(Lansium domesticum)* (tropical fruit trees) and Coconuts are typically found in areas heading towards the forest areas used significantly by human communities for their survival and economic activities.

Looking closely at the identified resources in the island provinces, it can be inferred that the volume of production directly correlates to the land area coverage utilized for such purposes. This has been true to some planted crops like garlic and root crops (Yam) in the island province of Batanes and to some extent to the Banana production in Siquijor. However, in terms of the fruit trees such as Lanzones (*Lansium domesticum*) and coconut, with its perennial nature, its productivity lies not only increasing the land area coverage but also to some other agricultural inputs. Also, these crops (Lanzones and coconut) have optimal years of productivity.

Technological inputs could enhance the productivity of these resources; however, for the case of the majority of these resources, the traditional and more “organic” means of production is being favoured to help as it is safer for the environment and also attuned to the local cultural practices of the island communities. This is especially true to the root crops and garlic (Batanes) and the Lazones (Camiguin) productions respectively.

In terms of the value of these agricultural resources, it can also be seen in the table, that through the last six years in record, there is a general decreasing trend for the volume of production and value of these agricultural resources. Although, the land area attributions can be a factor, it can also be said that the natural environmental capacity for such productivity can also explain such decrease. The significant decrease in production can be seen in Lanzones *(Lansium domesticum)* and Root crops (Yam) (Table 6.11), especially in the last three years of the records available. Even though there is an effort to increase the area for production, it did not work out for the Lanzones *(Lansium domesticum)* in the last two years to recover its production. Root crops (Yam) consumption in Batanes, has been decreasing in the last decade due to food preferential changes among the younger generation and the lesser market demand, explaining such decrease in production. Other agricultural resources, seemingly maintain a smoothly downward sliding trend in terms of production and its consequent value (Table 6.11).

Correspondingly, since the creation of market for “organic garlic” in Batanes, which started only in 2012, the gradual shift from root crops intensive production to garlic production, as dictated by the market conditions, can be seen in the decreasing area of land allotted for root crops production and steadily increasing areas for garlic production.

The cattle production in Siquijor, given a similar land area possible for such activity, has a steady volume of production. This could mean that the actual carrying capacity for the grassland has not been met and that the growth of cattle for production has a lapse of 3-5 years for production perspectives can be really felt.

The values of these agricultural resources are extremely helpful in improving the livelihoods of the local island communities and the general economic health of the island province itself. Among these agricultural resources, Lanzones *(Lansium domesticum)* as a high Value commercial crop (HVCC) can be seen as the most valuable agricultural resource based from the value it incurs as compared to other resources. Nonetheless, its production overtime in the island province of Camiguin has dwindled.

**Fishery Resources.** The limited land area bestowed to small island provinces is complemented, however, with a good pool of fishery resources. With a relatively large area to harvest fishery resources, local island communities still face some difficulties to increase its production. Among the reasons are environmental limits, although these island communities can be considered as masters of the seas and their environment, subsistence nature of fish harvest, limitations in machineries, as local fisher folks favour traditional and manual means of fish harvesting, etc.

Fish self-sufficiency for small island provinces is adequate. Thus, much of the fish harvest moves outside the small islands towards the larger market of the regions. The actual harvests of fishery resources among the three island provinces were summarized in Table 6.12, such include the corresponding annual value of the fishery resources harvest for 2012 up to 2017 in Philippine Peso (PhP).

**Table 6.12 Production of Fishery Resources in the Small Islands, 2012-2017**

| Province | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| | Volume of Production (In Metric Tons) | | | | | |
| **Batanes** | 1130.21 | 1113.80 | 1110.99 | 1010.08 | 813.06 | 880.13 |
| **Siquijor** | 3780.32 | 3723.80 | 3605.93 | 3523.08 | 3774.38 | 3575.08 |
| **Camiguin** | 3148.07 | 2962.09 | 2957.71 | 3028.27 | 3540.48 | 3322.07 |
| | Value of Production (In Thousand Philippine Peso[16]) | | | | | |
| **Batanes** | 93225.07 | 97003.09 | 106600.65 | 105298.31 | 89826.29 | 98987.49 |
| **Siquijor** | 240607.23 | 251590.08 | 256884.62 | 254646.54 | 269206.76 | 290049.21 |
| **Camiguin** | 192038.90 | 195372.47 | 240057.44 | 225606.61 | 263674.95 | 245079.52 |

There is decreasing trend for fishery resources production in general for the small island provinces. However, there is a short recovery in 2016 but it failed to sustain for the cases of Siquijor and Camiguin. Such decreasing trend in fish catch has been observed by the fisher folks in all the island province cases; however, factors affecting such vary from natural resources stock depletion, natural environmental conditions, increasing competition on the same economic resource, etc.

Although there is a clear gradual decrease in production of fishery resources, the regional spatial counterpart of small island provinces still has a huge gap in attaining fish self-sufficiency. For this reason, continuous extraction of fishery resources at huge volumes is still required to augment such demand.

[16] Euro (€) to Philippine Peso (PhP) annual Average exchange rate at 1 Euro to 61.673 Peso.

Many studies have suggested that there has been a continuous decline in fish stocks and it significantly need some time to replenish its resources, but with the increasing population and demand for fishery resources, more challenges can be expected to arise in the coming years. Small island provinces, therefore, are among the local governments that will have to carry burden to produce much of resources that the other larger communities in the mainland will require. At times, the produce at the local level, that is supposed to be consumed at the local communities are even brought to the larger regional counterpart (mainland) just to contribute to its huge demand, even at the expense of food insecurity in the islands.

Table 6.12 shows that Siquijor has the most volume of harvested fishery resources as compared to Batanes and Camiguin. This can be attributed to the greater number of fishermen in Siquijor as compared to Batanes and Camiguin. Also, Siquijor belongs to the Central Visayas region, which involves fisheries as among its main economic activities.

### 6.3.3 Who Wins in the Game in Resources Use and Valuation in Small Islands?

It is clear that through the natural resources of small islands, although faced with much vulnerability and fragility, provide income to the local communities by means of the volume of production for each of the selected raw material resources and their consequent values. Also, the movement of these resources were highlighted by the small island self-sufficiency and demand created at the regional and national level.

With much resources moving around the spatial system where the small island provinces revolve, still, the actual flow of the valued resources is not fully determined. Thus, value chain analysis of selected raw material resources was done to clearly delineate who wins in the game of resource distribution and movement across the larger spatial system.

The complete table of value chain analyses of Selected Commodities in the Small Island Provinces is listed in Appendix C. A summary table of the value chain analyses of selected raw material goods produced and harvested within the small island system is in Table 6.13. Here the very glaring stage of Middlemen collection and sorting of raw material goods and consequent whole sale trading reaps much of the income attributed to the production and harvest of natural resources in the island.

**Table 6.13 Summary Matrix Value Chains for Selected Small Islands Resources**

| Island Resource | Island Province | Stage of Value Chain where Income Accrue | Main Stakeholder |
|---|---|---|---|
| **Banana** | Siquijor | Collection of Banana from Backyard Farmers and Wholesale Trading | Middleman |
| **Garlic** | Batanes | Collection of Garlic and Transport | Middleman |
| **Lanzones** | Camiguin | Wholesale Trading | Middleman |
| **Cattle** | Siquijor | Wholesale Trading | Middleman |
| **Fishery Resources** | Batanes, Camiguin, Siquijor | Wholesale Trading | Middleman |

Also, it is important to highlight that the net income of the farmers and fisher folks of small island provinces are the ones getting the least in the income shares for the production of the raw material goods. Although much of the physical efforts of day to day farming and fishing activities, the local island farmers, cattle growers and fisher folks, alike, incur very minimal income. This is due to the fact that small island communities are tied to an established system of reciprocity to the middlemen, whom are their go to people in terms of emergency situations.

Although farm gate prices for these raw material goods exist to somehow protect the local farmers, fisher folks and cattle growers, the final buying and selling prices are still dictated by the middlemen.

Another concern in this movement of resources as reflected in the value chain is the direct buying agreements with the middlemen. Since the raw material goods needs to be freshly sold to the market, the local fisher folk, farmers and cattle growers have no chance to bargain and store their harvest since they are not linked to the market.

The consequent movement of these raw material resources towards the larger spatial system, either at the region or other areas is facilitated by the middleman taking advantage of the well-established sea transport route. Also, these middlemen are commonly residing to the larger regional spatial system and not coming from the small islands. Thus, the value of production for the harvested resources is actually brought to the larger spatial system as the middlemen move outside the small island province.

Nevertheless, these selected raw material goods from small islands were all freshly harvested resources that did not go on through product transformation. Discussing further each of the cases analysed will only show the context of small island province natural resources production and how such resources are consumed in the larger spatial system together with the context of values assigned to several stages in the assessment showing where the real income is generated (Figure 6.11).

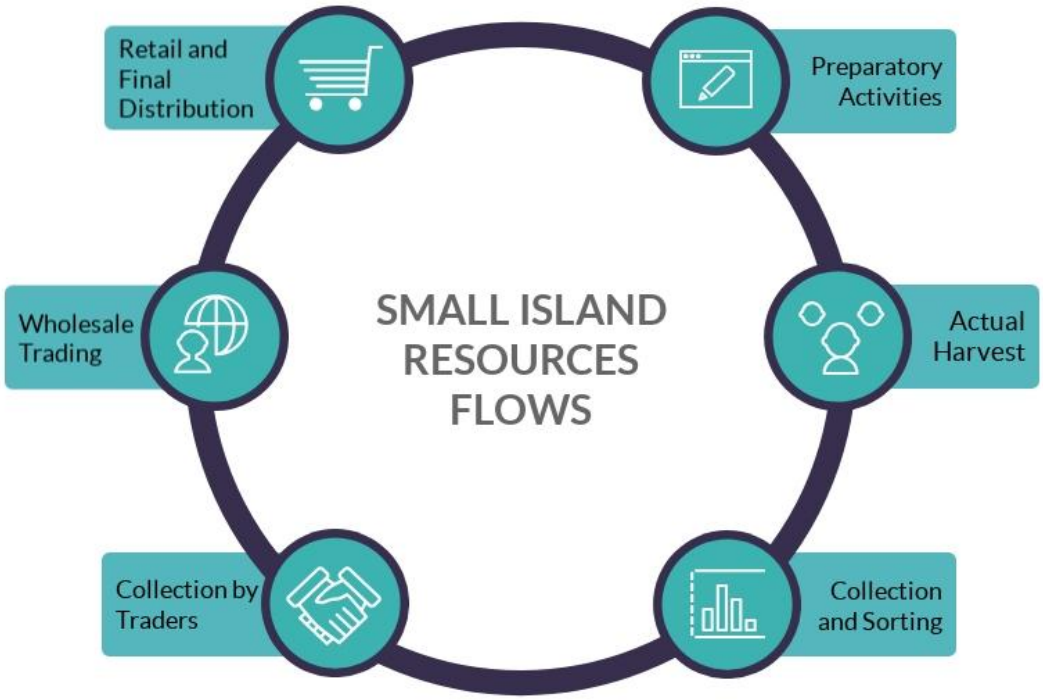



**Figure 6.11 Generalized Stages of Natural Resources Outflow of Small Islands**

**Backyard Banana Production.** Following the generalized pattern of resources outflows from small islands (Figure 6.11), the Banana production value chain of Siquijor had similar results compared to other natural resources flows of other small island cases. The detailed value chain analysis for the backyard banana production of Siquijor is shown in Appendix C.

The case on point for the backyard banana production of Siquijor is a farmer with 225 $m^2$ banana backyard farm. Backyard farming is very much common in small islands, especially for the case of Siquijor as large-scale plantation of Banana is nearly impossible due to lack of enough land area for such production purposes. The backyard farm is composed of approximately 50 banana herbs of various varieties. Often, as a backyard activity, the banana plants are intercropped with other plants to maximize the area occupied.

The Banana production cycle is discussed in the value chain table (Appendix C), showing similar preparatory activities; however, much attention is required in growing these herbaceous crops as it is very much prone to breakage due to its weak trunk system and heavy fruiting character. Banana requires at least five to six months to gain maturity before it starts flowering to bear fruits. The constant care on the growing and fruiting time is required for Bananas to assure that infestation will not happen. The basic inputs for backyard banana production are water and organic fertilizers applied on a specific time during growing and fruiting of the banana.

Generally, the banana fruits are marketed locally, but some bananas of high physical quality are transported outside the island as collected by the middlemen or traders. The interference of middlemen in the production cycle of Banana helps the backyard Banana farmers in the consequent distribution of their fresh harvest as the local market is not lucrative enough to cater the produced.

However, upon carefully analysing the value chain of backyard Banana production in Siquijor, the net income attributed to much physical efforts of the Banana farmer amounts to a minimum upper mark of PhP 900.00 to around PhP 3,600.00 if sold at the most favourable price. However, it can also be seen that local Banana farmers may incur more losses than income if no favourable conditions happen. If the harvest of Banana is only at five boxes/ trays or less, the computed incurred losses could be at least PhP 450.00 at the minimum. This reality pushes the Banana farmers to at least find an extra job to recover such losses.

The winning stakeholder in this value chain seems to be the middlemen, having at least PhP 8,450.00 minimum upper limit income up to PhP 22,200.00 by collecting at least 50 boxes/ trays of Banana sold from the different backyard Banana farmers in Siquijor. The fruit vendors are not having much of the income attributed to a very little mark-up they put in selling retailed Banana at the local markets. There are even losses computed at PhP 60.00 (if sold alone at a particular number of kilograms); however, this is easily augmented by the fact that local fruit vendors sell other fruits sharing the usual costs burdened by the fruit vendors in the process.

**Organic Garlic of Batanes.** The viability of Batanes garlic as a potential export of the province is really high and is supported by the local government. Garlic as a staple ingredient to almost every Philippine dish is indispensable, thus its demand is always high. Adding the value of being “organic,” the selling point of Batanes garlic only increases. However, given the difficulty to move these resources outside the island province due to limited sea transport linkages, the volume of production either lands within the small island, waiting to be delivered outside the province or transformed into other products with longer storage capacities.

Although the commercially available garlic has longer storage capacity, making it advantageous for the case of Batanes, still, the movement of the Batanes garlic is hampered by the limits imposed by natural environmental conditions. Few of these garlics actually move outside the small island and directly sold in the Manila market, at a very expensive price due to transportation costs. Nonetheless, its value does not diminish due to its “organic” character.

The actual value chain for the organic Batanes garlic is in Appendix C. Here, it is evident that much of the labor requirements are attributed to the manual physical works of the garlic growers. However, the income is still skewed towards the middleman and the mark-up strategies at the Manila market, making the Batanes garlic really expensive although it has been sold at a reasonable price by the Batanes garlic growers.

**Lanzones Fruit Value Chain**. As a valued tropical fruit, Lanzones has always been a staple market commodity in every fruit stands of the Philippines, especially during its season. Lanzones fruiting months in the island of Camiguin is during October every year. Much of the Lanzones trees of Camiguin are old growth and all naturally occurring to Camiguin island. With rich volcanic soil, and favourable weather condition, Lanzones trees thrive successfully in small island of Camiguin.

These environmental conditions provide the "sweetest and tastiest" Lanzones fruits in the Philippines, as claimed by the locals. No additional inputs are usually added in the Lanzones trees thus allowing it to naturally grow and fruit. The value chain of Lanzones fruit in Camiguin is detailed in Appendix C. Similar results can be inferred in the Lanzones value chain, intervention cuts much of the income from the Lanzones production in Camiguin. Although the income is somehow spread throughout the system, as the local Lanzones farmers and fruit vendors have something to gain of their retailing efforts, still, the income that is supposedly attributed to enriching the small island living is not fully attained.

Among all the selected natural resources of small island cases that has been subjected to value chain analysis, the case of Lanzones incur much of the positive income. Largely, this is due to the limited input requirements for the Lanzones trees to bear fruit yet the Lanzones farmers have some income from it, resulting to a chain of positive income perspectives for the middlemen and the fruits vendors in the value chain. Local Lanzones growers earn as much as PhP 36,800.00 on the lower upper limit of the Lanzones production and PhP 58,800.00 on the upper higher limit of the computed income (Appendix C).

The only input of a Lanzones grower, for such case, is the land area teeming with naturally grown mature Lanzones trees. A 2,500$m^2$ area of land having approximately 80 mature trees can produce roughly 30-50 boxes of Lanzones fruits (≈20 kg/ box), which will be collected by the middleman and transport it to the regional and national market, putting mark-up prices providing the middleman much income in the distribution of the Lanzones fruit along the spatial system. This is however problematic in terms of the returns to the natural ecosystem providing such services to the stakeholders in the value chain.

Although it has been mentioned in the previous sections that the actual production of Lanzones fruits decline over time, still, the local communities are not affected much, this points to the reason that much of the Lanzones growers are mere harvesters of the fruits and not really exerting efforts to grow and protect these resources. Only during the advent of the celebration of the Lanzones festival is when the actual attention to the Lanzones fruit was highlighted. Nonetheless, significant attention in terms of allocating research funds for substantially maximizing the benefits that can be sought in the Lanzones and further studying its fruiting capacities were not concerns of the local communities and even the local government.

**Small-Scale Cattle Production.** Tourism as a highly successful economic activity in the Central Visayas region impacts the small island of Siquijor to join the cattle production value chain give the huge demands of the resorts, hotels and restaurants on cattle meat products. However, Siquijor cannot compete with large-scale cattle production, thus the backyard and small-scale production system has been found workable by the locals.

Local cattle growers often do this as a backyard activity, having at least six heads of cattle can be a good starting point for entering the cattle production value chain in Siquijor. The details of the backyard cattle production in Siquijor is found in Appendix C.

For cattle production to be successful, a significant amount of time is required for cattle growers to finally reap the income from the long growing period of cattle. It usually takes two to three years for a calf to mature and be ready to be sold in the market. Backyard cattle growing also need considerable inputs such as feeds, water and shelter. Other equally important inputs, such as vaccinations and animal vitamins are being taken cared-off by the local government as part of their livestock propagation program.

With much support, still, the long duration of time and the huge food input for cattle production takes much of the time for cattle growers. Foraging for locally available weeds and grass (including leaves) combined with commercially available feeds (wheat pollard) substantiate the backyard cattle production inputs as solely relying to commercially available feed products will only lead to deficits in the computed income for the cattle growers.

After a considerable amount of time, these mature cattle are sold as live products to the middleman. The middleman then sells it or brings these live cattle to the slaughter house, after which, distribution in bulk as meat products follows. As per the computed income based from the value chain analysis, a cattle grower can have at least around PhP 10,500.00 income from the production. This is however, small considering the time allotted for such livestock to mature. On the other hand, the middleman gets around PhP 102,780.00 to 252,780.00 from a single transaction with the cattle growers. Even if the burden of paying the slaughter services is taken by the middleman, their income is incomparably high compared to that of the local cattle growers.

Upon learning about this challenge, the island province of Siquijor is looking forward to the completion of the community-based slaughter services facility that will somehow eliminate the middleman in the picture of the backyard cattle production value chain, which is expected to eventually redistribute the income to the local cattle growers in the island province.

**Fishery Resources Value Chain.** A common character of small island provinces is its huge area of coastal-marine waters. With this, a viable advantage for small island provinces is the availability of the varied fishery resources. Given this fact, the regions where these small islands are linked often task the small island to lead in the production of fishery resources to match its increasing demands.

Summarizing the common fishery resources that is harvested in the small island province's marine waters and sold to the regional market are detailed and provided consequent values in Appendix C. Here the clear picture of island fisher folks doing the physical efforts to harvest these fishery resources are detailed through the values assigned for physical labor (manpower) efforts and the other inputs for doing traditional small-scale fishing.

Often, fishermen spend five to six hours in the seas to gather as much fishery resources to be freshly sold to the market or to the traders that will eventually market this to the regional market (mainland). Again, the impact of middlemen in the value chain of fishery resources harvested by the fishermen in all the island cases is very glaring. Here it can be summarized that the middleman can incur as much as PhP 353,690.00 to PhP 752,690.00 in a single transaction compared to the income of the local fishermen (Appendix C).

The reason for the invariable success of middlemen in the production value chain is their established linkages with the local farmers, fishermen and cattle growers coupled with their knowledge on the regional market and existent networks. Local communities either have no

choice but to transact with the middleman or do things on their own which will eventually disrupt their daily survival livelihood activities. Also, these middlemen, coming from the mainland (regional centers) act as the godfathers and investors for some fisher folks and farmers giving them capitals to eventually collect the same harvests in bulk to be sold on a larger price. Local farmers see this phenomenon as a reciprocal relationship even though it is very clear that the local communities are the one on the losing end in this kind of relationship.

All these natural resources assessed through the value chain analysis show that small islands produce a good volume of natural resources, where stresses to both the natural ecosystem and the local community can be really underscored. The natural ecosystem, through the input materials and actual ecosystem as habitats through the decreasing productivity as seen in Tables 6.10 and 6.11, respectively; and the results of value chain analysis putting the local farmers, fisher folks and cattle growers at the bottom of the income sharing for the resources harvest only show that small islands, the actual ecosystem and its communities are losing the game of resource use and putting economic values to such.

In return, such losses correspond to the limits in the conservation and management approaches for small island resources, as the local farmers, fisher folks and cattle growers had to deal with the survival activities and putting a larger income for their families by doubling the extraction mechanisms for the resources in the small islands. Given the actual income gap between the local farmers, cattle growers and fisher folks with the middlemen, a vicious cycle can be expected to prosper pushing forward unsustainable practices and higher stress to the already fragile and vulnerable ecosystems and at the same time hurdling the local communities into the debts of poverty and subsistence living.

## 6.4 The Future of Small Island Resources Use

As small island resources are finite and analyses of its flows and value show disproportionate distribution putting the local island communities at the bottom. Adding the multifaceted issues on the future of natural resource use with poverty and influx of tourism only aggravate the existing situation.

### 6.4.1 Poverty and Food Security Trend in Relation to Natural Resource Use

As discussed in former chapters, poverty incidence in small islands is generally higher. Recent population growth and influx of tourism, puts pressure in the already alarming conditions of small island communities. The state of agricultural production shows the recent extraction of resources has substantially decreased as prices of commodities increase putting the locals in a vicious cycle of poverty (Figure 6.12). Natural resources extraction is often driven several pressures including (1) the local consumption perspectives, as well as tourist population demand and (2) economic activities assuming for the limited demand on specific raw material (sold with cheap labor and cost for productions) sources coming from the island.

All pressures are coming from the innate nature of local communities to survive, however, engulfed by the poverty trap. Figure 6.12 shows the stepwise process of the fishing activity among small island dwellers. The larger cycle of fishing activity from source to market is controlled however by the middlemen, often controlled or living not within the small island. The aspects of the fishing value chain among small island dwellers are only the first two phases of the fishing activity cycle.

Nonetheless, a smaller livelihood cycle exists among the fisher folk, wherein which the burden of the uneven distribution of income from the resource extraction (fishing activity) to the actual survival activities of the fishing community residing in the small islands is shouldered by them.

The continuous cycle of this burden among fishing communities leads them to do activities, which may be unsustainable to their own livelihood just to cope with the pressure of the vicious cycle they are locked in. Unsustainable practices then lead to jeopardizing their livelihood and at the same time their resource base.

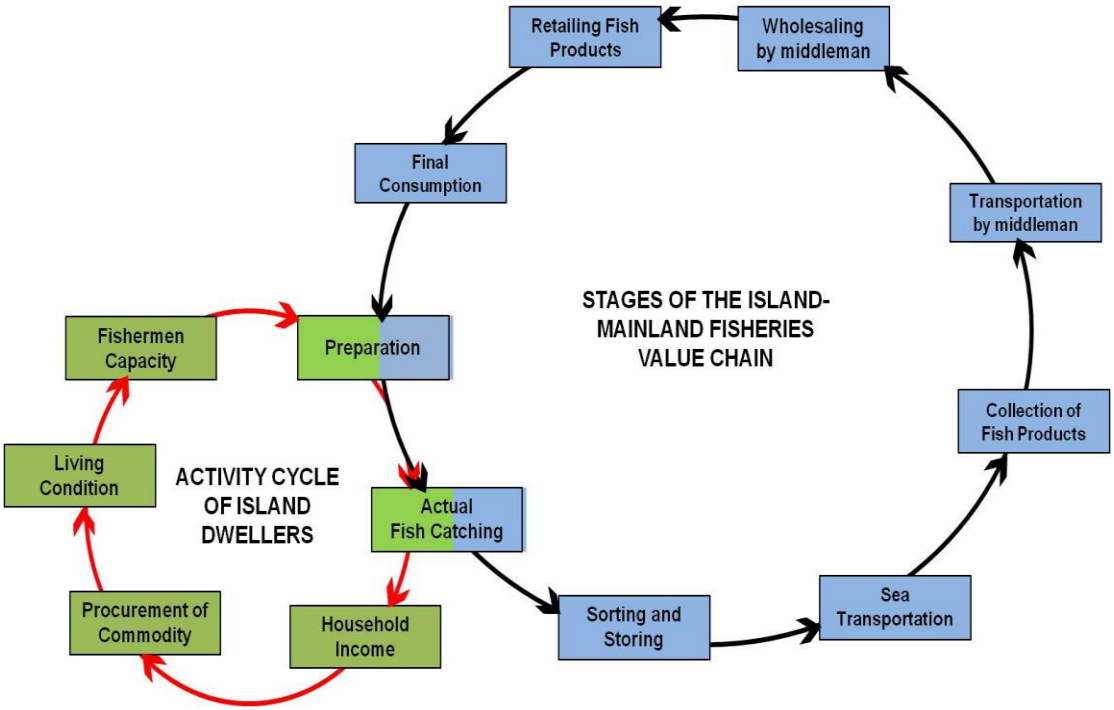



**Figure 6.12 General Vicious Activity Cycle of Fishery Resources Extraction in the Small Island**

Poverty incidence record in small island cases worsened through time, as the regional and national records improve (Table 6.14). It is no telling that the current initiatives to curtail poverty in small island provinces are inefficient. In as much as increasing the volume of production concerns the destruction of the island ecosystem by putting significant pressure on extraction surpassing the natural rate capacity of ecosystem to replenish itself, local communities have no choice but to continue with their current activities.

**Table 6.14 Poverty Incidence Trend among the Small Island Provinces**

| Spatial Unit | Year | | | | |
|---|---|---|---|---|---|
| | 2006 | 2009 | 2012 | 2015 | 2018[17] |
| Philippines | 26.6 | 26.3 | 25.2 | 21.6 | 4.3 |
| Cagayan Valley (Region II) | 25.8 | 25.5 | 22.1 | 15.8 | 3.7 |
| Central Visayas (Region VII) | 35.9 | 31.0 | 30.2 | 27.6 | 5.0 |
| Northern Mindanao (Region X) | 39.0 | 40.1 | 39.5 | 36.6 | 6.7 |
| **Batanes** | 14.5 | 16.7 | 18.2 | 0.0 | 3.9 |
| **Siquijor** | 25.6 | 27.2 | 24.0 | 48.9 | 2.1 |
| **Camiguin** | 31.4 | 20.4 | 41.0 | 29.9 | 5.8 |

*Source (PSA, 2018)*

[17] Covers only the first semester for the year 2018

### 6.4.2 Tourist Influx and its Impacts to the Local Resources

The lure of small islands to tourists as a paradise and place of rest and recreation has been very attractive. Thus, shift to service economy among local governments has been an aspiration among local decision makers. However, heading towards this direction entails a lot of efforts and commitment from all stakeholders to be successfully implemented.

Regardless of all the stakeholders' readiness, given such opportunities from regional policy framework environment and some business enthusiasts, tourism services start-ups surely will mushroom the small islands. Then as time goes all the establishments and other service-related activities are in all set. The multiplier effects (spread effects) of the tourism start-ups booms then the eventual problems related to the natural resources' depletion follows.

The cycle of tourism traps in small islands has been very progressive and the small island cases are not exempted from this. Although tourism activities in the three island cases look attractive and economically viable, however, uncontrolled development of tourism and influx of tourists will surely jeopardize the fragile island ecosystems.

Looking closely at the cases of the three small island provinces, Batanes has ecotourism as its mandate and the other two sees ecotourism as an option but currently estranged by mass tourism due to the access and locational advantage of the two small islands.

**Batanes Island Tourism.** Shaped by the prevailing environmental conditions imposed by the seas, the Batanes landscape is considered one of a kind in the Philippines. The island province is a destination of many tourists; however, due to its limited accessibility and costly travel issues, many opted postponing their visit and instead take other readily accessible ones.

In recent years, several airlines opened routes going to Batanes, this has created a huge lift in the tourist arrivals for the province. The Table 6.15 shows the trend of tourist arrivals in the province in the last years. During the months of February to June the tourist arrival is at peak, during these times the weather conditions permit air traffic to easily fly to the area. Also, occurrences of typhoons are not commonly experienced during these months.

The sudden peak of tourist arrivals from 2014 marked the entry of new airlines offering a daily travel to and from Batanes. From only one airline carrier in 2012, the flight offerings heading to Batanes from Manila alone rose to four which prompted the increase in tourist arrivals. Furthermore, the continued increase of tourist arrivals per year indicated the continued patronage and increasing daily travel of these airlines from once to twice daily for some airlines owing to the sudden increase.

Also, local tourists primarily enter the island of Batanes; very few are foreign travellers going to Batanes. In addition, the travellers are families, friends, and adventure enthusiasts from other parts of the Philippines.

**Table 6.15 Tourist Arrivals in Batanes Province 2012-2017**

| Month | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| January | 168 | 181 | 1,100 | 1,998 | 2,503 | 2,789 |
| February | 257 | 302 | 1,496 | 2,837 | 2,879 | 3,071 |
| March | 455 | 997 | 2,155 | 3,540 | 3,401 | 3,359 |
| April | 695 | 960 | 2,857 | 3,280 | 3,381 | 4,141 |
| May | 941 | 980 | 1,936 | 3,258 | 3,508 | 3,726 |
| June | 573 | 677 | 1,600 | 2,120 | 2,685 | 2,454 |
| July | 89 | 141 | 757 | 1,204 | 1,751 | 1,615 |
| August | 15 | 118 | 594 | 898 | 1,394 | 1,414 |
| September | 39 | 53 | 707 | 1,384 | 1,270 | 1,619 |
| October | 36 | 121 | 946 | 1,391 | 1,466 | 1,787 |
| November | 28 | 229 | 1,131 | 1,662 | 1,403 | 2,387 |
| December | 115 | 416 | 1,820 | 1,810 | 1,753 | 2,462 |
| **Total** | **3,411** | **5,175** | **17,099** | **25,382** | **27,394** | **30,824** |

Source: Batanes Tourism Office, 2018

Although there exists daily air transportation going to and from Batanes, it is still limited by the domestic airport capacity in Basco. Only small to medium sized aircrafts with only less than 80 seating capacity is allowed as per the runway size and length. Such limitations impact the same limits to light-weight aircrafts to land in the island province due to the rapidly changing air flow and speed in Batanes.

The booming tourist arrivals in the province, however, are limited by the capacity tourist accommodations and supply of meat products. This has been experienced in the last years where tourist arrivals peaked. Problems on accommodation have been addressed through homestays; however, in terms of food availability, locals have experienced scarcity of meat products especially during these seasons while tourist accommodations and restaurants buy in bulk leaving the locals nothing to buy in the market.

The pressure for Batanes to really keep up with tourist arrivals is really high, and its impacts to the changing food consumption patterns and food supply of the island province is felt with the changing cropping preferences by the locals to keep up with the tourist market and also to the increasing demand for the import of goods to the island.

The limits to this however are set, as the whole province is a protected area, construction and significant defacing and alteration of the natural landscape surely will impact largely the integrity of the whole island system. Also, no carrying capacity studies has been made yet to really measure the capacities of the island ecosystems in handling the impacts imposed by human activities.

The indigenous people, comprising almost every local living in the island province, has customary rights. Under the protection of IPRA, no activities or development outside the customary decisions of the locals shall be made in the whole province of Batanes as these are their ancestral domains.

The NIPAS and IPRA are two critical policies that guides for the development of Batanes. These policies help conserve the small island landscape and seascape as well as the culture and heritage of the people. Also, with its mandate to foster ecotourism as an activity, the chances of getting through with the actual principles of ecotourism will easily be handled.

Currently, Batanes is also trying to set a cap in terms of the number of inward flights for tourist visitation to potentially protect the integrity of the Batanes island and not fall haphazardly to the lure of tourism limelight.

**The Siquijor Tourism Perspective.** Contrary to the Batanes tourism outlook, which embodies ecotourism at its heart, the Siquijor tourism is more likely dictated by the presidential Proclamation 1810 and the consideration of Siquijor as a major tourist destination in the Visayas by the Philippine Tourism Authority (PDPFP-Siquijor, 2016). Such mandate sees Siquijor as a marine reserve and tourism core; however, this role has been overshadowed by the neighboring islands' tourism market that is also within the Central Visayas region. The likes of Cebu and Bohol as major Philippine tourist sites drawing much of local and foreign tourists are a current challenge for Siquijor tourism.

Another challenge for Siquijor's tourist arrivals is related to the primacy of sea transport in the island, making it only accessible at the region and not as compared to other provinces in the Central Visayas that is well connected to Manila via direct flights. For this reason, Siquijor always fall as a secondary or alternative destination as compared to the other three provinces offering direct access via air transport. In addition, Siquijor is affected by the Northeast Monsoon bringing about winds, rains and storms affecting the surrounding seas making it difficult at times to access the island.

The trend of tourist visits in the island of Siquijor is shown in Table 6.16. There is an increase in the tourist visits as shown in the Table. Tourist arrivals in Siquijor are all year round, however, it peaks during the months of April to May and October to January.

**Table 6.16 Tourist Arrivals in Siquijor, 2012-2015.**

| Tourist Profile | Year | | | |
|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 |
| Domestic | 18,187 | 17,959 | 17,140 | 21481 |
| Foreign | 13,759 | 15,472 | 23,345 | 16,252 |
| **Total** | **31,946** | **33,431** | **40,485** | **37,733** |

Source: PDPFP-Siquijor, 2016

The profile of tourists in Siquijor is a combination of local and foreign tourists. These foreign tourists usually land via Dumaguete or Cebu Airports and made an extra travel via the seas to reach Siquijor. Foreign tourists usually arrive in Siquijor on the months of December to February. The top foreign nationalities visiting Siquijor are French, Chinese, Americans, Germans and English (PDPFP-Siquijor, 2016).

Although clearly stipulated through the Philippine Tourism Authority that Siquijor is a major tourist destination in the Philippines, still, the support facilities and marketing of Siquijor is not peaking up to complement such role. This makes the tourism industry still a huge potential area for the province to further explore.

**The Camiguin Island Tourism.** As the Northern Mindanao island tourism hub, Camiguin is slowly being recognized in the Philippines as among the major tourist destinations. Unlike the other two island provinces, Camiguin is accessible by both air and sea transportation, thus the challenges faced by the other two island provinces in terms of tourism accessibility as catered properly in Camiguin. Also, Camiguin is the only island province offering such unique island adventure and paradise theme in the Northern Mindanao region as compared to the Siquijor's case in Central Visayas region.

Tourist arrivals in the island of Camiguin are steadily increasing throughout the years. Although the primary tourists are considered locals, increasing number of foreign tourists are also generally seen in the trend (Table 6.17). Much of the tourists are coming from USA, Germany, South Korea, Australia, Japan, etc.

**Table 6.17 Tourist Arrivals in Camiguin Province, 2008-2012.**

| Tourist Profile | Year | | | | |
|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 |
| Domestic | 242,793 | 260,355 | 283,142 | 326,306 | 350,490 |
| Foreign | 9,815 | 9,259 | 7,894 | 9,291 | 9,317 |
| **Total** | **252,608** | **269,614** | **291,200** | **335,597** | **359,807** |

Source: PDPFP-Camiguin, 2013

Tourism is a year-round activity in the island province. Since it is well connected via air and sea transport, easier access is expected in Camiguin as compared to the other two small island province cases. The months with the most tourists entering the small island are the months of March to April and October (PDPFP-Camiguin, 2013) due to the summer season in the Philippines, where locals are generally touring around the country. It is also during within these months that the annual pilgrimage event in Camiguin known as "*Panaad*"occurs. During October, however, is the Lanzones Festival, where the whole province is celebrating its Lanzones *(Lansium domesticum)* harvest.

However, the goal of the island tourism in Camiguin is to gear towards ecotourism as successfully implemented in Batanes. Nonetheless, efforts on conservation and protection of the island environment as well as its locals are becoming apparent in Camiguin as also set in the tourism master plan of Camiguin.

Similar to the case of Batanes, the island of Camiguin has a protected area under NIPA; however, not as the whole island, but a quarter of it. Nonetheless, the protection of the island is set into perspective. Claims for Indigenous people is on its way to be recognized, so Camiguin in the long run would really envision itself in line with Batanes' ecotourism perspective.

# CHAPTER SEVEN

*“Our knowledge is a little island in a great ocean of nonknowledge”*

*-Isaac Bashevis Singer*

# 7. SUMMARY OF FINDINGS AND CONCLUSIONS TOWARD SUSTAINABLE SMALL ISLAND PLANNING

This chapter is the synthesis of the previous chapters in working towards sustainable small islands management and planning. With the two-pronged research questions answered, this chapter further looks at possible solutions, methods to better understand the Philippine Spatial Planning towards the attainment of a sustainably managed island ecosystems leading to the development of spatial strategies for improved small islands planning. Indicative as it is, still, these are few steps to potentially improve the current situation of small islands planning.

Review of existing frameworks for analysis and planning of small island spatial units and where the apparent tools substantiated in this study will fit in to conclusively address the concerns of small islands will be focused in this chapter. Furthermore, the larger regional spatial system framework will also be reviewed to suggest ways to better include the concerns of the small islands.

Reviewing the existing framework for analysis will basically identify important indicators that could assume to address the issues on sustainable management of Small Island. At least, within this context, the identified indicators could initially provide means to put the sustainability of small islands at the center stage. Drawing from the experience from the three island cases, common binding indicators important in the small island analysis will be added to the current exhaustive ecological profiling that is anchored to the proposed methodology to make good use of the actual indicators for spatial planning purposes.

### 7.1 Confirming the Unique Cases of the Small Islands

This section summarizes the aspects unique to small islands that needed to be highlighted, especially in underscoring the concept of sustainability. Some literatures have provided insights on island uniqueness, which have been used to confirm the characteristics indicated in the small island province cases.

Other intervening factors not highlighted in other literature were consolidated to provide additional contextual bases for small islands, especially those relating to the small islands in the tropics. Also, these characteristics could provide additional layer of analysis important in understanding small islands sustainability issues.

Tackling sustainability issues transcend different aspects of development. The commonly used sustainable development pillar can be a guiding framework; however, it is better termed as the development sectors in spatial planning contextual theme. In Philippine spatial planning, these development sectors include the biophysical (natural environment), socio-cultural, economic, infrastructural (utilities and built environment) and institutional (governing policies and political environment). The table below (Table 7.1) shows the consolidated small island characteristics of the cases.

**Demographic Characteristics**. In terms of the population characteristics, the pressing and very visible aspect that pertains to small island population is its population size. All the small island cases have a low population size and also low population growth rate (Table 5.6). The population growth rate of the small island provinces on the average is very low as compared to the regional and national level accounts. Such figures confirm that these small islands are characteristically similar in terms of the pertinent demographic related issues faced.

Also, worth noting is the high population density; this is due to the area occupied by the island communities despite the relatively low turn-out of population count. This only shows that the settlement areas in small island communities are concentrated into one area where much of the economic and other community activities are also happening.

In addition, these small concentrated areas form part of the small island provinces town capital or other *poblacion* areas. The municipalities of Basco, Batanes and Mambajao, Camiguin show this character of high population density. The municipality of Siquijor in Siquijor, however, falls second in terms of the population density. This is however, explained through the comparable land area of San Juan that is only half of the land area occupied by the municipality of Siquijor.

Although there is little literature in the accounts of migration in the Philippines, also with small islands, evidences can be traced on the ethnicity and cultural relatedness of the small island communities with the adjacent or nearby islands. Much of the interviewed key informants mention that their relatives are coming from the adjacent islands or have migrated to the adjacent islands. Aside from kinship and cultural factors, other main driving forces for inter-island migration include economic reasons, opportunities for higher education and jobs, and the fancy notion of “getting away from the rural setting” of small islands.

The island cases of Camiguin and Siquijor had these stories from the community discussions held and have been a usual acceptable practice as families or relatives move back and forth to the small islands once in a while. However, this trend has been quite different for the case of Batanes due to its physical isolation from the region. Nonetheless, given that it has three inhabited islands, inter-island migrations were also observed among the locals, especially for the case of Basco, Batanes pulling much of the population to it due to the presence of jobs and being the center of economic activities in the island province.

**Socio-Cultural Characteristics.** Although not explicitly mentioned in the research conducted by Wong et al., (2009) regarding the “isola effect”, such information on the notion of being “rural” and the concept of “islanders” falls as among the defining socio-cultural character of small island cases as provided by the locals when asked about their difference from those in the mainland (or the larger islands). Characteristics such as malls, fast food chains, cinema, clubs, etc. are among the buzz words that island communities’ term as urban. Since these services are absent in the small islands, their perception of “rural” is defined.

Other aspects of urbanization are not felt that much in the small islands as people also enjoy internet connectivity and other communication facilities that the mainland or urban areas have. Contrary to Bass and Dalal-Clayton’s (1995) description of small island dwellers as having limited skill sets, all the island communities in the three small island cases enjoy a good access to education and jobs. Skills development and government programs targeting these aspects for the island province cases has been successful, thus, such character did not manifest significantly in the cases studied.

**Table 7.1 Summary of Small Island Province Cases Characteristics**

| Existing Literature Island Characters | Island Cases Characteristics | | |
|---|---|---|---|
| Characteristics | Present | Absent | Remarks |
| **Demographic** | | | |
| Small Size and Growth *(Bass and Dalal-Clayton, 1995)* | X | | These were the significant aspects observed from the data collected and focus group discussion |
| High Density *(Bass and Dalal-Clayton, 1995)* | X | | |
| Migration *(Bass and Dalal-Clayton, 1995)* | X | | |
| **Socio-Cultural** | | | |
| Rural context and Isola Effect *(Wong et al., 2009)* | X | | The Rural vs Urban concept, where small islands are rural |
| Cultural Identity | | X | Only strong in Batanes group of islands |
| **Economic** | | | |
| Narrow Economic base *(Bass and Dalal-Clayton, 1995)* | X | | Often related to land as a resource |
| Import Oriented | X | | Especially related to the abundance of retail trading |
| Vulnerable to natural environmental shocks *(Brigulio, 1995; Commonwealth Foundation, 2004)* | X | | As the small island resources are fragile and scarce, vulnerability is certain |
| Concentrated economic activity *(Nurse and Sem, 2001)* | X | | Also related to land as a scarce island resource |
| Devalued local economic goods *(Bass and Dalal-Clayton, 1995)* | X | | Island goods that are undervalued at the regional market |
| **Environmental** | | | |
| Vulnerable Natural Resources *(Bass and Dalal-Clayton, 1995; Deschenes and Chertow, 2004)* | X | | Often related to anthropogenic causes |
| High ratio of coastline to the land area *(Bass and Dalal-Clayton, 1995)* | X | | Coastal-marine waters as equally important natural resource base |
| Vulnerability to disasters *(Bass and Dalal-Clayton, 1995)* | X | | Earthquake, Storms, Volcanic Eruption, and other hydro-meteorological events that shape and reshape the island landscape |
| Complex Geographies *(Bass and Dalal-Clayton, 1995)* | X | | |
| Isolation *(Bass and Dalal-Clayton, 1995)* | X | | |
| **Infrastructure** | | | |
| Accessibility Issues | X | | Either hindered or promoted by the natural environmental conditions |
| Basic Services | X | | |
| **Institutional** | | | |
| Satellite town/ Sister town effect | X | | Only works for the case of Camiguin and Siquijor; All cases has a lone congressional seat at the national representation |
| Political Representation | X | | |

Equally important to note is the cultural identity of small island communities, which for the cases of Batanes and Camiguin (with its claims for its Indigenous communities) has been true, being a factor of small island uniqueness. The ethno-linguistic character and cultural divergence of small island communities, according to the cases identified, are much definitive of their character as a small island community. Siquijor, on the other hand, has the whole region as melting pot making the island dwellers technically homogenous unlike the other two cases.

**Economic Characteristics.** Much of the factors that define small islands also relate to the small island economy. The economic activities related to small islands are directly related to the local consumption of island resources. As such, small island economy is generally characterized by narrow resource base. However crude, this understanding generally claims on the aspect of land as a resource, wherein all other resources are valued. Although it has been clarified in the previous sections that small island resources are varied, unique and important, given its small unit area, make small islands' economic base narrow or better described further in the summary table (Table 7.1) as vulnerable to shocks.

These shocks are further explained as both natural and anthropogenic, which affirms these varied, unique and important resource bases fragile. This is however, overseen as small island context shortens the spatial planning horizon which endangers the context of sustainability (Deschenes & Chertow, 2004). Such exemplification is observed in the small island cases most of the local communities pay attention to their day to day survival activities and not really looking at the larger context of the environment they are living.

Also, with narrow resource base, especially the availability of land for feeding the local communities and providing the necessary processed goods, dependence on importation from other larger urban centers has characterized the small island provinces. Evidently, retail trade is occupying much of the economic activities happening in the small island provinces as provided by the registration of business establishments although small islands are characteristically relying with agriculture (Farming, grazing and fishing) as their primary source of living. This phenomenon is seconded by another economic character of small islands as explained by Bass and Dalal-Clayton (1995) on the notion of devalued natural resource bases of small islands (Table 7.1).

Furthermore, small island resources values are heavily tainted by the regional market competition and controls of market players such as the middlemen. Conversely, local communities use much of their resources as raw material economic goods, which have less value than processed goods. Still, some raw materials which are natural small island resources are gaining better marketing taking advantage of the "unique" character of small islands.

**Environmental Concerns.** Factors or characteristics defining small islands related to the natural environmental conditions include natural environment's vulnerability, the general physical environment quality, and geographic location factors.

Natural resources vulnerability, as related to natural resources use discussed in the economic characteristics, relates to the fragility of the natural resources endowment of the small islands. With unmanaged human consumption, its vulnerability follows. Also, this phenomenon is also related to the small island cases vulnerability to natural disasters.

Further discussing the context of natural disasters, the small island cases (and the Philippines in general) are located in the *Pacific Ring of Fire* and the *Pacific Typhoon Belt*, where

occurrences of earthquake, volcanic eruptions and typhoons/ storms are common. Adding to this fact, these small island provinces have at least one active volcano boasting both as a threat and an opportunity.

Given the unique formation of small islands in the Pacific region, the span of ecological diversity and complexity is also an identifying character. Having much of the Key Biodiversity Areas (KBAs) as earlier discussed, the extent of endemism of species is also high in these small island cases. Also, important to highlight as a geographic character of small islands is the relative ratio of its coastline to the actual land area. Such impacts create a better understanding of the expanse of the "real" natural resource base of small islands.

The geographic location of small islands, as mentioned, provides the context to which the local communities must operate and adapt. This fact points to the notion of isolation, since islands are technically separated by waters. Thus, access as a concept relates to its point where it is exactly located.

**Infrastructure Implements.** Physical infrastructures support the movement or flow of resources among spatial units. Absence of which may mean remoteness and isolation, especially in the case of small islands. Furthermore, infrastructure implements links various spaces and strengthens its relationships. For the small island cases, the apparent characteristics leading to the presence or absence of infrastructure are related to accessibility issues.

Since small islands have a comparably lower population to cater, basic services are often concentrated in one area of the small island (commonly the city center or the *poblacion*). Such basic services include schools, health facilities, protective services (police, fire protection, etc), social service facilities, etc. These basic services and facilities are often characterized as satellite facilities from the mainland or the larger spatial unit counterpart.

Accessibility issues are apparent in small islands as basic facilities are also limited, physical access through ports (air and sea) can be limited with the basic facilities available and the natural environment limits imposed to the small islands.

**Institutional Environment.** Although not readily seen as defining factor for small islands, the institutional environment plays a role in defining the unique case of small islands. Since much of the literature dwells on Small Island Developing States (SIDS), the influence of the local and regional institutional environment is not much sought. However, for the small island cases, it is evident and important to highlight as small islands have political linkages with the larger spatial unit. This phenomenon can be better given emphasis with the cases of Camiguin and Siquijor, these two small island provinces are formerly part of the larger island group, which has been separated only by virtue of national policy orders due to the population concentrated in small islands.

Siquijor was formerly a part of Negros Oriental and Camiguin was formerly a part of Misamis Oriental. Only Batanes has been a province ever since. This policy move, however, has created an impact on the island character of the two cases.

With the above-mentioned characteristics, it can be said that the small island cases possess similar situations with the other small islands in the world. Going back to the general notion of islands, in defining so, the term "insular" always comes. As such, insularity is often analysed as a function of islandness, and these similar characteristics are often resulting to such analysis.

Insularity can be further dealt with smallness (or the size of the island, in terms of land area and population), where impacts of natural and anthropogenic changes are immediately visible than in larger land unit areas (Brookfield,1990; Granger, 1993), distance (connoting access and remoteness) and proximity (defined as 'ease' of access). These factors are a function of location of small islands but have intervening impacts to the notion of insularity further affecting the small island character. Furthermore, as Newitt (1992) implies that smallness and islandness as island's general character are not invariably linked but inevitably affect each other. This notion is supported perfectly by the case of Batanes where factors related to "isolation and smallness" are reflected by its relative distance and its limited accessibility as compared with the other two cases.

### 7.2 Addressing Island Sustainability

Although, putting development concerns into compartments do not fully address the context of sustainability, the areas for the integration of these development sectors provide additional layer of analysis, however ideal, this process of integration is rarely achieved in practice. Another means of addressing sustainability concerns is through the thematic development areas like poverty, gender mainstreaming, climate change and disaster risk reduction, biodiversity, etc. to mention a few. All inclusive and ideal in frameworks that has been circulating for several decades already, but still limited in actual practice.

As discussed, other defining characteristics of small islands making it worthy as areas of study include distance/ proximity, accessibility, and integration, which are somehow discussed in usual profiling of a spatial unit in the Philippines but not defined comprehensively as deemed needed for approaching the small islands context.

#### 7.2.1 Aspects of Small Island Continuum

Some relevant aspects that were not highlighted in island studies literature that were evidently visible in small island cases include the following:

*(a) Island Ecosystem Continuum.* The character of having complex geographies is further assessed in small island cases in terms of the ecosystem continuum aspect. Although ecosystems show interconnections and is very much appreciated through nutrient cycling, small island ecosystems further demonstrate this with anthropogenic (human-induced) pressures that impact not a single aspect of the island ecosystem but transcends through the complexity of the whole small island landscape. Through the DPSIR framework, the analysis of the problems, issues and concerns were generated and assessed in a causal-effect relationship that could qualitatively provide bases for the linkages of several ecosystems in the small islands that has impacts to human communities and the island system as a whole (Figure 7.1).

The conceptualized DPSIR framework runs as explanatory cause-effect factors assessing the relationships of observed problematic condition among small islands as discussed by the local communities themselves. In addition, islands with large, externally oriented economies often rely on a few, heavily weighted factors such as tourism, oil imports or tax incentives. Not only do these factors fail to account for the environmental constraints of the island system, but their sudden disruption can also leave an island vulnerable to serious resource shortages (Deschenes & Chertow, 2004).

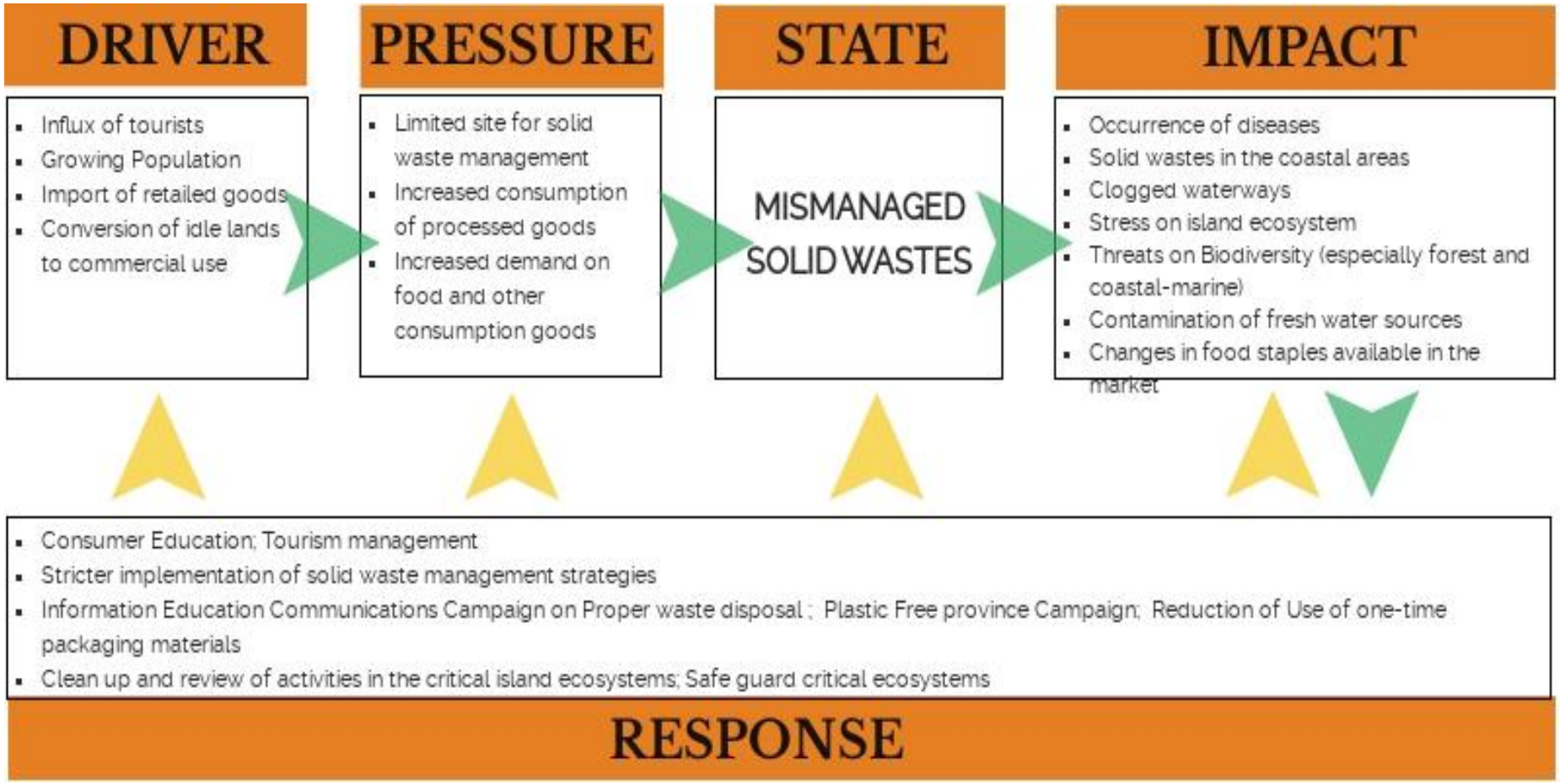



**Figure 7.1 DPSIR Framework for Small Island Solid Waste Management**

*(b) Sea Faring Culture and Indigenous Knowledge.* These cultural identifying characters of small island communities are very relevant in underscoring sustainability issues. Although not succinctly discussed, some literature in island anthropology imparts that it has been repeatedly shown a close historical connection between environmental sustainability and human survival (Kirch, 1997; Erickson and Gowdy, 2000). Batanes group of islands has perfectly shown this sustainability practices in their indigenous agriculture activities, local housing adaptations, fishing activities, etc. Also, the cultural tradition of the local *Ivatans* has shown the relevance of their sea-faring culture as an adaptive practice in the mastering the living conditions in islands.

Small island living also suggests the natural affiliation of human communities to the seas, making the "sea-faring culture" relevant and worth analysing in highlighting island sustainability. For example, several literatures have shown that the age-old practice of *Ivatans* in Batanes has been very effective in the conservation of the environment and survival of human population through time. As such, the island context then brings sustainability concerns rapidly to the forefront of environmental management and planning (Chapman, 2011).

*(c) Defining the subsistence economy of small islands*. It has been clear that agriculture is an important economic engine for small island communities' survival. However, assessment on the agricultural conditions of small island dwellers, based from the cases were limited to agricultural statistics and not digging deeper to analysing the subsistence context of small island communities.

Subsistence economy, driven by human communities' direct extraction of island natural resource bases, must be looked at in the aspect of the existing informal economy in small islands. This will bring the realization of the direct connection of small island resources to the survival activities of small island dwellers.

The issues related to linking human activities (industries) to the limits of environmental carrying capacity as seen by Deschenes and Chertow (2004) as of immediate importance for island systems will be highlighted upon realizing this situational context of small islands.

*(d) Small Island Resources Outflow.* Much of this chapter dealt with how to contextually approach the small islands in trying to achieve a better understanding of its situational reality. However, equally important to recognise is the dynamics of the exchanges between islands (locally and globally), given its immense impacts to the island economy (Baldacchino, 2008) and largely, to its sustainability.

Including the factors related to local resources interaction, which connotes the direct use of the local island resources for the subsistence and economic activities and its consequent flow through a larger system is practically needed to be highlighted in underscoring sustainable small island planning.

### 7.2.2 Distance as Factor in Realizing the Small Island Roles in Highlighting Sustainability

Distance is a constant factor considered in analysing human settlements; proximity and access are notions of physical distance of one area to another. In a similar case, island systems, where human settlements also exist, see the distance factor not only as an indicator of accessibility and proximity but also isolation.

Accessibility and proximity are measures of interaction and also the notion of isolation in small islands, therefore, looking at the relative distance of small island systems from its neighbouring settlements, impact the kind of spatial interaction that is expected among the provinces contained within the same region.

Variations in the small island cases and their regional counterpart can be contextual, especially in relation to their relative distances among each other. The Northern Mindanao region and the Cagayan Valley region have similar cases, where the greater majority of provinces are in one land mass and only the small island province is technically separated from the whole region. The difference in the two cases lies in the relative distances of the island province case of Cagayan Valley as compared with that of the Northern Mindanao.

The Central Visayas case region is a bit different as the cases are all island provinces, although these provinces are technically close towards each other, aspects of land transportation however, is not possible only but air and sea transport are technically connecting these island provinces.

Transportation connotes easier accessibility, especially in the cases of the three regions considered where settlements are entirely connected among each other via land sea or air transportation media. However, ease of access, although it is also a reflection of the quality of medium is easier and cheaper with land transportation as it only requires workable roads and bridges as compared to sea and air transport. For this reason alone, it makes the provinces contained in the mainland easier to interact as compared to the island provinces interacting to those in the mainland.

The land transportation case is somewhat different in the Central Visayas region, as seas transport came to me an easier means to connect the island provinces. However, this similar difficulty is shared among the small island provinces in all the three regions where it belongs. Often left out as physically isolated landscapes, the small island provinces had to deal with such factor making it unique as a case point for settlement interactions.

Also, the proximity of other urban places impacts connectivity and consequent settlement interaction, as Central Visayas tend to have more urban places than the other two regions. Urban centers and provincial centers are areas of population concentration and centralization of activities thus, naturally attracting movement of people in a region. The population and existing services are constants for a region, but the proximity, especially of the small islands to other areas where spatial interaction could foster makes the difference.

For the three regions having small islands, the relative distance of one settlement, among each other were measured and is shown in Table 7.2. At a glance, the distances in the Central Visayas region can be said to be closer to each other than the other two island provinces. However, these distances are affected by the transport medium, where sea transport primarily takes into greater account in the Central Visayas except of the cases of the highly urbanized areas in the region contained in the province of Cebu.

**Table 7.2 Matrix for Relative Distances (km) of the Island Province in other Provinces and Urban Centers within their Region**

| Region | Urban Centers | Provincial Centers (Provincial Town Capital) | | | | | Highly Urbanized City | | |
|---|---|---|---|---|---|---|---|---|---|
| Cagayan Valley | | Batanes | Cagayan | Isabela | Nueva Vizcaya | Quirino | Tuguegarao** | | |
| | Batanes | | 315 | 368 | 450 | 450 | 315 | | |
| | Cagayan | 315 | | 61 | 141 | 134 | 0 | | |
| | Isabela | 368 | 61 | | 119 | 93 | 61 | | |
| | Nueva Vizcaya | 450 | 141 | 119 | | 42 | 141 | | |
| | Quirino | 450 | 134 | 93 | 42 | | 134 | | |
| | Tuguegarao City** | 315 | 0 | 61 | 141 | 134 | | | |
| Central Visayas | **Urban Centers** | **Provincial Centers (Provincial Town Capital)** | | | | | **Highly Urbanized City** | | |
| | | Bohol | Cebu | Negros Oriental | Siquijor | | Cebu* | Lapu Lapu | Mandaue |
| | Bohol | | 71 | 75 | 63 | | 71 | 67 | 76 |
| | Cebu | 71 | | 129 | 130 | | 0 | 13 | 5 |
| | Negros Oriental | 75 | 129 | | 27 | | 129 | 131 | 134 |
| | Siquijor | 63 | 130 | 27 | | | 130 | 127 | 132 |
| | Cebu* | 71 | 0 | 129 | 130 | | | 13 | 5 |
| | Lapu Lapu | 67 | 13 | 131 | 127 | | 13 | | 10 |
| | Mandaue | 76 | 5 | 134 | 132 | | 5 | 10 | |
| Northern Mindanao | **Urban Centers** | **Provincial Centers (Provincial Town Capital)** | | | | | **Highly Urbanized City** | | |
| | | Bukidnon | Camiguin | Lanao Del Norte | Misamis Occidental | Misamis Oriental | Cagayan de Oro* | Iligan | |
| | Bukidnon | | 130 | 139 | 150 | 65 | 65 | 98 | |
| | Camiguin | 130 | | 165 | 131 | 82 | 82 | 118 | |
| | Lanao Del Norte | 139 | 165 | | 52 | 100 | 100 | 50 | |
| | Misamis Occidental | 150 | 131 | 52 | | 91 | 91 | 55 | |
| | Misamis Oriental | 65 | 82 | 100 | 91 | | 0 | 49 | |
| | Cagayan de Oro City* | 65 | 82 | 100 | 91 | 0 | | 49 | |
| | Iligan | 98 | 118 | 50 | 55 | 49 | 49 | | |

**Note:** The relative distances were measured using Google Earth Satellite Imagery
* Functions as Highly Urbanized city, Provincial Capital and Regional Capital
** Functions as Provincial Capital and Regional Capital

Land transportation on the other hand is the advantage of the Northern Mindanao and Cagayan Valley regions, respectively, although not for the case of the island provinces. This dilemma of island isolation makes a clear point in regional spatial dynamics.

The greaer tendencies for spatial interaction to happen within areas closer by relative distance is higher and more probable than those father away. Given such, the island province cases make it really hard to impact spatial interactional connections with the rest of the privinces in the same region for this very limitation.

Among the three island provinces, Batanes, is the most isolated in terms of its relative distance to other provinces along its region. The cases of Camiguin and Siquijor are somewhat negligible as its distance from the next closest provincial center is not so far, Siquijor- Negros Oriental (≈27 km) and Camiguin-Cagayan de Oro (≈82 km). As measurements were done from provincial capital to another, symbolizing the connection of the urban centers making the case of Siquijor-Negro Oriental the closest distance, however, if considered as island mainland connection, the distance of Camiguin to the closest mainland point in Misamis Oriental (≈30km). This is outrageously close as compared to the closest mainland provincial link for Batanes province (Cagayan) at ≈220km (Sta.Ana, Cagayan), the measure however was made to the Cagayan provincial capital and regional center, Batanes-Tuguegarao city (≈315 km) (Table 7.2).

All other provincial interactions within the regions are somewhat closer and linked with various transport media. Only the cases of small island province are peculiar. Thus, due attention to the regional spatial interaction can be obtain by looking at the physical distance alone.

Close connection and spatial interaction happens between settlements with relatively closer distances like the link between Cagayan- Isabela (≈61 km) and Nueva Viscaya-Quirino (≈42 km) in Cagayan Valley where provincial capital cities are connected. Similarly, the cases of Cebu-Bohol (≈71 km) and Siquijor-Negros (≈63) in Central Visayas region. Lastly, the cases of Iligan City- Cagayan de Oro City (≈ 49km), Lanao del Norte-Misasmis Occidental (≈52 km) and Misamis Oriental-Bukidnon (≈65 km) (Table 7.2).

Clearly, the distances among settlements, especially the cases of small island provinces are apparent and must be considered to properly analyze the context and nature of spatial interaction that can be expected. In this case, the small island provinces of Camiguin and Siquijor, although isolated by waters can still be considered well connected as compared with the case of Batanes province, having very minimal connections to the Cagayan Valley region in terms of the distance covered.

### 7.2.3 Highlighting the Spatial Interaction among Small Island Provinces

Simple spatial interaction model provides an analysis that highlights the state of spatial integration or isolation of a human settlement, especially for the case of small islands. Using the human settlements' population as the mass attracting a pull of services and functions and the distance as intervening factor, spatial interaction values computed may show the strength of spatial interaction between human settlements.

Applying simple gravity modelling, on the stregth of interaction among small island provinces to the regional centers and the national capital region shows further that small island provinces are facing greater challenges of spatial interaction. The small island province cases show the least values of spatial interaction as measured from physical distance and air travel distance (Table 7.3).

**Table 7.3 Spatial Interaction Values of Selected Human Settlements in the Philippines**

| Human Settlements | | Population Size | Distance | | | Spatial Interaction Values* | | |
|---|---|---|---|---|---|---|---|---|
| | | | Distance to the Regional Center (km) | Combined Transportation Media to the Regional Center** (sec) | Air Transportation to the National Capital (sec) | Distance to the Regional Center (km) | Combined Transportation Media to the Regional Center** | Air Transportation to the National Capital |
| Cagayan Valley | Batanes | 17246 | 315 | 3600 | 7800 | 0.000405842 | 0.035716494 | 0.021680399 |
| | Cagayan | 1045818 | 109.7 | 6840 | 4500 | 0.202923560 | 0.599969745 | 0.622011043 |
| | Isabela | 1593566 | 61 | 6540 | 4500 | 1.000000000 | 1 | 1.000000000 |
| | Nueva Vizcaya | 452287 | 141 | 14340 | 19680[+] | 0.053120909 | 0.059033869 | 0.089316564 |
| | Quirino | 188991 | 134 | 13740 | 26100[+] | 0.024576563 | 0.026869099 | 0.021219161 |
| Central Visayas | Bohol | 1313560 | 71 | 11160 | 5400 | 0.000070241 | 0.004093922 | 0.354083350 |
| | Cebu | 3709748 | 1 | 1200 | 5400 | 1.000000000 | 1 | 1.000000000 |
| | Negros Oriental | 1354995 | 129 | 18180 | 5400 | 0.000021949 | 0.001591358 | 0.365252572 |
| | Siquijor | 88478 | 139 | 17160 | 5400 | 0.000001411 | 0.000116632 | 0.023850138 |
| Northern Mindanao | Bukidnon | 1415226 | 65 | 8640 | 16260[++] | 0.022352119 | 0.019664321 | 0.257288192 |
| | Camiguin | 95984 | 82 | 12840 | 5400 | 0.000952557 | 0.000603878 | 0.158214566 |
| | Lanao del Norte | 1019013 | 100 | 14340 | 13440[++] | 0.006799850 | 0.005139987 | 0.271154194 |
| | Misamis Occidental | 602126 | 91 | 16680 | 6600 | 0.004852038 | 0.002244791 | 0.664407687 |
| | Misamis Oriental | 888509 | 7.7 | 960 | 6000 | 1.000000000 | 0.019664321 | 0.962827557 |
| Regional Center | Tuguegarao City | 153502 | 0 | 0 | 4200 | 0 | 0 | 0.579771820 |
| | Cebu City | 922611 | 0 | 0 | 5400 | 0 | 0 | 1.000000000 |
| | Cagayan de Oro City | 675950 | 0 | 0 | 5700 | 0 | 0 | 0.248699103 |
| National Capital | Metro Manila | 12877253 | - | - | 0 | - | - | 0 |

*The Spatial Intearction Values ranges from 0-1. 1 being the highest or strogest spatial interaction and 0 as the least. The computation is based from the gravity model of interaction.

** The fastest and cheapest route from the regional center to the human settlements.

[+] Land transportation only

[++] Combined air and land transportation

Values show that small island provinces (Batanes, Siquijor and Camiguin) in all accounts (physical distance and transportation media) have the least scores as compared with the spatial interaction of other provinces in their respective regions (Table 7.3). Since the range of values is from 0 to1, it is clear the small island provinces have the weakest form of spatial interaction. The results follow the logic that larger human settlements attract more activities and services making spatial interaction stronger. These further confirm that provinces in proximity with the regional center show stronger interaction than the other provinces.

Although physical distance as intervening factor may be addressed by various forms of transportation media, especially for the case of small islands where maritime and air transportation is made possible. Still, the cases of small island provinces, through the scores (Table 7.3) prove further that limits provided by the physical environment add complexity in their spatial integration in the region. Such physical environment limits impacts additional costs in the transportation and maintenance of services to continuously link the small island settlements to the regional center or even the national capital.

Among the three small island provinces, Batanes has the weakest spatial interaction to the national capital (Metro Manila), through air transportation (Table 7.3). The impact of distance play a critical role here and the relatively small population of Batanes compared to the other two cases. Scores in the spatial interaction of the three cases to their regional centers (Table 7.3), respectively, show that Batanes on the other hand, has an advantage (0.035716494) compared to the scores of Siquijor (0.000116632) and Camiguin (0.000603878). However, such score connotes that the only means of transportation for Batanes is by air unlike the other two cases where maritime transportation were more favourable. This means that although the spatial interaction score for Batanes is higher than the other two cases, the frequency of use of air transportation as medium is less and more costly making the spatial interaction still weak.

The spatial interaction scores, although crude, still provided a clear indicative that small island provinces are isolated from other provinces making the spatial integration a more challenging aspect for small island sustainable development be better achieved.

### 7.2.4 Tourism and its Impact to the Small Island Environment.

On a short-term perspective, the influx of tourists in small island provinces can be considered good as the gross domestic productivity (GDP) on small islands attributed to tourism has increased significantly. Also, as Yazdi, Hussein and Saghaei (2007) emphasized, tourism can provide alternative sources of income when other local industries are falling short.

The direct impact of tourism to island communities is employment generation. Many related jobs can be expected to manifest significantly through the services offered under the flagship of tourism. Also, increased demands on the existing local industries, especially those related to accommodation, food and manufacturing of goods is expected to support the tourism industry. This has been backed up by several studies about the immediate direct and indirect effects of tourism in the community (Mansoori, 2003; Jafari, 1990; Bersales, 2003; and Alampay, 2005) from income and economic benefits (economic growth and development), livelihood opportunities, and empowerment.

Similarly, the introduction of tourism as an emerging industry in small island provinces follows the classical theory of circular cumulative causation of Gunnar Myrdal (1944), wherein tourism industry brings about several direct and indirect benefits that is very fitting for small islands, as their natural resources base are generally small and fragile

All good at first glance but the pressure imposed to the natural ecosystem of the small islands, given its fragility, can be unprecedented. Tourism perspectives, without careful planning and management, carry the seeds of its own destruction (Weaver, 2008).

Access, as described in the above section is continuously improving, thus, putting pressure in the resources use and impacting significantly in the small island planning perspective. However, on a long-term conservative assessment, such influx is actually a threat if not managed properly. Furthermore, given the fragile conditions of the small island ecosystems and its direct link to human activities, all other related activities towards developing the small islands may be halted due to the innate vulnerability of its physical environment.

The three small islands include tourism as among the rapidly growing service sector propelling the island economy. Given the trend in the influx of tourists arriving in the island province and the continued population growth, pressure imposed by increased concentration of population and centralization of human activities and services is a reactionary estimate of the near future of islands. This has been highlighted through an interview by the Oxford Business Group (2015) indicating that “Some islands in the country were allowed to develop too fast and uncontrolled, and today face environmental degradation as a result” as quoted from Mr. Laurent Lamasuta (president and CEO of El Nido Resorts).

A summary of overarching policy and guiding frameworks (Table 7.4) is provided to assess the realized role of small islands in tourism. At the national stance, the Philippine Department of Tourism (DOT) has priority areas at the national level to pursue tourism development through infrastructure development assistance. However, the three island provinces offering tourism activities were not part of this. Nonetheless, infrastructure development projects are still spread throughout all the regions in the country.

Since small island provinces cannot compete with other provinces endowed with a large land area for agricultural purposes, focusing on tourism is the trend for every small island. Thus, the three small island provinces always have this perspective to really deal with tourism as an equally important industry to develop.

In the discussion on the local industries in the previous chapter, those related to tourism are concentrated in the administrative services offering tour packages, rental cars, etc. and the accommodation and restaurants. Clearly, there are a considerable number of businesses and employment attributed to tourism; however, the full potentials of these island provinces in tourism are not fully achieved. In 2018, the World Travel and Tourism Council (WTTC) described that the largest contributor of economic growth for the Philippines is the tourism sector. As such, small islands are encouraged and have a huge policy backing at the local level to really push forward service sector provision as their main driving force for economic growth. However, a carefully laid tourism planning is required to assure that sustainable tourism is achieved and not to fall into the tragic cases of other tourist areas in the Philippines.

Although not fully achieved in terms of all the other potentials related to the tourism industry, as these three small island provinces are just starting their tourism development agenda, several persistent problems have been very visible making tourism in the small islands not easy to fully realize. Relational evidence can be seen through the DPSIR framework for the tourism industry (Figure 7.2).

**Table 7.4 General Tourism Outlook for the Three Small Island Cases**

| Province | Tourism Tagline | Tourism Spatial Development Support | | | | | Conservation Policies | Ecotourism as a strategy |
|---|---|---|---|---|---|---|---|---|
| | | National-Regional Support | Link to the Local Spatial Development Plan | Tourism Master Plan | Tourism Office/ Center/ | Tourism Personnel | | |
| **Batanes*** | Breath-taking Batanes: Explore Simplicity | **X** | **X** | **X** | **X** | **X** | **NIPAS, IPRA** | **X** |
| **Siquijor** | The Mystic Island | **X** | **X** | | **X** | | | |
| **Camiguin** | The Island Born of Fire | **X** | **X** | **X** | **X** | **X** | **NIPAS** | **X** |

**Note:** *Batanes has an Ecotourism framework plan complete in form and structure. It has significant relevance to the provincial framework plan and has considerable arrangements following through the management criteria set upon by NIPAS and IPRA. Ecotourism is embodied in the created plan.
**Siquijor has a relatively old tourism development, emphasized in the Provincial Development and Physical Framework Plan (PDPFP). Concerns regarding tourism development have been laid out in the PDPFP but not actual tourism Master plan for the island province is available. There are no actual personnel working on the tourism growth of the province as the point-person is oinly a designate working for other development sector of the province as well.
***Camiguin has a tourism master plan of which the objectives coincide with the provincial thrusts and goals. However, the aspect of ecotourism has been floating as a concept but not significantly integrated in details in the master plan. The tourism center is being created under the assistance of the Tourism Infrastructure and Enterprise Zone Authority (TIEZA).

Nonetheless, without vertical and horizontal complementation in relation to the actual tourism master plan and the spatial development perspectives of the island province, the rightful claim to really push forward tourism development as an engine for island development is half-baked. Batanes and Camiguin have their tourism master plans in place; however, only Batanes has significantly pushed forward the translation of the tourism activities to the level of municipal government since Camiguin has not completed the land use plans for its municipalities, although it will definitely try to integrate such mandates in the local plans.

Also, Camiguin and Batanes have been recognized at the regional level to really push forward tourism as an engine for their development. Camiguin is identified together with Gingoog City in the Northern Mindanao region to lead in the tourism adventure loop of the region and Batanes has been an all-time favourite of the Cagayan Valley region to claim the heritage tourism of the region given its rich cultural and natural heritage. The island of Siquijor, although the mandate at the region and at the national level since the 1970s has been present, still needs an empowering engine to break through the tourism giants in the Central Visayas region, namely the provinces of Cebu and Bohol.

Further analysing the tourism industry through the DPSIR framework (Figure 7.2) shows that many related indirect activities can further aggravate the situation of small island ecosystem and such considerations are solely based from the current situation. As such, socio-cultural (peace and order, indigenous cultures, etc), economic (job creation, livelihood, financial flows, etc), environmental (waste management, resources depletion, mismanaged natural resources, etc) and institutional (land conversion, services provision, etc) are manifesting significantly as either a driver or an situation these small islands are currently facing with regards to their tourism development.

Among the prevalent problems organized into DPSIR framework are shown in Figure 7.2. These problems and challenges are directly coming from the local community members and as emphasized by local authorities.

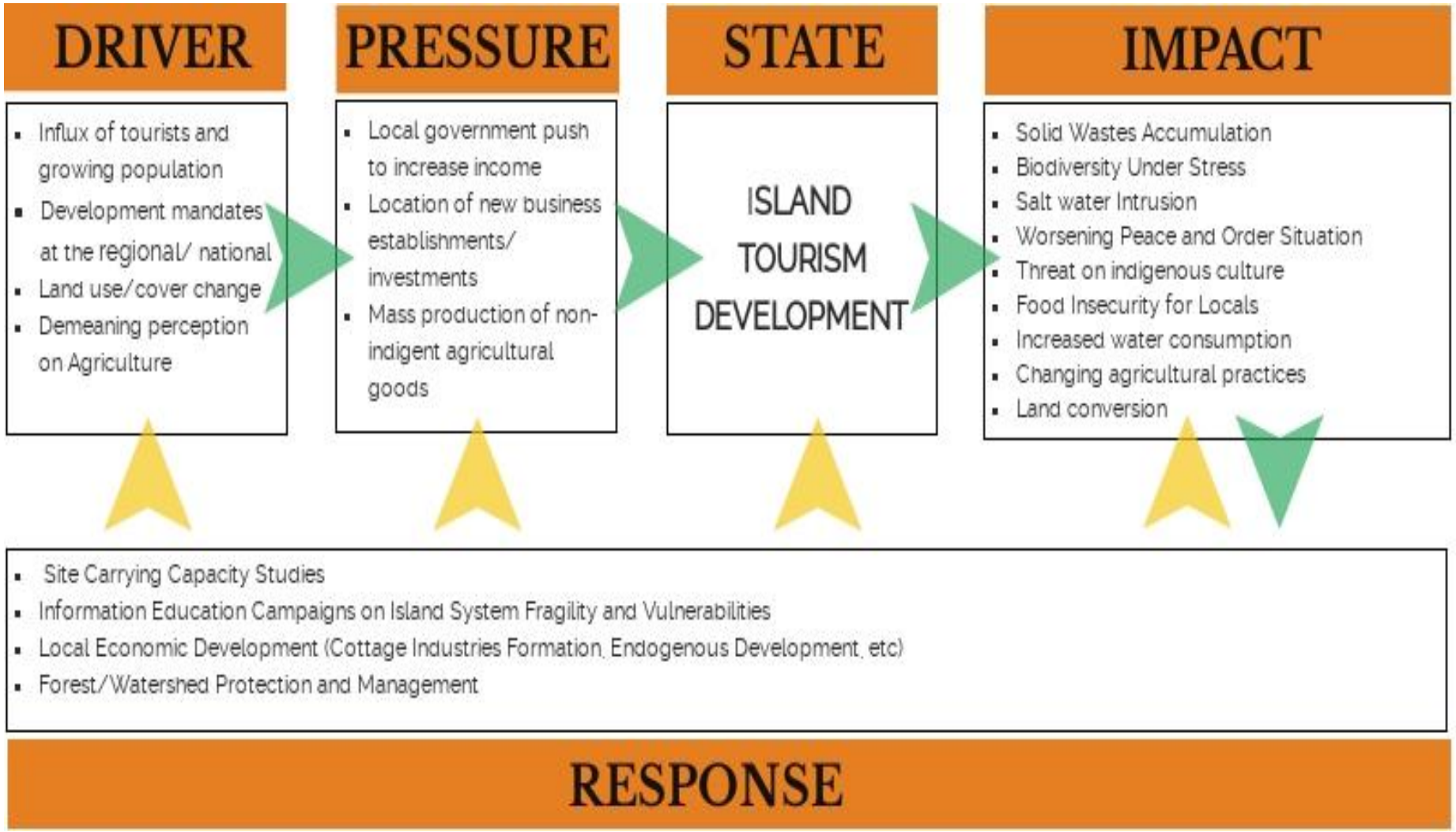



**Figure 7.2 DPSIR Framework for Small Island Tourism Development**

## 7.3 The Ecological Profiling of Small Islands

In writing the profile of small islands it must emphasize the context of islandness or insularity to practically deliver the exact needs of small islands in the spatial development process.

Other aspects identified in highlighting islands are the context of distance, proximity to services and accessibility. These in turn impacts the spatial development indicators listed in Table 7.5. Indicators without corresponding authors where found important in the three small island provinces that could impact better island characterization to properly highlight its uniqueness as a landscape and area of planning. Also, the inclusion of these indicators in Table 7.5 provides the context of greater aspirations for achieving a sustainable small island province.

**Table 7.5 Key Indicators for Highlighting Small Islands Context in Spatial Planning**

| Development Sector | Indicators |
|---|---|
| **Demographic** | Small Size and Growth *(Bass and Dalal-Clayton, 1995)*<br>High Density *(Bass and Dalal-Clayton, 1995)*<br>Migration *(Bass and Dalal-Clayton, 1995)* |
| **Environmental** | Vulnerable Natural Resources *(Bass and Dalal-Clayton, 1995; Deschenes and Chertow, 2004)*<br>High ratio of coastline to the land area *(Bass and Dalal-Clayton, 1995)*<br>Vulnerability to disasters *(Bass and Dalal-Clayton, 1995)*<br>Complex Geographies *(Bass and Dalal-Clayton, 1995)*<br>Isolation *(Bass and Dalal-Clayton, 1995)*<br>Ecosystem Continuum<br>Natural Resources Movement or Flows (Valuation) |
| **Socio-Cultural** | Rural context and Isola Effect *(Wong et al., 2009)*<br>Cultural Identity (*Indigenous Communities and Sea faring culture)* |
| **Economic** | Narrow Economic base *(Bass and Dalal-Clayton, 1995)*<br>Import Oriented<br>Vulnerable to natural environmental shocks *(Brigulio, 1995; Commonwealth Foundation, 2004)*<br>Concentrated economic activity *(Nurse and Sem, 2001)*<br>Devalued local economic goods *(Bass and Dalal-Clayton, 1995)*<br>Subsistence and Informal Economy |
| **Institutional** | Satellite town/ Sister town effect<br>Political Representation |
| **Infrastructure** | Accessibility Issues<br>Basic Services |

Without due consideration on these indicative factors, the context of small islands cannot be fully actualized. Also, it is important to note that adding these indicators to the existing exhaustive profiling process will ultimately lead to better analysis of the different development sectors on small islands planning allowing better appreciation and understanding of the small islands situation.

The suggested detailed alterations in the ecological profiling in the Philippine spatial planning process are shown in Appendix D.

### 7.4 Spatial Framework for Planning Small Island Landscapes

The existing spatial framework for all local government units in the Philippines is the Comprehensive Land Use Plan (CLUP). This is an exhaustive planning document involving both the Ecological profile, development sectors study and the actual land use plan and the zoning ordinance. Through this document, all of the local government aspirations and goals are translated into workable programs and projects reflective of the community's vision.

However, the implementation of this planning document, even with the presence of the zoning ordinance, is ineffective. Several reasons contribute to such are the incapacity of the local government to act on its actual plans, limited training and skills development of the local government, and the apparent reason for the conduct of this study involving the mismatch and shallow appreciation of the realities of the planning environment.

As small island landscape involves a critically different environment, fragile and vulnerable, fitting spatial planning approach should be done. This notion has been floating and waiting to be addressed for almost a decade but no apparent and clear mechanisms to implement has been laid out. The diagram below shows the different planning areas within a local government. As such, different thematic areas must be considered (Figure 7.3) and since the CLUP is the binding and implementable physical framework plan for the local governments, only through the integration of this several plans will better lead to achievement of local government goals.

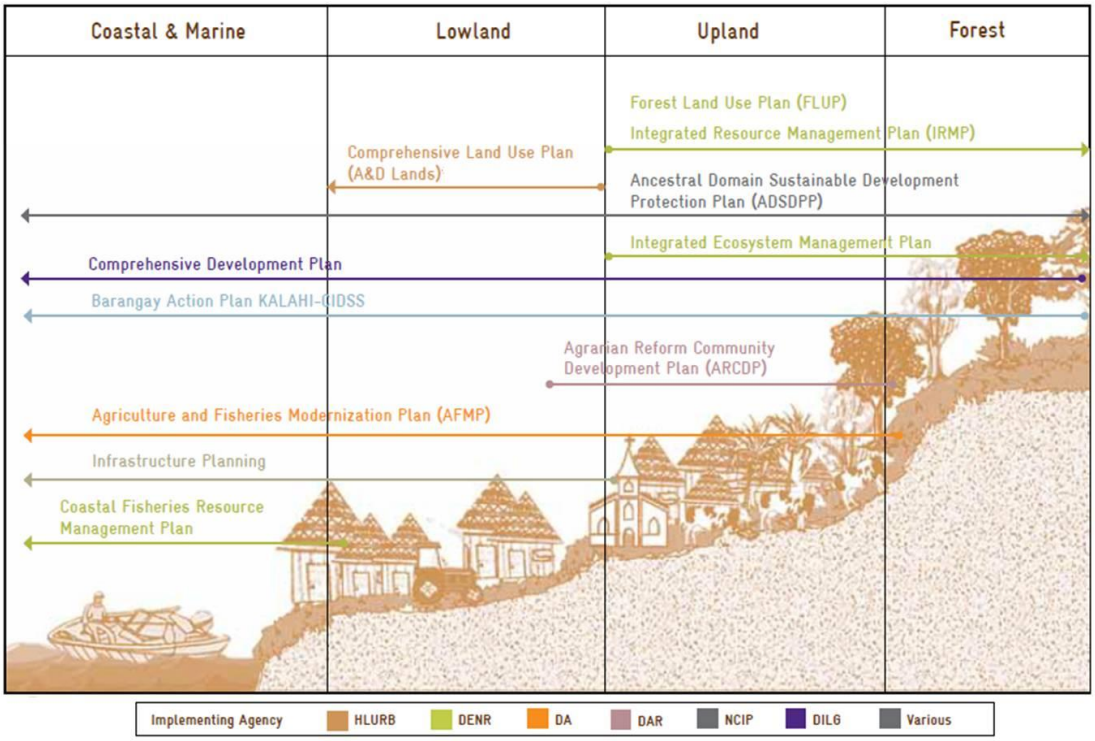



**Figure 7.3 Thematic Areas of Planning in the Philippine Landscape** *(Elmer Mercado, 2013)*

Nonetheless, the CLUP stops at the land use aspect, and much of those tackling marine water environment include the Coastal Fisheries Resource Management Plan, Comprehensive Development Plan, and other policies, but these planning documents and policy measures do not have the spatial framework lens making it really difficult to assume for the proper spatial development of the marine areas as part of the local governments.

Therefore, the proper implementation of Comprehensive Land and Water Use Planning (CLWUP) is highly suggested especially for the small island cases. Only by explicitly including the water as part of the spatial planning framework, will its concerns be better integrated. Furthermore, small islands continue to imply the ecosystem continuum aspect given the impacts on the land ultimately affect the coastal-marine environment; thus, it is only fitting to push-forward CLWUP as a spatial planning mechanism for small islands.

### 7.5. Conclusions in Creating Spatial Strategies for Sustainable Island Development

Answering the two-pronged research question puts forward the context of developing strategies for sustainable island planning and development. True enough, several indicators directly explained the context of small islands and its uniqueness as a planning environment making small islands an exciting and ecologically significant areas for planning.

Proper explanation of the contextual conditions existent in small islands provides sufficient hints on how to achieve small island sustainability. Indeed, small islands are unique ecosystems that merit well defined and carefully laid development strategies for its development. The small island unique characters have been properly identified and included in the procedural physical planning approach, hence, assuring that the special concerns of small islands are not just highlighted but also directly addressed. The three small island province cases characteristically followed the identifying indicators for small islands following closely the different development sectors in physical planning. Also, the DPSIR clearly shows the linkages of ecosystems within the small islands that merit the context of ecosystem, continuum in properly analyzing small islands.

Nonetheless, island resources are not confined within the islands alone, as how the island communities also facilitate resources exchange among different spatial systems seem to provide a more complex situation of small islands within its immediate regional administrative landscape environment. With this, the context of sustainability is altered and must definitely look at the island interaction happening significantly. Resources mapping and spatially locating these island resources prove outflow movement of island resources affecting its development.

The movement of these resources also imply (1) stress on the island ecosystem providing the resources to the larger spatial system and (2) measuring these resources flow only show the disproportionate distribution of income among the involved stakeholders. The results of the materials flow analysis combined with the value chain analysis of selected commodities coming from the small islands show that the uneven distribution does not favour the local island dwellers and their local environment. Therefore, actions on organizing and better managing this relationship are required to fully rationalize the development of small islands. Tourism provides an alternative source of income for small islands, however, on a long range perspective, without careful delineation of areas for significant protection and management in small islands, still destruction of this fragile system is inevitable.

All these results were gathered and integrated to form a strategy, discussed in the recommendation chapter, to address the problem of small islands.

# CHAPTER EIGHT

*“Small islands of coherence in a sea of chaos can shift the whole system to a higher order”*

*-Barbara Marx Hubbard*

# 8. RECOMMENDATIONS TOWARDS IMPROVED SMALL ISLAND MANAGEMENT AND PLANNING

Addressing the small island sustainability needs a holistic approach that will transcend through different layers of development issues and concerns. The possible approach has been shown in this research, however, deeper and closer look at seemingly unrelated aspects of development can still create a means of addressing the survival needs of the local island populations where sustainability issues usually circulate.

### 8.1 Cross-section of Small Island Management and Planning

The diagram (Figure 8.1) shows a generalized approach to possibly tackle the sustainability issues faced by small islands using the framework/approach of this research as lens to analyze the existing situation.


**Figure 8.1 Approach to Tackle Small Island Sustainable Development** *(own construct)*

#### 8.1.1 The Horizontal Island Development Spectrum

The horizontal level approach provides the island level concerns that need to be integrated and further studied. Some of which were already covered in the study, but also can be further tested to see if the recurrence is similar thus providing a deeper context of small island sustainability.

The environment lens could explore some of the following concerns in terms of analytical methodologies and conservation/ management strategies for highlighting sustainable development of small islands,

(a) The carrying capacity studies applied through small island ecosystem as a continuum. Not only dissecting the small islands into unit-based material resources or ecosystem-based carrying capacity and valuation methodologies but also magnifying its context to the whole island ecosystem carrying capacity analysis. Given the fact that small island ecosystems show significant relationships among each other, and that the fragility of island resources are impacting each ecosystem present in small islands, a mechanism to better compute for the value of the whole island ecosystem could be further generated to better imagine the importance of these ecosystems in the world.

(b) Key Biodiversity areas are appropriate mechanisms to control/ better manage small island ecosystems, but the protection aspect must directly translate to effective small island environmental planning and zoning. Spatial stratification of identified activities followed and respected by all stakeholders employing the conservation principle of sustainable use. Zoning must also emphasize the spatial and temporal aspects to allow the locals to maximize and make productive use of the available natural resources.

The Batanes strategy as a declared protected area can provide lessons to the other two island provinces were conservation of natural resources always come as the forefront concern. Lessons learned from this strategy can also be applied to continuously improve on the existing management practices and adopt to better workable ones.

(c) The valuation of common raw material goods in the Material flow analysis and the value chain analysis employed in the study can be set as bases in the distribution of environmental funds at the regional/national level. Such merits of the small island ecosystems are not often felt if the small island, or part of it, is not proclaimed as a protected area by the Philippine policy. Local governments can also employ these methods to potentially address the local environment concerns with the bases of its economic contributions given that these resources are technically products of a properly managed island ecosystem.

(d) Protection of critical ecosystems must be strictly enforced and reaffirmed especially for protected forests and marine reserves. Methods such as spatial-temporal zoning, social fencing, and stricter implementation of conservation strategies must be enforced.

Spatial-temporal zoning will not only create zones for strict protection, conservative use, multiple use, and buffer zones but also look at the temporal aspects of human activities in specific areas, especially those important for indigenous communities so as to allow a continued use of resources but also protecting and allowing the natural ecosystems to regenerate itself through time. Social fencing, on the other hand, will allow local communities to safeguard their own resources by giving them a chance to productively use areas by protecting them at the same time. This will relieve the actual limitations in manpower of all the island provinces' local forest and coast guards.

Continuous updating and assessments of existing protected sites must also be done to assure that the integrity of the natural ecosystems is intact. This is especially true in the case of small islands as the ecosystem-based approach continue to highlight, which directs the health of one ecosystem aspect is related to others.

(e) Multi-sectoral collaboration is a theme for small island sustainability as emphasized through the ecosystem continuum concept explored in small islands. Since several agencies, local and regional alike, are held liable to each ecosystem concerns (Figure 8.2), a reality that for larger land masses are hard to materialize. Through the proven linkages and felt relational problems among the ecosystems impacting the local communities and also the liable agencies, better cooperative actions can be done and crafted.

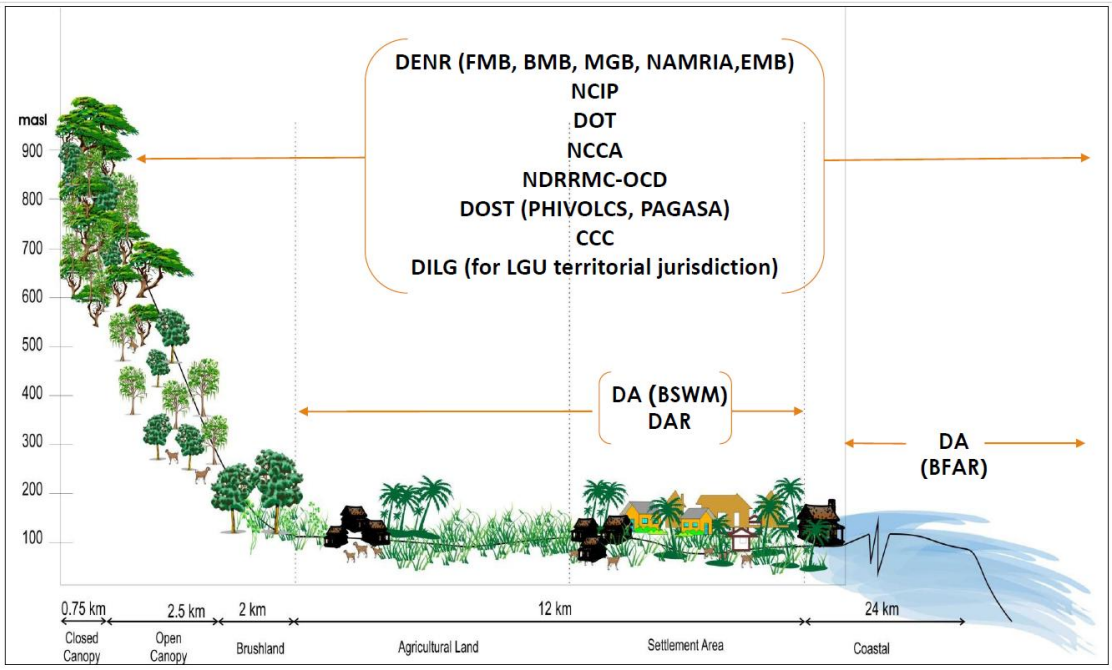



**Figure 8.2 Inter-agency Cooperation in Ecosystem-based Management** *(HLURB, 2013)*

Although this may take a little while to accrue, small island provinces could take the first steps to substantially create a working group that will exemplify the notion of collaborative work among differently oriented development groups.

(f) Climate Change and Disaster risk reduction. Climate change adaptation and disaster risk reduction are apparent themes to be included in continuous island analysis. Although these themes were not as comprehensively tackled in this research, the analysis and integration of these themes will be easier as the general understanding of small island characters were already highlighted in the study. Islands are among the most affected sectors in the events related to climate change and disaster risks. This study could better inform future climate adaptation projects in terms of the methodology and salient points to consider especially in dealing with islands. Scenario building on the context of small islands, climate change and disaster risk reduction and management can be better interpreted using this research as the basic notions for defining the experience and actual situations in small islands in the Philippines are already succinctly discussed in this research.

Socio-cultural and demographic aspects must also look at the integration of the following themes:

(a) Indigenous Knowledge integration in the profiling and sustainability analysis for small islands. Much of the discussed aspects related to Indigenous Knowledge centered on the survival capacities of indigenous groups in terms of harnessing their natural resources base. However, its continuity/ discontinuity over time have not been tackled. Generating a

vivid picture of the Indigenous Knowledge and Practices can enhance and potentially change the sustainability trajectory over time.

(b) Migration is a factor in population analysis crudely measured in the Philippines. With increased mobility through infrastructure development, this demographic factor may be more difficult to measure in the long run. However, policy changes can improve the documentation of migration especially those related to season migration and tourism related movement of people. Through this, better allocation of scarce resources can be handled by the local governments.

Also, small islands occupy a specific boundary and separated by water, control over the migration issues can be better laid down.

(c) The manner of productive use of the small island resources by the local population is an aspect of island sustainability that is not described nor focused in socio-economic profiling. A section must be suggested to create a better picture of how local island communities are using its resources in their daily living.

Equally important to note, the measure of poverty can be better understood using this qualitative measure as it can better accrue to the actual resource use and energetic efficiency of human community survival in relation to subsistence and food intake.

(d) The context of informal settlement families in the small islands, although not as significant as compared to the urban areas in their respective, are found scattered along the coastal areas or near the critical ecosystem fringes making them vulnerable to hydro-meteorological hazards. Assisting the local governments in their action plans in resettlement housing is supportive to the zoning recommendations for small islands, where areas of critical importance is conserved and settlement expansion areas are prescribed for the local population. Indigenous communities, although not considered as informal settlement families, are respected and awarded their birth right to occupy and use the natural resources in their ancestral lands long as it is used for their traditional activities and not for commercial purposes.

In terms of the economic sustainability, factors that need to be further scrutinized that have not been provided with much attention are the following:

(a) Input-output methodology. With the current level of data collection and review, there is very little possibility to provide a comprehensive analysis of the local economy using the input-output analysis. Improved data gathering and data base management, on the other hand, is the most important aspect to be considered if comprehensive economic analysis is sought. This is, however, complemented with enough training on skills development and database infrastructure upgrading.

(b) MFA is an effective tool in analyzing local and regional material flows and distribution. Although it entails a huge set of data and tasks. Still, the relevance and impacts of the results can provide concrete bases on how resources are used in the whole system.

This methodology can also be used in material flows of waste, which was not dealt in this research succinctly. Waste analysis through MFA could inform and better provide options for local governments to find profit from these seemingly unproductive resources.

(c) Through MFA, commodity flows and Value chain analyses, as employed in this study, food/commodity value chain assessments and analysis can be done. Such actions could provide more informed actions for decision makers to uplift the status of impoverished farmers/fisherfolk by controlling and better managing this food value chains in a way that is equitable to the grassroots.

Simple technological implements can provide options and information for local farmers/ fisher folk about the products they are harvesting. Here, strategic allocation of resources can be done to achieve the highest value possible for their commodity.

(d) Value addition and effective marketing strategies for local island products can also incur dramatic impacts to local economic condition. Through product transformation and market linkages, the value of small island resources could be improved.

Also, Product branding through the innate and unique character of small islands could create a new market for island products as healthier and safer options for food to consume. Adding to such is the notion of sustainable farming and harvesting. This has been a success for Batanes agricultural innovation of branding their local and traditional farming practices as "organic" and sustainable. Camiguin is also quite successful in this aspect as well, with their Lanzones (*Lansium domesticum*) production, branded as the tastiest in the country. The most sought-after variety of Lanzones *(Lansium domesticum)* must be coming from Camiguin.

However, since these are practically raw material goods, its value is not much as compared with processed goods.

(e) Economic infrastructure upgrading
Product value addition, branding and efficiency in the delivery of fresh goods and services are directly related to the economic infrastructure availability in small islands.

This is, still, in addition to the basic infrastructure implements required for a better functioning local economy- staple electricity (sustainable), water and waste management facilities; support infrastructures such as port, trading post, etc.

### 8.1.2 The Vertical Island Development Perspective

Ensuring the sustained development of small island provinces must complement the direction of spatial development for the regional and also the national level. The vertical spatial development integration for small island provinces provides this opportunity to incorporate concerns related to the regional and national spatial development. Such integration completes the picture of improved assessment of spatial development among small islands as it harmonizes all the concerns into one.

Tackling the concern of island sustainability, as explained and proven in the island cases considered, involves the careful analysis and consideration of the larger spatial landscape where small islands operate. Some of the vertical spatial development considerations for improving small island sustainability found useful through this study are emphasized as recommendations for future and further assessments are as follows.

(a) Resources Outflow assessment. Through Materials Flow Analysis (MFA), it was made possible to analyse how small islands provide some natural resources to the regional and national levels. Given such limitations in the needed datasets, still, the impacts of its results create an understanding of how small islands contribute for regional and national

development despite the limited attention provided to these landscapes in return. Also, resources flow assessment directly gives the importance of small island economies in addressing regional/national raw material demands. This makes the value of sustainability, in a systems perspective, important to underscore.

Applying the resources outflow analysis, coupled with value chain of some selected commodities, give light to how really these specialized commodities move around the regional spatial system and valued financially. Harmonizing the states for every commodity flow within the value chain system to equitably distribute the value of income is still possible through this assessment. Re-organizing the flow of resources and empowering the local communities in asserting their rights to improving their income perspectives are still possible by raw material products further processing, adding values to the source.

Also, taking advantage of the technological advancements (cellular phones and internet connectivity), prevailing market prices at the regional market can be easily accessed, making it possible for the local farmers, fisher folks and cattle growers to demand better pricing of their hard-earned harvests.

(b) Middlemen connecting the vertical integration of small islands to the region. It has been clear that the middlemen effect in the distribution of income is not helping the local island communities realize the true value of their activities, and at the same time the stress on the natural ecosystems where extraction of these natural resources was made. Many studies also try to reduce or even eliminate the middlemen in the picture of resources management to redistribute the income for the local communities- possible scenario but may demand empowerment and self-help development among local communities to fully realize.

In the small island cases, however, completely eliminating the middlemen in the picture entails some repercussions that instead of improving the system of distribution values assigned to the stages of work incurred for a certain raw material resource, will in turn just jeopardize the whole working system and create further chaos due to the local communities limited capacities and readiness to take on the role facilitated by the middlemen.

Integrating the middlemen in the system instead of removing them could be an option to consider. Through cooperative building and taking advantage of the skills of the middlemen, redistribution of the income can be possible. Also, since the middlemen have the linkages to the region, better targeted distribution of raw material resources can be made, increasing both the income of the local communities and the middlemen working for the cooperative of the locals.

(c) Regional Market active participation. Small islands can take advantage of the existing market linkages to the region and play along with other provinces. Such movement of small island provinces is not through increased production, as certainly it is not their comparative advantage but through informed product branding and marketing. This has been very successful in Lanzones and garlic raw material products reaching a huge market for traditionally and organic means of production. Other raw material products could also explore the quality of environment where these resources are extracted. As such, the small island's mystical character can work on their advantage by promoting its pristine all natural-context making its products the best, less altered and all natural. Improving not only on marketing but also walking the talk by really integrating this to the local traditional practices can also be a viable marketing strategy.

The organic market is also having a boost in the recent decade. Exploring this option can be a good idea for small islands by making their products organic, which adds value to the same product and creating a specific market niche as well. This is the option that is possible, especially for cattle and root crops that has lesser appreciation in the regional market although can open a huge potential for the small islands.

Database on the regional market, including the top restaurants and resorts with organic menus should be created for the purpose of enabling the local island resources to directly create market linkages with these establishments, creating a larger market for the small island resources.

In support to this, the local governments must provide the enabling mechanisms for the local farmers, fisher folks and cattle growers, through their cooperatives, to directly link and facilitate this network by creating social protection to the local communities and at the same time, creating standards that will meet the right quality of resources to be provided to the resorts and restaurants. With this, the local community members are able to deliver fresh and quality goods to the restaurants and specialty stores requiring the quality that is usually and already provided by the island ecosystems. Also, raw material post-harvest packaging and handling must follow as food safety and quality preservation is always what the restaurants and other specialized establishments are looking for.

(d) Spatial Development Roles assigned by the region and the national levels to the small islands often related to tourism and fishery resources production must be coupled with supportive infrastructure development to small islands to help them realize and propel their own development supportive to the general spatial framework. However, the national and regional development councils must also highlight that protection and actual situations faced by small islands, both at the ecosystem and the local communities' level. This notion has been continuously highlighted in this research, as it has been existent, however, not been acted upon by the authorities.

(e) Follow through the centrality analysis, since small island municipalities forming the provincial unit are seen more likely as satellite towns, coordinated and partnerships within these small island municipalities could be sought. These will provide collaborative functioning of the municipalities forming clusters that will accrue to the insistent dominion of the regional city players. With this framework of coronation, functions of these satellite municipalities can be further stream-lined, making complementary functions thus improving further the productive capacities of the small island province as a whole. The capital town of the island provinces could function more on assisting the growth and development of the specialities of the next clusters of municipalities within the same island province.

### 8.2 Sustainable Agriculture and Ecotourism as Themes in Better Island Development

Transcending challenges on the island provinces, including agriculture and tourism were also highlighted in the study, some recommendation to further address these challenges in creating a sustainable small island are summarized as follows.

#### 8.2.1 Sustainable Agriculture

Local tradition, especially the indigenous agricultural practices, are proven sustainable especially that is has been well adapted to the actual environmental conditions of small islands. The fact that these practices have been recognized worldwide is giving enough

reason to be continued and supported by the local governments. Batanes islands show much of these carefully documented agricultural practices that can be adopted by other small island provinces such as Camiguin and Siquijor, still, yet to be tested and specified which particular activities suites the environmental conditions in the other two small islands.

With the current practices in the three small island cases, several recommendations can still further their agricultural practices making it more sustainable and profitable for the local communities. Some of these suggestions are as follows:

(a) Prioritization of local indigenous varieties or species of crops. The most adaptive and economically viable crops are those which are indigent to the area. Especially for the case of small islands, having relatively different environmental conditions, from the hydro meteorological factors down to the type of soil and water availability, which introduced varieties of crops, may have difficulty in adapting. Also, much of the introduced varieties disrupt the natural ecological processes happening in small islands. Introduced species of trees and other crops may have invasive properties that could significantly alter the natural conditions of the small islands.

    Massive research on the indigenous species of crops and fruit trees must be launched and prioritized to address this. Local governments and regional state colleges and universities could find this as a niche to study and explore. Crop production and propagation institutions should lead island researches related to enhancing the local varieties of plants, especially the Lanzones fruit trees of Camiguin.

    The Philippine Department of Agriculture also must upgrade its services especially in providing assistance programs such as seed dispersal and animal husbandry, which at times are not culturally relevant and not fitting to the island conditions. Informed researches are available and shelved in the universities and local colleges left untapped.

(b) Intercropping and Multiple Cropping. Due to the time requirement for banana to be on the mature age for harvesting purposes, intercropping it with Legumes, nuts, and root crops is also advisable. Multi-storey cropping can also be done especially in the case of small island landscapes where land area is very limited.

### 8.2.2 Island Ecotourism

(a) Ecotourism as proposed for small islands. The existence of a National Ecotourism framework provides the guidelines and means to properly implement ecotourism activities. Prioritizing community-based tourism can be a good start for small islands. Experience-based tourism is also gaining much attention, especially for targeting foreign tourists.

    The presence of rich cultural groups and their practices can be a good marketing strategy for experience-based tourism. Each of the three small island provinces can start with those already established activities such as the (a) "traditional" and organic agricultural (fishing and farming) practices of Ivatans in Batanes; (b) Traditional and nature's healing in Siquijor; (c) fishing village and the traditional means of Lanzones harvesting in Camiguin. Also, part of the experience-based tourism is creating a traditional food/ cuisine market could positively steer the indigenous natural resources sustainable use in the island province. There are a lot of indigenous natural resources readily available and abundant in the small island cases making it profitable for locals at the same time harnessing the natural resources niche of the indigent resources thus maintaining the natural balance of the island ecosystem.

(b) Tourism infrastructure improvement and retrofitting. Infrastructure development as supportive to tourism activities is important. However, engineering and design to fit to the

natural and changing environmental conditions should be adopted. Connecting the small islands to the region by transport linkages, through sea effective sea and air transport following the safest routes, ecologically and economically. Sea transport route in Batanes must significantly improve to provide better linkages to the Cagayan Valley region and the greater Luzon island in general. Creation of sea transport tourism route for the other two island cases is also imperative as it enhances and strengthens the linkages among settlements that will cut across regions.

Storage facilities for fresh good harvests of small islands must be installed in the island provinces. This must be well connected to a reliable off-grid renewable power source to facilitate effective management of the island resources. Cold storage and post-harvest technologies will definitely avoid resources wastage in small islands. Also, the local farmers and fisher folks will not have to deal with the prices dictated by middlemen as choices for them are available.

(c) Carrying capacity studies on small islands and its habitats and heritage sites. Ecotourism will only be sustainable if the carrying capacity will be known and successive planning and management be implemented carefully.

(d) Local economy and local community acceptance and empowerment. It is important to highlight in doing tourism is the support of the local community. Better integration of the local community in the ecotourism activity functions both on local empowerment and at the same time, maximizing the local human resources of small islands. This must be complemented by right training and technical skills development available in island provinces (e.g. Management, local business management, tourism management, etc.)

Equally important to highlight is the creation of technical education in relation to agricultural modernization and development, fisheries modernization and post-harvest training and development on local indigenous materials supportive of the local economy and the booming tourism sector.

**8.3 Regional Spatial Planning**

The regional planning environment for small islands must be ready in the following aspects to continuously provide an enabling environment for small islands to thrive and progress as a unit.

(a) Regional policy framework environment must continuously create an enabling environment for provinces to move towards collective spatial development. Attention towards island vulnerabilities and capacities must be highlighted and not to be treated as like other landscapes. Better informed regional development council could retrofit provincial roles into attainable and doable undertakings. Setting achievable goals are as important as being able to come up with innovative and adaptive solutions toward the sought spatial development.

(b) Regional marketing strategies could also be explored as a means to highlight the comparative advantage of the region, especially in terms of the quality of products the region can offer. Branding through regional uniqueness and the consequent impact on their resources could help boost the specific local products of islands.

Market linkages at the regional level can also support the other devalued natural resources endowment of small islands, like that of Batanes root crops, where surplus is commonly held as wastes.

(c) Regional Development Council. The regional advisory council must carefully craft and redefine small islands, seeing through this research about the special attention required by the fragile nature of small islands.

### 8.4 Creating a Model Indicative Approach for Small Island Development

Following closely the means to do comprehensive land and water use planning, only but this integrated approach tries to include several identified indicators in highlighting the concerns of small islands which are spatially determinable. This approach will directly affect the four policy areas for the preparation of physical framework plans- protection, production, settlements and infrastructure.

With this, a vivid description of areas for conservation and protection within the small island is necessary to fit in the spatial development concerns revealed in this research.

#### 8.4.1 Creating a Small Island Ecosystem Network Continuum

The concept of ecosystem continuum stems from the research results that small island ecosystem has a distinct yet fragile ecosystems extending from the mountain down to the coastal -marine ecosystem. Such approach to analyzing the small islands has been proven critical in underscoring sustainability issues, thus, creating possible zones is important to help conserve the resources of small islands and at the same time provide areas for human population to harmoniously utilize the small island resources.

The notion of ecosystem continuum is not new, however, applying it to the context of small island management and planning, is an emerging idea. Needless to say that small islands are already complex themselves, current situations of human interaction in these small islands are creating an additional layer of complexity. Thus, the introduction of the Small Island Province Ecosystem Continuum (SIPEC) within the small islands is necessary.

SIPEC is a delineated forest-riparian-coastal-marine ecosystems showing physical connectivity. Critical ecosystem patches, which were identified at the local level resources mapping and backed up by environment authorities, will then form the ecosystem continuum for small islands. Protecting this network of ecosystems ultimately connotes the total ecosystem conservation. Protection of this network is necessary because of the already given fact that the island ecosystems are very fragile and directly linked with one another. As the impacts of human induced problems are felt along the whole ecosystem network, protecting such for further misuse is the best option for small island provinces to forge sustainable development. SIPEC resembles critical watershed extending to the coastal-marine environment. The network analysis and the DPSIR framework resulted to the clear manifestation of the interlinked conditions of small islands and its fragile condition as directly influenced by human activities.

For the three small island cases, indicative delineation was done to arrive in their respective SIPEC (Appendix E). Through this, LGUs are guided to which areas must be strictly conserved and protected. SIPEC must also include a buffer zone surrounding it to cushion the probable impacts of human activities nearby.

Gradient of zones follows the SIPEC resembling the exact intensity and specific activities allowed for human interaction. Also, the temporal values of this zoning should be specified.

#### 8.4.2 The Zoning Principle for Small Islands

The usual process of determining decision areas for small islands will be primarily handled through the framework (Figure 8.3) so aspects already mentioned in the alterations for the proper ecological profiling, as discussed in the earlier chapter, can be well integrated.

Starting from the land cover layer, using satellite imagery and those available through the mapping agency of the Philippines (such as the outputs of LIDAR technology, NAMRIA, etc.), as a representation of the reality and providing the general outlook for small island landscape containing all the contextual concerns of small island provinces highlighted in the DPSIR framework. After which, the policy areas containing the indicators highlighted for small islands, as emphasized in the ecological profile for small islands, is integrated to the land cover layer.

Areas for protection policy area must further delineate areas and ecosystems with direct ecosystem continuum as its main consideration and must be labeled as critical. Here land cover types must be strictly identified and protected as impacts on these ecosystems are severe to the small island stability if not properly addressed. Through this, the Small Island Province Ecosystem Continuum (SIPEC) can be potentially created. The previous section discussion, however, combined the result of the participatory mapping and the available land cover maps through which the small islands context are better described.

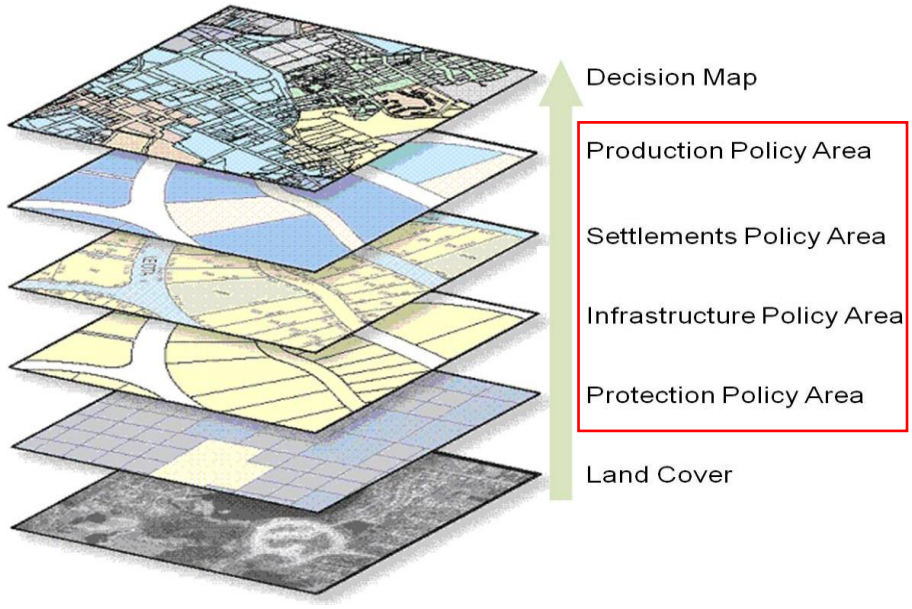



**Figure 8.3 Development Framework for Integrating Small Islands Concerns**

River system and the watersheds must be extended as part of the protection zone for small islands as these are the direct ecosystem linkage between the forest and the coastal-marine environment. Strict protection of these networks, especially the head waters is necessary especially for the critical case of small islands where natural flow and processes of ecosystems are transpired in the river system. Restrictive activities must be aligned properly to evaluate areas in the river system for restrictive use.

Adopting the management scheme for the Environmentally Critical Areas Network (ECAN) for the Strategic Environmental Plan (SEP) for Palawan, as small islands practically show similar environmental conditions in its protected areas. Zoning of the terrestrial and coastal-marine environment into strict protection, buffer and general (sustainable) use are prescribed. The summary of this zoning is listed in Table 8.1.

Production areas are those identified using the participatory resource mapping. These could be traditional agricultural and fishing zones or those identified by the LGU as prime areas for natural resources extraction and processing. The production areas must be separated properly to the protection areas and proper delineation of the boundaries between these uses is necessary.

**Table 8.1 Sustainable Management Schemes for Small Islands**[18]

| Ecosystem Type | Zoning Prescription | Description |
|---|---|---|
| **Terrestrial** *(consists of mountains, ecologically important low hills and lowland areas)* | **Core Use** | Area of maximum protection and shall be free of human disruption. This includes all types of natural forest above the elevation of 1,000 meters including first growth residual forest and edges of intact forest, endangered habitats and habitats of endangered and rare species |
| | **Buffer Use** | The buffer consists of a (a) restricted use area, which serves as the protective barrier to the core zone; a (b) controlled use area wherein limited extractive activities are allowed and the (c) traditional use area where land use has already been stabilized. |
| | **Multiple Use** | Development Framework for Integrating Small Islands Concerns |
| **River System** | **Core Use** | Areas forming the head waters and the estuaries |
| | **Buffer Use** | Terrestrial lining of the river system 25-50 meters from the riverside |
| | **General Use** | Allowable uses of the river system as prescribed by the local environment agency |
| **Coastal-Marine** *(the whole coastline and the open sea where active fishing and tourism activities are carried out)* | **Core Use** | Free from any human activity includes sanctuaries of rare and endangered species, selected coral reefs, seagrass and mangrove ecosystem reserves |
| | **Buffer Use** | Salvage area in between the core use and multiple use zones to allow recovery and gradual transition to the variety of uses |
| | **Multiple Use** | Development area for fishery, mariculture, recreation, rehabilitation of small islands and mangrove ecosystem, education and research are also allowed in this area |

Settlements policy area pertains to areas for living. These identified areas must also comply properly with the requirements for residential facilities. Areas away from hazards and the protected areas to assure that any expansion and pressure imposed to the use if these areas will not significantly damage the protection zones and works in harmony with other policy areas.

Infrastructure policy area includes the existing road networks and other facilities connecting the different land uses. This layer must guide and support the other policy areas to assure that their effect will be functional. Important to consider here are aspects related to access, as this is among the many unique concerns of small islands albeit island isolation.

The decision map is the final output layer of this map overlay analysis. It should then integrate all the requirements of sustained development at the same time apply the combined indicators with non-spatially related small islands program mentioned in the previous section

[18]Adopted from the ECAN main strategy (PCSD, 1992)

to align the horizontal undertaking of including the socio-economic and other development sectors important in island development.

Detailed sample of the zoning employed for the small island provinces are mapped out and shown in Appendix E. In these maps, the coastal environment, together with the gathered patches of conservation areas, zones for restrictive, conservative and traditional use were categorized for every island provinces case.

### 8.4.3 Spatial Strategies for Small Islands transcending to Spatial Policy Areas

As previously mentioned in the former section, the four policy areas include the protection, production, settlement and infrastructure. These policy development areas, taking its leaps from the identified unique characteristics of the small island provinces will define the rightful recommendations for creating spatial strategies that will guide small island development in the Philippines.

The protection policy for small islands tackles primarily it innate context of vulnerability of the small island biological system, here, translation into spatially determinable aspects runs from carrying capacity studies and highlighting the interconnectedness of the small island ecosystems. Protection emanates the strong linkages of this intricate web of island ecosystem taken as one whole interacting biological system to the human communities. Protection policies for small islands must include a spectrum of possibilities and allowable uses, this means, that as critical and fragile as it may seem, still it must be looked at as areas providing material resources to the human communities. With this, the ecosystem functions and services must be continuously highlighted in identifying measures for the protection policies. Areas sought for providing material resources include spatio-temporal conditioning to go within the carrying capacities and limits of the island ecosystem; aspects of island ecosystem related to regulatory and support functions must be dealt with utmost protection as these other critical functions of ecosystem are always overlooked; and cultural and aesthetic must atleast consider the traditional rights (indigenous knowledge) in maintaining these values of the island ecosystem.

In terms of production policies, the apparent direct relationship of the protection areas to the existing industries within the small islands is critical in this policy. Protection policy as inputs to the production policies may require limits in production and going more nature-based, as what sustainable agriculture and ecotourism advocates, as discussed in the previous sections. Nonetheless, zoning and temporal/seasonal variation of economic options for small islands must be rapidly done adaptable to human activities. Without this notion, the already altered condition of the small island resources could be further aggravated. Putting values on these island material resources transcends from value addition, branding and diversification. As local population pressure is not really a problem, vulnerability to environmental shocks can be addressed through proper disentanglements of the existing industries and moving away from pure extraction of resources into more service orientation.

The human communities, particularly the small island dwellers, are the direct recipients and movers for the settlement policy. The inclusion of this policy area uplifts the concerns of the locals, especially the marginalized sectors within the small islands, including the indigenous communities, farmers and fisher folks, and others. Blending with the production and protection policies, these communities are the actual implementers and movers of the policies for protection and production. Social policing as an aspect of protection and control is advocated and at the same time, temporal dimensions of production must be equally highlighted to provide options for the local island dwellers in terms of their productive capacities.

Equally important to note is the infrastructure policies, this is very important as infrastructure implement supports the fulfillment of all the other development policies. Nature-based infrastructures are important in the protection policies and also supportive of the production and settlement policies. Hard physical implements are also required to address the physical isolation issues of small islands. Also an increasingly important consideration is the digital infrastructure of small islands, allowing its insistent nature as isolated landscape to be part of the distant past character of small islands.

The proper mixing of these policies therefore provides bases for the spatiality of actions for development strategies workable on small island development. Nonetheless, without really looking at the small island contexts, all these possibilities will not be even seen nor be accounted.

**BIBLIOGRAPHY**


Advancing Safer Communities and Environments against Disasters. ( 2011). *A Call to Action for Small Islands in the Philippines*. Richmonde Hotel Eastwood, Quezon City. October 6, 2011.

Alampay, R.B.A. (2005). Challenges of Sustainable Tourism in the Philippines. Sustainable Tourism. January 2005.

Ambal,R.G.R., *et. al.* (2012). The Philippine Key Biodiversity Areas. Biodiversity Management Bureau- Department of Environment and Natural Resources (BMB-DENR). 2012.

Arkolakis, C. (2017). Advancements in Gravity Models of Spatial Economics. PER Lectures, Yale University. January 31, 2017.

Asian Development Bank. (1996). *Socio-cultural Issues and Economic Development in the Pacific Islands*. Office of Pacific Operations and Social Development Division, Pacific Studies Series. Information Office, ADB, Manila, Philippines.

Baldacchino, G. (2006). Editorial: Islands, Island Studies, Island Studies Journal. *Island Studies Journal*, *1*(1), 3–18.

Bass, S. and Dalal-Clayton, B. (1995) „Small island states and sustainable development: strategic issues and experience", Environmental Planning Issues no. 8 International Institute for Environment and Development, London.

Baxter, R., Hastings, N., Law, A., & Glass, E. J. . (2008). *Social Network Analysis (Theory and Applications)*. *Animal Genetics* (Vol. 39).

Bell, D and M. Jayne (2009). *Small Cities? Towards a Research Agenda.* International Journal of Urban and Regional Research 33 (3):683-699· DOI: 10.1111/j.1468-2427.2009.00886. September 2009.

Bersales, J.E. (2003). Contested space: tourism, power, and social relations. PASCN Discussion Paper 2003-07.Makati City, Philippines: Philippine Institute for Development Studies.

Boe, D. – C. Grasland – Healy, A. et.a. (1999) Spatial integration. http://www.mcrit. com /SPESP/SPESP_REPORT/1.4.%20Final%20Report%20(23-05- 2000).pdf 33-46. [2014.10.24.]

Boto, I., & Biasca, R. (2012). Small island economies: From vulnerabilities to opportunties. *Brussels Rural Development Briefings*, (27), 1–34. https://doi.org/Briefings no. 27

Brigulio, L. (1995). *Small island developing states and their economic vulnerabilities*. World Development, 23(9), 1615–1632.

Brown, S. (n.d). *Central Place Theory: Sixty Years On.* University of Ulster.

Brown, A. and J. Standinforth. (1991). *Economic Planning in the Pacific Island Countries: A Change in Focus to Improve Economic Management*. United Nations Development Program.

Buhr, F. G. (2014). *SPATIAL INTEGRATION OF MIGRANTS : Spatial integration of migrants : a brief overview and critique*.

Chapman, D. (2011). *Inside outside : Spatial planning and Small islands*.

Chen Y. and L. Huang (n.d.). A Scaling Approach to Evaluating the Distance Exponent of Urban Gravity Model. Unpublished Manuscript. Department of Geography, College of Urban and Environmental Sciences, Peking University. Beijing, China.

Christaller, Walter. *Die zentralen Orte in Suddeutschland*. Jena: Gustav Fischer, (1966). (Translated (in part), by Charlisle W. Baskin, as *Central Places in Southern Germany*. Prentice Hall, 1966.

Coastal CORE Sorsogon (CCS), (MaCEC), M. C. for E. C., & Quezon), S. A. C. N. Q. (SAC-N. (2011). *A Voyage to Disaster Resilience in Small Islands:A Guide to Local Leaders*.

Commonwealth Foundation (2004) The Commonwealth Foundation and small island developing states 2001-2004 Commonwealth Foundation, London.

Connell, J. (2012). Population resettlement in the Pacific: lessons from a hazardous history? Australian Geographer, 43(2), 127-142

Crane, R.(1995).*The Practice of Regional Development in Indonesia: Resolving Central-Local Coordination Issues in Planning and Financing*. Department of Urban and Regional Planning, University of California, Irvine. John Wiley and Sons, Ltd.

Creswell, J. W. (2007). An Introduction to Mixed Methods Office of Qualitative and Mixed Methods Research, 1–43.

Crosier, S. (2011). *Johann-Heinrich von Thünen: Balancing Land-Use Allocation with Transport Cost*. Center for Spatially Integrated Social Science. Copyright © 2001-2011

by Regents of University of California, Santa Barbara (http://www.csiss.org/classics/content/9).
Dahl, A.L and Depraetere, C. (2007) „Island locations and classifications", in Baldacchino, G. (Ed.) A world of islands. An islands studies reader Agenda Academic Institute of Small Island Studies, Malta and Canada.
Department of Regional Development Secretariat for Economic and Social Affairs Organization of American States. (1984). *Integrated Regional Development Planning: Guidelines and Case Studies from OAS Experience*. Washington, D.C., USA.
Deschenes, P. J., & Chertow, M. (2004). An island approach to industrial ecology: Towards sustainability in the island context. *Journal of Environmental Planning and Management*, *47*(2), 201–217. https://doi.org/10.1080/0964056042000209102
Deutsch Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. (2003). *Guide to Rural Economic and Enterprise Development*. Working paper 1st edition. November 2003.
Doxiadis, C. (1970). *Ekistics: The Science of Human Settlements*. Urban Management and Development – Ekistics Program, Universidad del Rosario, Bogota, Colombia, 1995.
Eaton, C., & Lipsey, R. G. (1982). Eaton-Lipsey-centralplace.pdf. *The Economic Journal*, *92*, 56–72.
Erickson, J. D. & Gowdy, J. M. (2000) Resource use, institutions, and sustainability: a tale of two Pacific island cultures, Land Economics, 76, pp. 345–354.
Filipinas Foundation, Inc. (1976). *Spatial Transformation Strategy: Province of Batangas*. IBM Press Roman, Manila, Philippines.
Fitzhugh, B., & Kennett, D. J. (2010). Seafaring Intensity and Island – Mainland Interaction along the Pacific Coast of North America. *The Global Origins and Development of Seafaring*, (Kennett), 69–80. https://doi.org/10.1111/j.1095-9270.2011.00333_2.x
Hall, W. W., & Hite, J. C. (1970). Southern Journal of Agricultural Economics the Use of Central Place Theory and Gravity-Flow Analysis To Delineate Economic Areas Introduction Central Place Theory.
Ho, P. S. *Myrdal's Backwash and Spread Effects in Classical Economics: Implications for Multilateral Trade Negotiations*. Journal of Economic Issues, Vol. XXXVIII, No. 2. June 2014.
Housing and Land Use Regulatory Board (HLURB). (2013). *Enhanced Comprehensive Land Use Plan and Zoning Ordinance*. Environmental Planning Capability Building Course.
Hsu, Wen-Tai. (2008). *Central Place and Zipf's Law*. July 17, 2008. Department of Economics, University of Minnesota, Twin Cities. July 17, 2008.
Hutter A. and R. Neidhardt. (2006). "Urban and Rural Areas: A Changing Relationship. Agriculture and Rural Development: Urban-Rural Linkages, Vol 2. 2006. pp 57-59.
Ibenholt, K. (2002). Materials Flow Analysis and Economic Modeling. In R. U. Ayres & L. W. Ayres (Eds.), *A Handbook of Industrial Ecology* (pp. 177–184).
Ishihara, M., Hoshino, E., & Fujita, Y. (1996). *Self-Determinable Development of Small Islands*. *Springer* (Vol. 5). https://doi.org/10.1044/1059-0889.0502.07
Jafari, J. (1990).Research and Scholarship. The basics of tourism research. J. Tourism Studies
Jayne, M. *et.al.* (2010). *The Cultural Economy of Small Cities. Cultural Economy of Small Cities. Geography Compass 4(9):1408 - 1417. DOI: 10.1111/j.1749-8198.2010.00380.x. September 2010.*
Jenkins, M., Pierson, N., Pohnan, E., Ramirez, J. S., & Wang, S. (2012). *Material Flow Analysis for the Island of Maui*. Yale School of Forestry and Environmental Studies.
Kincses, A. and G. Toth (2014). *The Application of Gravity Model in the Investigation of Spatial Structure*. Acta Polytechnica Hungarica vol. 11. No 2. pp 5-19.
Kerr, S. A. (2005). What is small island sustainable development about ? *Ocean and Coastal Management*, *48*, 503–524. https://doi.org/10.1016/j.ocecoaman.2005.03.010
Kirch, P. V. (1997) Microcosmic histories: island perspectives on 'global' change, American Anthropol- ogists, 99, pp. 30–42.
Kytzia, S. (2003). Material Flow Analysis as a Tool for Sustainable Management of the built environment. In *The Real and the Virtual World of Spatial Planning*. Springer.
Legaspi, P. E. (n.d.). HRD And Globalization : Improving Competencies at the Local Government Level.
Lorenzen,M. et. al., (2008). *Journal of Economic Geography*, Volume 8, Issue 5, September 2008, Pages 589–592, https://doi.org/10.1093/jeg/lbn026
Mansoori, Ali. (2003). Tourism and sustainable development. Journal of Geography

Education.
Maxim, L., Spangenberg, J. H., & O'Connor, M. (2009). An analysis of risks for biodiversity under the DPSIR framework. *Ecological Economics*, *69*(1), 12–23. https://doi.org/10.1016/j.ecolecon.2009.03.017
Mcelroy, J. L., & Albuquerque, K. (1990). *Integrated sustainable tourism for Small Islands*.
Mercado, E. (2013). Approaches to Applying EIM in PA Management and Local Land Use Plans. November 2013.
Mink, S. D. (1993). *Poverty, population, and the environment*. *World Bank Discussion Papers* (Vol. 189).
Myrdal, G. (1944). An American Dilemma: The Negro Problem and .Modern Democracy (New York: Harper & Brothers, 1944).
National Economic Development Authority (NEDA). (2009). *Regional Development Agenda 2010-2020, MIMAROPA: Food, Leisure and Gateway to Southern Philippines*. NEDA Regional Office IV-B. August 2009.
National Statistical Coordination Board (NSCB). (2010). Philippine Standard Industrial Classification (PSIC).
Nurse, L. A., R.F., M., Agard, J., Briguglio, L. P., Duvat-Magnan, V., Pelesikoti, N., … Webb, A. (2014). Small Islands. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1613–1654). https://doi.org/10.2134/jeq2008.0015br
Nurse, L.A. and Sem, G. (2001) „Small island states", in McCartney, J.J. (Ed.) Climate change IPCC Group 11, Cambridge University Press, Cambridge.
OECD. (2008). *Measuring material flows and resource productivity* (Vol. I).
Palawan Council for Sustainable Development (PCSD). (1992). The Strategic Environmental Plan for Palawan and ECAN.
Philippine Statistical Authority (2018). Philippine Agricultural Statistics. Database on Philippine crops and fishery resources.
Puu, Tönu. (2003). Mathematical Location and Land Use Theory: An Introduction. 2nd Revised Ed. Springer- Verlag. Berlin, Germany.
Quitalig, R., & Orale, R. L. (2017). Comprehensive Land Use Planning Capacity of Local Government Units in Samar Philippines. *Countryside Development Research Journal*, *4*(February), 36–55. https://doi.org/10.1108/IMDS-09-2016-0359
Reyes, EMJr. (2014). Assessment of the Spatio-Economic Linkages Between the Island Municipality of Tingloy and the Southwestern Portion of Batangas for Regional Economic Growth. Master Thesis. School of Urban and Regional Planning, University of the Philippines Diliman.
Ruiz-tagle, J. (2013). A Theory of Socio-spatial Integration : Problems , Policies and Concepts from a US Perspective. *International Journal of Urban and Regional Research*, *37*(March), 388–408. https://doi.org/10.1111/j.1468-2427.2012.01180.x
Santos-Paulino, A., McGillivray, M., & Naudé, W. (2011). *Understanding Small-island Developing States: Fragility and External Shocks*. *Routledge* (Vol. 46).
Serote, E. (2008). *Rationalizing the Local Planning System*. Department of the Interioir and Local Government.
Smeets, E., & Weterings, R. (1999). *Environmental indicators: Typology and overview*. *European Environmental Agency* (Vol. 25). https://doi.org/10.1016/j.jtbi.2013.04.018
Smith, S., Richardson, J. and McNab, A. (2010). *Towards a more efficient and effective use of Strategic Environmental Assessment and Sustainability Appraisal in spatial planning*. London. Retrieved from http://webarchive.nationalarchives.gov.uk/ 20120919132719 /http: /www.communities.gov.uk/documents/planningandbuilding/pdf/1513010.pdf
Solesbury, W. (2003). *Sustainable Livelihoods : A Case Study of the Evolution of DFID Policy London*.
Tegart, W. M., & Sheldon, G. W. (1993). *Climate Chamge 1992: The Supplementary Report to the IPCC Impacts Assessment*. Canberra.
The Ambon statement. (2010). *Shima: The International Journal of Research in Island Cultures*, *4*(2), 108–109.
The World Bank. (2004). *Sustaining Forests: A Development Strategy*. Washington.
United Nations Conference on Environment and Development (UNCED). (1994). *UN Global conference on the Sustainable Development of Small Island Developing States.* Barbados, April 26-May 6, 1994.

United Nations Development Program. (2016). *Integrated Planning & Sustainable Development : Challenges and Opportunities Synthesis Report*.
United Nations Environment Programme (UNEP), World Conservation Monitoring Centre (WCMC) (2004). *Biogeographic Realms*. Last accessed on October 23, 2019, http://www.unep-wcmc.org/biogeographic-realms-2004_727.html.
United Nations WTO (World Tourism Organization). (2014). Tourism in Small Island Developing States ( SIDS ) Tourism - Fostering growth and development.
University of Siena. (2011). The DPSIR framework. *University of Siena Press*.
Udvardy MDF. (1975). *A Classification of the Biogeographical Provinces of the World*. Occasional Paper of the IUCN Species Survival Commission No. 18. Morges, Switzerland: IUCN.
Vancouver Island Economic Developers Association (VIEDA). (2003). *Regional Economic Analysis: Vancouver Island/Coast Economic Region*. Vann-Struth Consulting Group and Eric Vance & Associates Planning and Management Consultants.
Weaver, D. (2008). Ecotourism. 2nd ed. John Wiley and Sons.
Wong, P. P., Marone, E., Lana, P., Fortes, M., Moro, D., Agard, J., … Mulongoy, K. J. (2009). Island Systems. In J. Baker, A. Lugo, & A. Sua (Eds.), *Millennium Ecosystem Assessment: Current State & Trends Assessment* (pp. 663–679). Retrieved from http://www.millenniumassessment.org/en/Condition.aspx
World Wildlife Fund for Nature (WWF). (2009). *The Coral Triangle: Nursery of the Seas.* WWF Coral Triangle Programme. April 2009.
World Travel and Tourism Council (2018). "Travel and Tourism largest sector in the Philippines in 2018, says new WTTC Benchmarking research." WTTC Press Office. London, UK.
Wright, C. and Lewis, B. (2012). *On the Edge of Crisis: Contending Perspectives on Development, Tourism and community participation on Rote Island, Indonesia*. Australian Journal of South-East Asian Studies (ASEAS), vol 5 (1). pp 102-127.
Yazdi P., Houssein M. and M. Saghaei, (2007), Tourism Nature and Implications, Samt publication. 2007.
Yiougo, Lydie S.A. (International Institute for Water and Environmental Engineering, 2iE) Dorothee Spuhler (seecon international gmbh). 28 November 2018. https://sswm.info/sswm-university-course/module-4-sustainable-water-supply/further-resources-water-sources-software/material-flow-analysis-%28mfa%29

# APPENDIX

**Appendix A** (Summary of Local Industry Formations in the Small Island Provinces)

| PSIC Section | 2014 Summary of the Business Establishments | Aggregate Provincial Totals | | |
|---|---|---|---|---|
| | | **Batanes** | **Camiguin** | **Siquijor** |
| A | Agriculture, forestry and fishing | 1 | 0 | 0 |
| B | Mining and Quarrying | 1 | 0 | 0 |
| C | Manufacturing | 17 | 12 | 25 |
| D | Electricity, gas, steam and air-conditioning supply | 0 | 0 | 0 |
| E | Water supply, sewerage, waste management and remediation activities | 0 | 0 | 4 |
| F | Construction | 0 | 0 | 0 |
| G | Wholesale and retail trade; repair of motor vehicles and motorcycles | 165 | 204 | 232 |
| H | Transportation and Storage | 37 | 25 | 58 |
| I | Accommodation and food service activities | 2 | 6 | 2 |
| J | Information and Communication | 0 | 0 | 0 |
| K | Financial and insurance activities | 0 | 0 | 2 |
| L | Real estate activities | 0 | 3 | 5 |
| M | Professional, scientific and technical services Section | 0 | 0 | 0 |
| N | Administrative and support service activities | 15 | 21 | 30 |
| O | Public administrative and ; compulsory social security | 0 | 0 | 0 |
| P | Education | 0 | 0 | 0 |
| Q | Human health and social work activities | 2 | 5 | 4 |
| R | Arts, entertainment and recreation | 0 | 0 | 0 |
| S | Other service activities | 9 | 14 | 25 |
| T | Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies | 0 | 0 | 0 |
| U | Activities of extra territorial organizations and bodies | 0 | 0 | 0 |

| PSIC Section | 2015 Summary of the Business Establishments | Aggregate Provincial Totals | | |
|---|---|---|---|---|
| | | Batanes | Camiguin | Siquijor |
| A | Agriculture, forestry and fishing | 0 | 2 | 3 |
| B | Mining and Quarrying | 3 | 0 | 0 |
| C | Manufacturing | 22 | 20 | 17 |
| D | Electricity, gas, steam and air-conditioning supply | 0 | 0 | 0 |
| E | Water supply, sewerage, waste management and remediation activities | 2 | 1 | 1 |
| F | Construction | 0 | 0 | 0 |
| G | Wholesale and retail trade; repair of motor vehicles and motorcycles | 189 | 336 | 183 |
| H | Transportation and Storage | 5 | 2 | 1 |
| I | Accommodation and food service activities | 54 | 52 | 46 |
| J | Information and Communication | 0 | 0 | 0 |
| K | Financial and insurance activities | 0 | 0 | 0 |
| L | Real estate activities | 4 | 2 | 2 |
| M | Professional, scientific and technical services Section | 0 | 0 | 0 |
| N | Administrative and support service activities | 27 | 30 | 18 |
| O | Public administrative and ; compulsory social security | 0 | 0 | 0 |
| P | Education | 0 | 0 | 0 |
| Q | Human health and social work activities | 1 | 3 | 5 |
| R | Arts, entertainment and recreation | 0 | 0 | 0 |
| S | Other service activities | 7 | 9 | 14 |
| T | Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies | 0 | 0 | 0 |
| U | Activities of extra territorial organizations and bodies | 0 | 0 | 0 |

| PSIC Section | 2016 Summary of the Business Establishments | Aggregate Provincial Totals | | |
|---|---|---|---|---|
| | | Batanes | Camiguin | Siquijor |
| A | Agriculture, forestry and fishing | 2 | 0 | 0 |
| B | Mining and Quarrying | 0 | 0 | 0 |
| C | Manufacturing | 22 | 19 | 25 |
| D | Electricity, gas, steam and air-conditioning supply | 0 | 0 | 0 |
| E | Water supply, sewerage, waste management and remediation activities | 1 | 0 | 0 |
| F | Construction | 0 | 0 | 0 |
| G | Wholesale and retail trade; repair of motor vehicles and motorcycles | 212 | 164 | 420 |
| H | Transportation and Storage | 40 | 1 | 2 |
| I | Accommodation and food service activities | 121 | 43 | 62 |
| J | Information and Communication | 0 | 0 | 0 |
| K | Financial and insurance activities | 0 | 0 | 1 |
| L | Real estate activities | 4 | 0 | 6 |
| M | Professional, scientific and technical services Section | 0 | 0 | 0 |
| N | Administrative and support service activities | 54 | 26 | 41 |
| O | Public administrative and ; compulsory social security | 0 | 0 | 0 |
| P | Education | 0 | 0 | 0 |
| Q | Human health and social work activities | 2 | 6 | 4 |
| R | Arts, entertainment and recreation | 0 | 0 | 0 |
| S | Other service activities | 16 | 10 | 28 |
| T | Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies | 0 | 0 | 0 |
| U | Activities of extra territorial organizations and bodies | 0 | 0 | 0 |

| PSIC Section | 2017 Summary of the Business Establishments | Aggregate Provincial Totals | | |
|---|---|---|---|---|
| | | Batanes | Camiguin | Siquijor |
| A | Agriculture, forestry and fishing | 15 | 8 | 5 |
| B | Mining and Quarrying | 0 | 0 | 0 |
| C | Manufacturing | 28 | 12 | 34 |
| D | Electricity, gas, steam and air-conditioning supply | 0 | 0 | 0 |
| E | Water supply, sewerage, waste management and remediation activities | 3 | 2 | 8 |
| F | Construction | 0 | 0 | 0 |
| G | Wholesale and retail trade; repair of motor vehicles and motorcycles | 181 | 108 | 277 |
| H | Transportation and Storage | 15 | 17 | 4 |
| I | Accommodation and food service activities | 138 | 29 | 75 |
| J | Information and Communication | 0 | 0 | 0 |
| K | Financial and insurance activities | 0 | 0 | 1 |
| L | Real estate activities | 3 | 0 | 0 |
| M | Professional, scientific and technical services Section | 0 | 0 | 0 |
| N | Administrative and support service activities | 57 | 17 | 34 |
| O | Public administrative and ; compulsory social security | 0 | 0 | 0 |
| P | Education | 0 | 0 | 0 |
| Q | Human health and social work activities | 2 | 2 | 3 |
| R | Arts, entertainment and recreation | 0 | 0 | 0 |
| S | Other service activities | 9 | 2 | 11 |
| T | Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies | 0 | 0 | 0 |
| U | Activities of extra territorial organizations and bodies | 0 | 0 | 0 |

**Appendix B** (Centrality Measures for the Island Provinces)

**Table B-1.Centrality Scores in the Three Small Island Cases for the Year 2014**

| Municipality | Functions and Services | | | | | | | | | | | | | | | | | | | | | Total Centrality Scores |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | |
| Basco | 1.00 | 1.00 | 0.82 | 0.00 | 0.00 | 0.00 | 0.81 | 1.00 | 0.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | **8.06** |
| Itbayat | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.42** |
| Ivana | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.25** |
| Mahatao | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.27** |
| Sabtang | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| Uyugan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| **Batanes** | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **9.00** |
| Enrique Villanueva | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | **0.49** |
| Larena | 0.00 | 0.00 | 0.16 | 0.00 | 0.50 | 0.00 | 0.10 | 1.00 | 0.20 | 0.00 | 1.00 | 0.40 | 0.00 | 0.30 | 0.00 | 0.00 | 0.25 | 0.00 | 0.28 | 0.00 | 0.00 | **4.19** |
| Lazi | 0.00 | 0.00 | 0.20 | 0.00 | 0.25 | 0.00 | 0.10 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.25 | 0.00 | 0.04 | 0.00 | 0.00 | **1.15** |
| Maria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| San Juan | 0.00 | 0.00 | 0.24 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.29 | 0.00 | 0.00 | 0.20 | 0.00 | 0.03 | 0.00 | 0.00 | 0.25 | 0.00 | 0.24 | 0.00 | 0.00 | **1.37** |
| Siquijor | 0.00 | 0.00 | 0.32 | 0.00 | 0.25 | 0.00 | 0.43 | 0.00 | 0.33 | 0.00 | 0.00 | 0.40 | 0.00 | 0.47 | 0.00 | 0.00 | 0.25 | 0.00 | 0.36 | 0.00 | 0.00 | **2.81** |
| **Siquijor** | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **10.00** |
| Catarman | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.04 | 0.17 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | **0.39** |
| Guinsiliban | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.06** |
| Mahinog | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.54** |
| Mambajao | 0.00 | 0.00 | 0.67 | 0.00 | 0.00 | 0.00 | 0.65 | 0.67 | 0.96 | 0.00 | 0.00 | 1.00 | 0.00 | 0.86 | 0.00 | 0.00 | 1.00 | 0.00 | 0.93 | 0.00 | 0.00 | **6.73** |
| Sagay | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.03 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.28** |
| **Camiguin** | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **8.00** |

A Agriculture, forestry and fishing
B Mining and Quarrying
C Manufacturing
D Electricity, gas, steam and air-conditioning supply
E Water supply, sewerage, waste management and remediation activities
F Construction
G Wholesale and retail trade; repair of motor vehicles and motorcycles
H Transportation and Storage
I Accommodation and food service activities
J Information and Communication
K Financial and insurance activities
L Real estate activities
M Professional, scientific and technical services Section
N Administrative and support service activities
O Public administrative and ; compulsory social security
P Education
Q Human health and social work activities
R Arts, entertainment and recreation
S Other service activities
T Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies
U Activities of extra territorial organizations and bodies

**Table B-2.Centrality Scores in the Three Small Island Cases for the Year 2015**

| Municipality | Functions and Services | | | | | | | | | | | | | | | | | | | | Total Centrality Scores |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | |
| Basco | 0.00 | 0.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.58 | 1.00 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.67 | 0.00 | 0.00 | 1.00 | 0.00 | 0.43 | 0.00 | 0.00 | **4.94** |
| Itbayat | 0.00 | 1.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.53** |
| Ivana | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.43 | 0.00 | 0.00 | **0.82** |
| Mahatao | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | **0.57** |
| Sabtang | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.14** |
| Uyugan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| **Batanes** | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **8.00** |
| Enrique Villanueva | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.25** |
| Larena | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.28 | 0.00 | 1.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 | 0.00 | 0.00 | **1.95** |
| Lazi | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 1.00 | 0.02 | 0.00 | 0.00 | 0.50 | 0.00 | 0.06 | 0.00 | 0.00 | 0.25 | 0.00 | 0.14 | 0.00 | 0.00 | **2.11** |
| Maria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| San Juan | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.00 | 0.14 | 0.00 | 0.00 | **0.94** |
| Siquijor | 0.00 | 0.00 | 0.71 | 0.00 | 1.00 | 0.00 | 0.47 | 0.00 | 0.41 | 0.00 | 0.00 | 0.50 | 0.00 | 0.67 | 0.00 | 0.00 | 0.50 | 0.00 | 0.50 | 0.00 | 0.00 | **4.76** |
| **Siquijor** | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **10.00** |
| Catarman | 0.00 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.10 | 0.25 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.72** |
| Guinsiliban | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 | **0.61** |
| Mahinog | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.25 | 0.00 | 0.07 | 0.00 | 0.00 | 0.50 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.00** |
| Mambajao | 0.00 | 0.00 | 0.60 | 0.00 | 0.00 | 0.00 | 0.51 | 0.50 | 0.81 | 0.00 | 0.00 | 0.50 | 0.00 | 0.57 | 0.00 | 0.00 | 1.00 | 0.00 | 0.78 | 0.00 | 0.00 | **5.26** |
| Sagay | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.02 | 0.25 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.41** |
| **Camiguin** | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **8.00** |

**A** Agriculture, forestry and fishing
**B** Mining and Quarrying
**C** Manufacturing
**D** Electricity, gas, steam and air-conditioning supply
**E** Water supply, sewerage, waste management and remediation activities
**F** Construction
**G** Wholesale and retail trade; repair of motor vehicles and motorcycles
**H** Transportation and Storage
**I** Accommodation and food service activities
**J** Information and Communication
**K** Financial and insurance activities
**L** Real estate activities
**M** Professional, scientific and technical services Section
**N** Administrative and support service activities
**O** Public administrative and ; compulsory social security
**P** Education
**Q** Human health and social work activities
**R** Arts, entertainment and recreation
**S** Other service activities
**T** Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies
**U** Activities of extra territorial organizations and bodies

**Table B-3.Centrality Scores in the Three Small Island Cases for the Year 2016**

| Municipality | Functions and Services | | | | | | | | | | | | | | | | | | | | Total Centrality Scores |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | |
| Basco | 0.00 | 0.00 | 0.45 | 0.00 | 0.00 | 0.00 | 0.58 | 0.00 | 0.74 | 0.00 | 0.00 | 1.00 | 0.00 | 0.52 | 0.00 | 0.00 | 1.00 | 0.00 | 0.69 | 0.00 | 0.00 | **4.98** |
| Itbayat | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.15 | 0.23 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | **0.72** |
| Ivana | 1.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.08 | 0.03 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | **1.47** |
| Mahatao | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | **0.19** |
| Sabtang | 0.00 | 0.00 | 0.23 | 0.00 | 1.00 | 0.00 | 0.14 | 0.75 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | **2.65** |
| Uyugan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| **Batanes** | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **10.00** |
| Enrique Villanueva | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.03 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | **0.37** |
| Larena | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.19** |
| Lazi | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.09 | 0.50 | 0.10 | 0.00 | 1.00 | 0.33 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | **2.56** |
| Maria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| San Juan | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.00 | 0.00 | **1.29** |
| Siquijor | 0.00 | 0.00 | 0.44 | 0.00 | 0.00 | 0.00 | 0.41 | 0.50 | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 | 0.71 | 0.00 | 0.00 | 1.00 | 0.00 | 0.54 | 0.00 | 0.00 | **4.59** |
| **Siquijor** | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **9.00** |
| Catarman | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.15 | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.00 | 0.00 | **1.64** |
| Guinsiliban | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.02** |
| Mahinog | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.32** |
| Mambajao | 0.00 | 0.00 | 0.79 | 0.00 | 0.00 | 0.00 | 0.70 | 0.00 | 0.88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.00 | 0.00 | 1.00 | 0.00 | 0.70 | 0.00 | 0.00 | **4.88** |
| Sagay | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.15** |
| **Camiguin** | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **7.00** |

**A** Agriculture, forestry and fishing
**B** Mining and Quarrying
**C** Manufacturing
**D** Electricity, gas, steam and air-conditioning supply
**E** Water supply, sewerage, waste management and remediation activities
**F** Construction
**G** Wholesale and retail trade; repair of motor vehicles and motorcycles
**H** Transportation and Storage
**I** Accommodation and food service activities
**J** Information and Communication
**K** Financial and insurance activities
**L** Real estate activities
**M** Professional, scientific and technical services Section
**N** Administrative and support service activities
**O** Public administrative and ; compulsory social security
**P** Education
**Q** Human health and social work activities
**R** Arts, entertainment and recreation
**S** Other service activities
**T** Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial organizations and bodies
**U** Activities of extra territorial organizations and bodies

**Table B-4.Centrality Scores in the Three Small Island Cases for the Year 2017**

| Municipality | Functions and Services | | | | | | | | | | | | | | | | | | | | Total Centrality Scores |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | |
| Basco | 0.60 | 0.00 | 0.64 | 0.00 | 0.67 | 0.00 | 0.60 | 0.13 | 0.83 | 0.00 | 0.00 | 1.00 | 0.00 | 0.47 | 0.00 | 0.00 | 0.50 | 0.00 | 0.89 | 0.00 | 0.00 | **6.33** |
| Itbayat | 0.07 | 0.00 | 0.07 | 0.00 | 0.33 | 0.00 | 0.12 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.78** |
| Ivana | 0.07 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | **0.93** |
| Mahatao | 0.20 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.39** |
| Sabtang | 0.07 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.10 | 0.87 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.36** |
| Uyugan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | **0.21** |
| **Batanes** | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **10.00** |
| Enrique Villanueva | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.04 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | **0.28** |
| Larena | 0.00 | 0.00 | 0.06 | 0.00 | 0.25 | 0.00 | 0.05 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.33 | 0.00 | 0.09 | 0.00 | 0.00 | **0.93** |
| Lazi | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.29** |
| Maria | 0.00 | 0.00 | 0.41 | 0.00 | 0.25 | 0.00 | 0.42 | 0.50 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.33 | 0.00 | 0.27 | 0.00 | 0.00 | **2.61** |
| San Juan | 0.00 | 0.00 | 0.12 | 0.00 | 0.13 | 0.00 | 0.08 | 0.25 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | **0.83** |
| Siquijor | 0.00 | 0.00 | 0.32 | 0.00 | 0.25 | 0.00 | 0.32 | 0.25 | 0.36 | 0.00 | 1.00 | 0.00 | 0.00 | 0.76 | 0.00 | 0.00 | 0.33 | 0.00 | 0.45 | 0.00 | 0.00 | **4.06** |
| **Siquijor** | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **9.00** |
| Catarman | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.15** |
| Guinsiliban | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.13** |
| Mahinog | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 | 0.16 | 0.94 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | **2.13** |
| Mambajao | 0.00 | 0.00 | 0.58 | 0.00 | 0.50 | 0.00 | 0.47 | 0.06 | 0.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.76 | 0.00 | 0.00 | 0.50 | 0.00 | 0.50 | 0.00 | 0.00 | **4.14** |
| Sagay | 0.00 | 0.00 | 0.42 | 0.00 | 0.00 | 0.00 | 0.34 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | **1.46** |
| **Camiguin** | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | **8.00** |

| | | | |
|---|---|---|---|
| A Agriculture, forestry and fishing | H Transportation and Storage | O Public administrative and ; compulsory social security |
| B Mining and Quarrying | I Accommodation and food service activities | P Education |
| C Manufacturing | J Information and Communication | Q Human health and social work activities |
| D Electricity, gas, steam and air-conditioning supply | K Financial and insurance activities | R Arts, entertainment and recreation |
| E Water supply, sewerage, waste management and remediation activities | L Real estate activities | S Other service activities |
| F Construction | M Professional, scientific and technical services Section | Activities of private households as employers and undifferentiated goods and services and producing activities of households for own use extraterritorial T organizations and bodies |
| G Wholesale and retail trade; repair of motor vehicles and motorcycles | N Administrative and support service activities | U Activities of extra territorial organizations and bodies |

**Appendix C** (Value Chain Analyses of Selected Raw Material Resources)

**Table C-1.Value Chain for Fishery Resources in the Three Small Island Cases**

| Stage | Description | Units Accounted | Units Used | Price per Unit (PhP) | | Total Cost (PhP) | | Net Income (PhP) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | High | Low | High | Low | High |
| Preparation | Preparatory Activities for Fishing (Buying and Maintenance of Inputs) | Motorized Boat[19]<br>Fishing Gear (set)<br>Man Power | 1<br>1<br>2 | 100<br>25<br>100 | -<br>-<br>- | 100<br>25<br>200 | -<br>-<br>- | | |
| Actual Harvest | Actual Fishing Activity | Fisherman's Food<br>Fisherman's Water<br>Fish Bait (set) | 2<br>2<br>1 | 20<br>20<br>100 | -<br>-<br>- | 40<br>40<br>100 | -<br>-<br>- | | |
| Sorting and Storing | Collation, Sorting (and storing) of Fish catch | Fish Container[20]<br>Plastic Cover | 2<br>2 | 5<br>5 | -<br>- | 10<br>10 | -<br>- | | |
| Sea Transport | Transportation of Fish catch to the Middleman | Gasoline (Liter) | 1 | 60 | - | 60 | - | | |
| Collection of Fish Products[21] | Collection by the middleman | Fishery Resources[22] (kg) | 8-30 | 80 | 130 | 640-2400 | 1,040-3,900 | 55-1815 | 455-3,315 |
| Transportation by the Middleman | Transport to the trading post by the middleman | Forward Truck[23]<br>Gasoline (Liter)<br>Manpower<br>Cargo Shipment Fees[24]<br>Maintenance of equipment[25]<br>Other Costs[26] | 1<br>7<br>2<br>1<br>1<br>1 | 1000<br>60<br>150<br>5000<br>90<br>100 | -<br>-<br>-<br>-<br>-<br>- | 1000<br>420<br>300<br>5000<br>90<br>500 | | | |
| Wholesale Trading | Wholesale trade by the Middleman | Fishery Resources(kg) | 800-4,000 | 90 | 190 | 72,000-360,000 | 152,000-760,000 | 64,690-353,690 | 144,690-752,690 |
| Retailing of Fish Products | Sold fishery resources in bulk, then transport to the wet market | Trucking Service<br>Manpower<br>Other costs[27] | 1<br>2<br>1 | 500<br>150<br>1000 | | 500<br>300<br>1000 | | | |
| Final Consumption[28] | Retail trade by the fish vendors to the public | Fishery Resources (kg) | 50-100 | 100 | 210 | 5000-10,000 | 10,500-21,000 | 3,200-8,200 | 8,700-19,200 |

[19] Rent-to-own payable for two (2) year at PhP 73,000.00
[20] One time cost estimate for buying and maintenance, durability of at least 10 years
[21] Fishery Resources sold at farm gate price
[22] *Commonly Traded fishery resources are as follows: Tuna, Mackerel Scad, Anchovies, Snapper, Grouper, Dolphin fish, Squid*
[23] At cost per unit is estimated as PhP 1,500,000.00, computed on a daily charge in a 5 year return of investment scheme.
[24] One (1) round trip fee
[25] Includes maintenance and repair of truck spare parts, wheels, etc (Estimated at PhP32,000.00/ year)
[26] Includes food, water and cargo loaders costs
[27] Maintenance and operating Expenditures
[28] Fishery Resources sold at market price

**Table C-2. Value Chain for Lanzones (*Lansiumdomesticum*) Fruit in the Island Province of Camiguin**

| Stage | Description | Units Accounted | Units Used | Price per Unit (PhP) | | Total Cost (PhP) | | Net Income (PhP) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | High | Low | High | Low | High |
| Land Preparation | Preparatory Activities for Lanzones Harvesting | Manpower | 1 | 100 | - | 100 | - | | |
| Harvesting | Actual Lanzones fruit harvest | Manpower<br>Other costs[29] | 5<br>1 | 100<br>500 | -<br>- | 500<br>500 | -<br>- | | |
| Sorting and Storing | Collation, Sorting (and storing) ofLanzones Fruits | Lanzones Containers/ Boxes | 60 | 10 | - | 600 | -<br>- | | |
| Collection of Lanzones | Collection by the Middleman | Lanzones Fruits in Boxes[30] | 30-55 | 700 | 1,100 | 21,000-38,500 | 33,000-60,500 | 19,300-36,800 | 31,300-58,800 |
| Transportation by the Middleman | Transport to the trading post by the middleman | Forward Truck[31]<br>Gasoline (Liter)<br>Manpower<br>Cargo Shipment Fees[32]<br>Maintenance of equipment[33]<br>Other Costs[34] | 1<br>7<br>2<br>1<br>1<br>2 | 1000<br>60<br>150<br>5000<br>90<br>500 | -<br>-<br>-<br>-<br>-<br>- | 1000<br>420<br>300<br>5000<br>90<br>1000 | | | |
| Wholesale Trading | Wholesale trade by the Middleman | Lanzones Fruits in Boxes[35] | 100-300 | 1,400 | 1,800 | 140,000-180,000 | 420,000-540,000 | 132,190-172,190 | 412,190-532,190 |
| Retailing and transport to market | Transport from trading post to market | Trucking Service<br>Manpower<br>Other costs[36] | 1<br>2<br>1 | 500<br>150<br>1000 | | 500<br>300<br>1000 | | | |
| Final Consumption | Retail trade by the Fruits vendors to the public | Lanzones Fruits (kg) [37] | 50-100 | 100 | 110 | 5000-10,000 | 5,500-11,000 | 3,200-8,200 | 3,700-9,200 |

[29] Includes food and water consumption for the workers
[30] Lanzones fruits sold at farm gate price; ≈20 kilograms per box sold at PhP 35.00-40.00 per kilogram
[31] At cost per unit is estimated as PhP 1,500,000.00, computed on a daily charge in a 5 year return of investment scheme.
[32] One (1) round trip fee
[33] Includes maintenance and repair of truck spare parts, wheels, etc (Estimated at PhP32,000.00/ year)
[34] Includes food, water and cargo loaders costs
[35] Wholesale trade by the middleman; Sold per box (≈20 kilograms) at PhP 70.00-90.00 per kilo
[36] Maintenance and operating Expenditures
[37] Lanzones sold at market price at PhP 100.00-110.00 per kilogram

**Table C-3. Value Chain for Backyard Banana Production in the Island Province of Siquijor**

| Stage | Description | Units Accounted | Units Used | Price per Unit (PhP) | | Total Cost (PhP) | | Net Income (PhP) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | High | Low | High | Low | High |
| Land Preparation and Planting | Preparatory Activities such as: Nursery Maintenance, planting, seedling care, Watering, Organic Fertilizer application, etc) | Manpower<br>Other costs[38] | 1<br>1 | 100<br>100 | -<br>- | 100<br>100 | -<br>- | | |
| Fruiting Maintenance and Care | Includes plant care (spraying), Propping/Guying, Bagging, Fruit obstacle removal, etc | Manpower<br>Other costs[20] | 1<br>1 | 100<br>100 | -<br>- | 100<br>100 | -<br>- | | |
| Weeding and Green manuring | Weeding, Fertilizing-green manuring, spraying, windbreak/ plant support, sucker pruning, Pest control etc | Manpower<br>Other costs[20] | 1<br>1 | 100<br>100 | -<br>- | 100<br>100 | -<br>- | | |
| Harvesting | Actual Banana fruit harvest | Manpower<br>Other costs[39] | 1<br>1 | 100<br>500 | -<br>- | 100<br>500 | -<br>- | | |
| Sorting and Packing | Collation, Sorting (and storing) ofBanana | Banana Trays/ Boxes<br>Manpower<br>Other costs[21] | 10<br>2<br>1 | 10<br>100<br>300 | -<br>-<br>- | 100<br>200<br>300 | -<br>-<br>- | | |
| Collection of Banana | Collection by the Middleman | Banana in Trays/ Boxes[40] | 5-10 | 270 | 540 | 1,350-2,700 | 2,700-5,400 | (-) 450-900 | 900-3,600 |
| Transportation by the Middleman | Transport to the trading post by the middleman | Two-wheeler Truck[41]<br>Gasoline (Liter)<br>Manpower<br>Cargo Shipment Fees[42]<br>Maintenance of equipment[43]<br>Other Costs[44] | 1<br>7<br>2<br>1<br>1<br>1 | 300<br>60<br>150<br>4000<br>80<br>200 | -<br>-<br>-<br>-<br>-<br>- | 300<br>420<br>300<br>4000<br>80<br>200 | | | |
| Wholesale Trading | Wholesale trade by the Middleman | Banana in Trays/ Boxes[45] | 30-50 | 275 | 550 | 8,250-13,750 | 16,500-27,500 | 2,950-8,450 | 11,200-22,200 |
| Retailing and transport to market | Transport from trading post to market | Trucking Service, Manpower<br>Other costs[46] | 1 | 500 | | 500 | | | |
| Final Consumption | Retail trade by the Fruits vendors | Banana sold at PhP 22-45/ kg | 22-45 | 20 | 50 | 440-1,100 | 900-2,250 | (-) 60- 600 | 400-1,750 |

[38] Includes fertilizers/ sprays (subsidized by the Local government), water and other maintenance and operating expenditures
[39] Includes food and water consumption for the workers
[40] Banana fruits sold at farm gate price; ≈13.5 kilograms per box sold at PhP 20.00-40.00 per kilogram
[41] At cost per unit is estimated as PhP 456,250.00, computed on a daily charge in a 5 year return of investment scheme.
[42] One (1) round trip fee
[43] Includes maintenance and repair of truck spare parts, wheels, etc (Estimated at PhP32,000.00/ year)
[44] Includes food, water and cargo loaders costs
[45] Wholesale trade by the middleman; Sold per box (≈13.5 kilograms) at PhP 22.00-48.00 per kilo
[46] Maintenance and operating Expenditures

**Table C-4. Value Chain for the Raising Garlic Production in the Island Province of Batanes**

| Stage | Description | Units Accounted | Units Used | Price per Unit (PhP) | | Total Cost (PhP) | | Net Income (PhP) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | High | Low | High | Low | High |
| Land Preparation, Planting, Maintenance | Preparatory Activities such as tilling, plant selection, clove/ seed preparation, mulching, application of fertilizer, irrigation | Manpower<br>Other costs[47] | 1<br>1 | 100<br>100 | -<br>- | 100<br>100 | -<br>- | | |
| Crop Protection | Weeding, Pest control activities, etc | Manpower<br>Other costs[29] | 1<br>1 | 100<br>100 | -<br>- | 100<br>100 | -<br>- | | |
| Harvesting, Sorting and Storing | Includes activities such as the actual harvesting, drying and bundling | Manpower<br>Other costs[48] | 2<br>1 | 100<br>500 | -<br>- | 200<br>500 | -<br>- | | |
| Collection of Garlic and Transport | Collection by the Middleman | Garlic bundles sold to Middleman[49]<br>Trucking and Sea Transport | 20<br>1 | 150-250<br>10000 | 210-350<br>- | 3,000-5,000<br>- | 4,200-7,000<br>- | 1,900-3,900 | 3,100-5,900 |
| Wholesale trading | Wholesale trade by the Middleman | Garlic Buddles[50] | 300 | 243-405 | 300-500 | 72,900-121,500 | 90,000-150,000 | 62,900-111,500 | 80,000-101,500 |
| Retailing and transport to market | Transport from trading post to market | Trucking Service, Manpower<br>Other costs[51] | 1 | 450 | - | 450 | | | |
| Final Consumption | Retail at the local market | Garlic bundles sold at the local market[52] | 10 | 540-750 | 750-1250 | 5,400-7,500 | 7,500-12,500 | 3,950-7,050 | 7,050-12,050 |

[47] Includes organic fertilizers/ sprays, water and other maintenance and operating expenditures
[48] Includes food and water consumption for the workers
[49] Garlic sold at farm gate price; ≈3-5 kilograms per bundle and sold at PhP 50.00-70.00 per kilogram
[50] Wholesale trade by the middleman; ≈3-5 kilograms per bundle and sold at PhP 81.00-100.00 per kilogram
[51] Maintenance and operating Expenditures
[52] Sold at the Manila Market PhP 180.00-250.00 per kilo

**Table C-5. Value Chain for Backyard/ Small -Scale Cattle Production in the Island Province of Siquijor**

| Stage | Description | Units Accounted | Units Used | Price per Unit (PhP) | | Total Cost (PhP) | | Net Income (PhP) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | High | Low | High | Low | High |
| Preparation, Cattle Growing | Preparation of Stall, Tethering, or staking, housing, etc | Man Power | - | - | - | - | - | | |
| Cattle feeding and care | Stall feeding, feeding fatteners | Man Power<br>Other Cost[53] | -<br>1 | -<br>150 | - | -<br>150 | - | | |
| Adult/ Mature Live Wholesale | Collection by the middleman from the cattle growers | Live wholesale trade[54](head) | 2 | 15,000<br>8,000 | -<br>- | 23,000<br>- | -<br>- | 10,500 | - |
| Transportation by the Middleman | Transport to the trading post by the middleman | Forward Truck[55]<br>Gasoline (Liter)<br>Manpower<br>Cargo Shipment Fees[56]<br>Maintenance of equipment[57]<br>Other Costs[58] | 1<br>7<br>2<br>1<br>1<br>1 | 25,000<br>60<br>150<br>5000<br>16,000<br>100 | -<br>-<br>-<br>-<br>-<br>- | 25,000<br>420<br>300<br>5000<br>16,000<br>500 | | | |
| Wholesale Trading | Wholesale trade by the Middleman | Live wholesale trade(head) | 6-12 | 16,000<br>9,000 | -<br>- | 150,000<br>- | 300,000<br>- | 102,780<br>- | 252,780<br>- |
| Slaughtering and Retail Trading | Slaughtering of cattle, storage and distribution to the market | Slaughter Services[59]<br>Other costs[60] | 1<br>1 | 30000<br>1000 | -<br>- | 30000<br>1000 | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- |
| Final Consumption[61] | Retail trade by the fish vendors to the public | Beef (kg) | 20-50 | 200 | 260 | 4000-10,000 | 5,200-13,000 | 3,000-9,000 | 4,200-12,000 |

* Annually, one head of cattle excretes 60 kilograms Nitrogen, four kilograms Phosphorus and 18 kilograms Potassium.
* A cow reaches puberty at the age of 18 months and has a gestation period of 283 days. Estrous cycle is 18 – 24 days.
* Cattle can be used in transporting farm products to and from markets and to transport fuel, water and goods.
* It takes about 1,000 days to breed and raise cattle to the butchering weight of 400-500 kilograms.
* On an average, Filipinos consume two kilograms of beef per year as the country's cattle supply drops continuously.

[53] Feeds are a combination of forage and commercially available feeds (at PhP 150.00 monthly) for 1000 days
[54] Two major types the "Braman" species, usually sold at PhP 15,000.00 / Head; Native cattle species, sold at PhP 8,000.00 / head
[55] At cost per unit is estimated as PhP 1,500,000.00, computed on a monthly charge in a 5 year return of investment scheme.
[56] One (1) round trip fee
[57] Bi-annual maintenance and repair of truck spare parts, wheels, etc (Estimated at PhP32,000.00/ year)
[58] Includes food, water and cargo loaders costs
[59] Usually Shouldered by the middlemen; Slaughtered cattle is 400-500 kilograms per weight; slaughtering services is at PhP 71.60/ kilo of live weight
[60] Maintenance and operating Expenditures including transport to the market for final selling and consumption
[61] Beef sold at market price

**Appendix D** (Ecological Profiling Outline Adapted in Small Island Province Ecological Profiling)

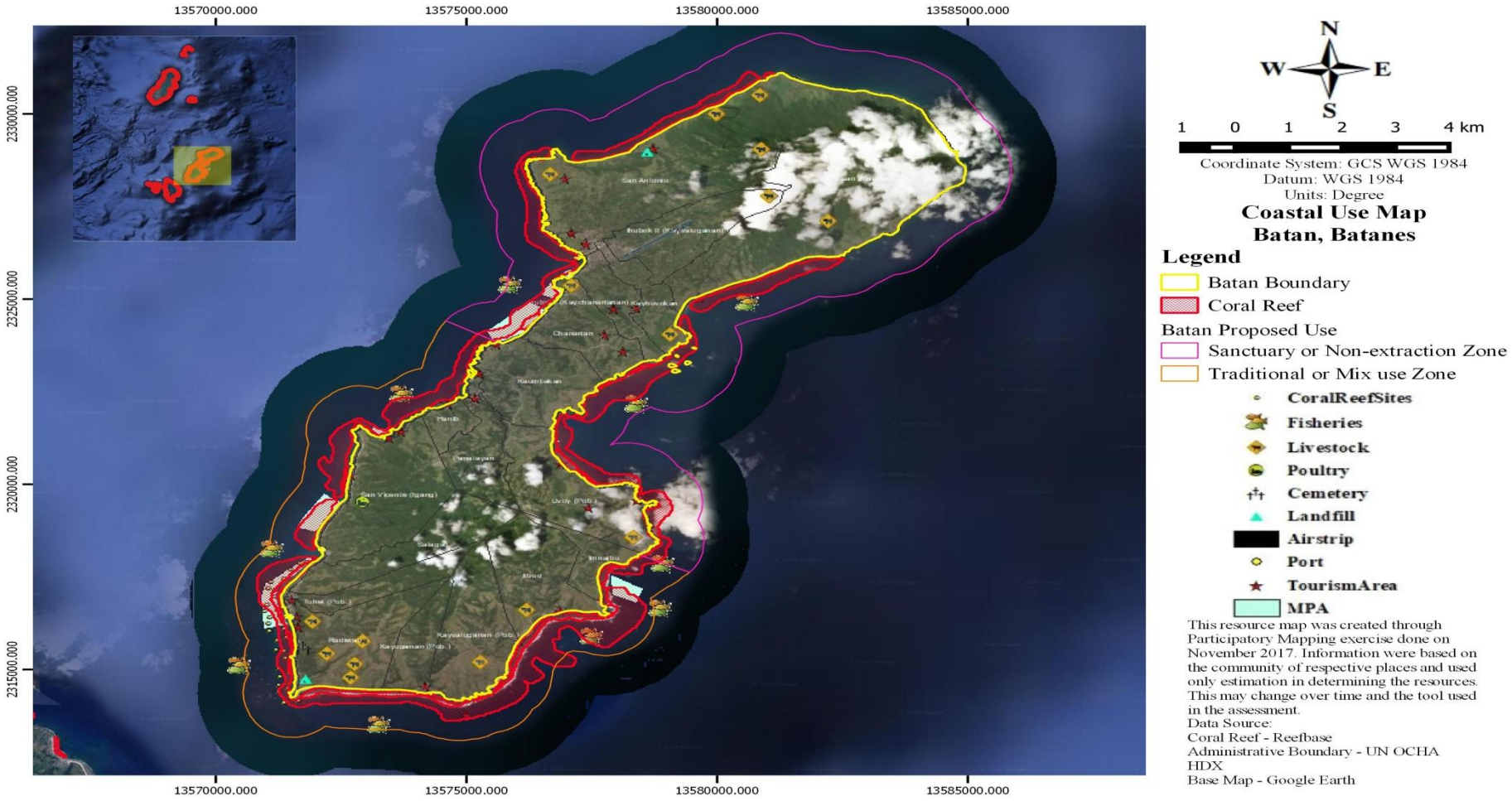
| COMMON ECOLOGICAL PROFILING OUTLINE | REMARKS FOR SMALL ISLAND ECOLOGICAL PROFILING |
|---|---|
| **CHAPTER I HISTORY** | |
| **CHAPTER II GEO-PHYSICAL ENVIRONMENT**<br>2.1 Geographical Location<br>2.2 Political Boundaries<br>2.3 Topography<br>2.3.1 Elevation<br>2.3.2 Slope<br>2.4 Geology<br>2.4.1 Rock Formations<br>2.4.2 Landforms<br>2.4.3 Soils<br>2.4.4 Land Capability Classes<br>2.5 Land Resources<br>2.5.1 Land Classification<br>2.5.2 Existing General Land use<br>2.5.3 Urban Land Use Pattern<br>2.6 Mineral Resources<br>2.7 Coastal Resources<br>2.7.1 Coral Reef<br>2.7.2 Seagrass Communities<br>2.7.3 Mangrove Forests<br>2.7.4 Coral Lifeforms and Associated Species<br>2.7.5 Reef Fish Communities<br>2.8 Freshwater Resources<br>2.8.1 Surface Run-off<br>2.8.2 Groundwater Resources<br>2.9 Climate<br>2.9.1 Atmospheric Temperature<br>2.9.2 Relative Humidity<br>2.9.3 Cloudiness<br>2.9.4 Rainfall<br>2.10 Natural Hazards/ Constraints<br>2.10.1 Flooding<br>2.10.2 Erosion and Siltation<br>2.10.3 Infiltration and Soil Drainage | **Inclusion of a section that will tackle Islandness or Insular Character:**<br>**1. Distance**<br>**2. Coastline Ratio**<br>**3. Endemic Resources Vulnerability**<br>**4. Complex Geography**<br>**5. Ecosystem Continuum (SIPEC)** |
| **CHAPTER III POPULATION AND SOCIAL PROFILE**<br>3.1 Social Composition and Characteristics<br>3.2 Population Size and Growth Rate<br>3.3 Growth of Barangay Population<br>3.4 Migration Patterns<br>3.5 Population Density<br>3.6 Household Distribution<br>3.7 Urban – Rural Distribution<br>3.8 Tempo of Urbanization<br>3.9 Age – Sex Distribution<br>3.10 Dependency Ratio<br>3.11 Present Status of Well-being<br>3.11.1 Health<br>a. Health Personnel and Facilities, Public and Private<br>b. Ten (10) Leading Causes of Morbidity (All Ages)<br>c. Ten (10) Leading Causes of Mortality (All Ages)<br>d. Nutritional Status<br>e. Other Health Statistical Data<br>f. Family Planning Services<br>3.11.2 Social Welfare<br>a. Social welfare programs and services available | **Highlight the following aspects that were already mentioned:**<br>**1. Small Size and Growth pattern**<br>**2. High Density**<br>**3. Migration, especially the context of kinship**<br>**4. Rural context and Isola Effect**<br>**5. Cultural Identity (*Indigenous Communities and Sea faring culture)*** |

| | |
|---|---|
| b. Number of types of clientele<br>c. Number and location of day care centers<br>3.11.3 Education<br>a. Educational Attainment and Literacy Rate<br>b. School-age population and Participation Rate, by level<br>(elementary, secondary, tertiary)<br>c. Number and location of schools, by level, public and private<br>d. Other Educational Statistics<br>3.11.4 Housing<br>a. Number of housing units, by type of building (single, duplex, etc.) and construction materials<br>b. Tenure on the house and homelot<br>c. Sources of drinking water<br>d. Type of fuel used for lighting and cooking<br>e. Types of garbage disposal<br>3.11.5 Employment and Income<br>a. Employment rate, by sector<br>b. Number of overseas Filipino workers (OFWs)<br>3.11.6 Recreation and Sports Facilities<br>a. Type, number and location of sports and recreational facilities<br>3.11.7 Protective Services<br>a. Total number of police personnel<br>b. Police – population ratio<br>c. Types and volume of crime in the LGU<br>d. Fire-fighting personnel and facilities<br>e. Occurrence of fire and response time | |
| **CHAPTER IV LOCAL ECONOMY**<br>4.1 The Primary Sector<br>4.1.1 Agricultural Crops<br>a. Agricultural Croplands<br>b. Crop Production<br>4.1.2 Livestock and Poultry<br>a. Number and volume of production by type of livestock and poultry<br>b. Livestock and Poultry Production – Consumption Relationship<br>4.1.3 Fisheries<br>a. Inland Fisheries<br>b. Municipal Fisheries<br>c. Commercial Fisheries<br>4.1.4 Food Self-sufficiency Assessment<br>4.1.5 Forestry<br>a. Forest-based production activities<br>b. Type and volume of production<br>4.1.6 Agricultural Support Facilities<br>a. Production Support Facilities<br>b. Post-harvest Facilities<br>4.2 The Secondary Sector<br>4.2.1 Manufacturing<br>4.2.2 Construction<br>4.2.3 Mining and Quarrying<br>4.2.4 Electricity, gas and Water<br>4.3 The Tertiary Sector<br>4.3.1 Financial Institutions<br>4.3.2 Wholesale and Retail Trade<br>4.3.3 Transportation and Communications<br>4.3.4 Personal Services | **Discuss the following important island economic indicators:**<br>**1. Narrow Economic base**<br>**2. Import Oriented (what are these imports, best is to assess using input-output analysis)**<br>**3. Vulnerable to natural environmental shocks**<br>**4. Concentrated economic activity**<br>**5. Devalued local economic goods (Economic valuation**<br>**6. Subsistence and Informal Economy** |
| **CHAPTER V INFRASTRUCTURE/ UTILITIES/ FACILITIES**<br>5.1 Inventory of Roads by classification (Barangay, City/ Municipal, Provincial andNational), length and type of pavement (concrete, asphalt, gravel and earth)<br>5.2 Inventory of Bridges by classification (Barangay, City/ Municipal, Provincial and National), length, type of construction (RCDG, steel truss, timber, others) and condition (passable, unpassable, needs repair, etc)<br>5.3 Irrigation System<br>5.4 Flood Control and Drainage Facilities, by | **Highlight the following:**<br>**1. Accessibility Issues**<br>**2. Physical Isolation and Distance Analysis**<br>**3. Spatial Interaction Scoring**<br>**4. Basic Support Services** |

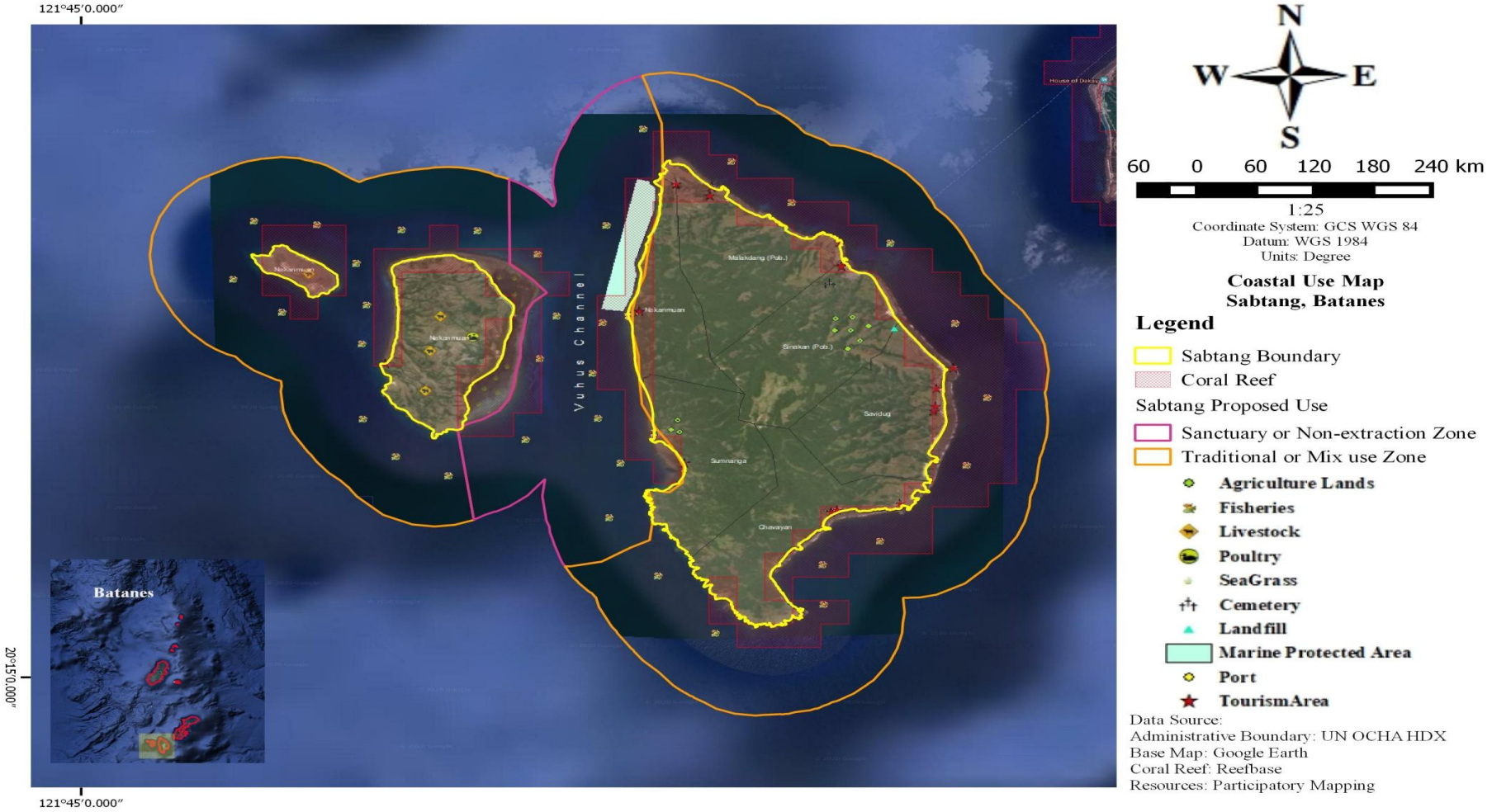
| | |
|---|---|
| location, type of facility (group riprapping, concrete lining, etc.), length, width, thickness<br>5.5 Domestic Water Supply<br>5.6 Electric Power Supply<br>5.7 Transport Facilities<br>5.8 Communication Facilities<br>5.9 Waste Disposal System<br>5.10 Port<br>5.11 Municipal/ City Cemetery<br>5.12 Slaughterhouse<br>5.13 Public Market | |
| **CHAPTER VI LOCAL INSTITUTIONAL CAPABILITY**<br>6.1 Local Government Structure<br>a. The LGU's Organizational Structure<br>6.2 Local Fiscal Management<br>a. Status of Financial Health<br>b. Revenues by Source<br>c. Actual Expenditures by General Account<br>6.3 Development Legislation<br>a. Inventory of resolutions passed/ ordinances enacted, by sector, by year<br>6.4 LGU – CSO – Private Sector Linkages | **Discuss the following aspects:**<br>**1. Satellite town/ Sister town effect**<br>**2. Political Representation**<br>**3. Role of the small island province** |

**Appendix E** (Indicative Small Island Province Zoning)

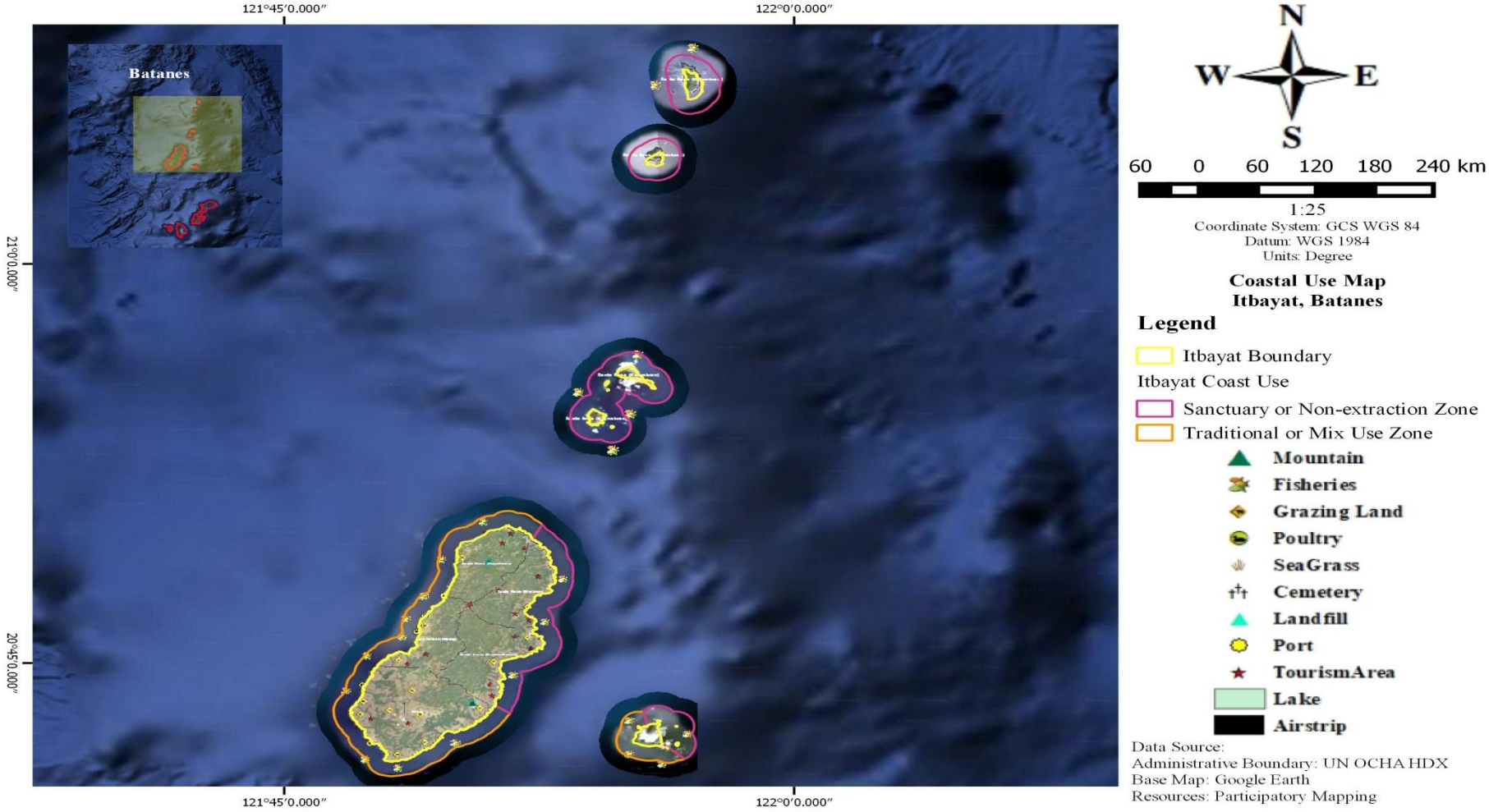
**E1-1 Batan Island Coastal Use Map**



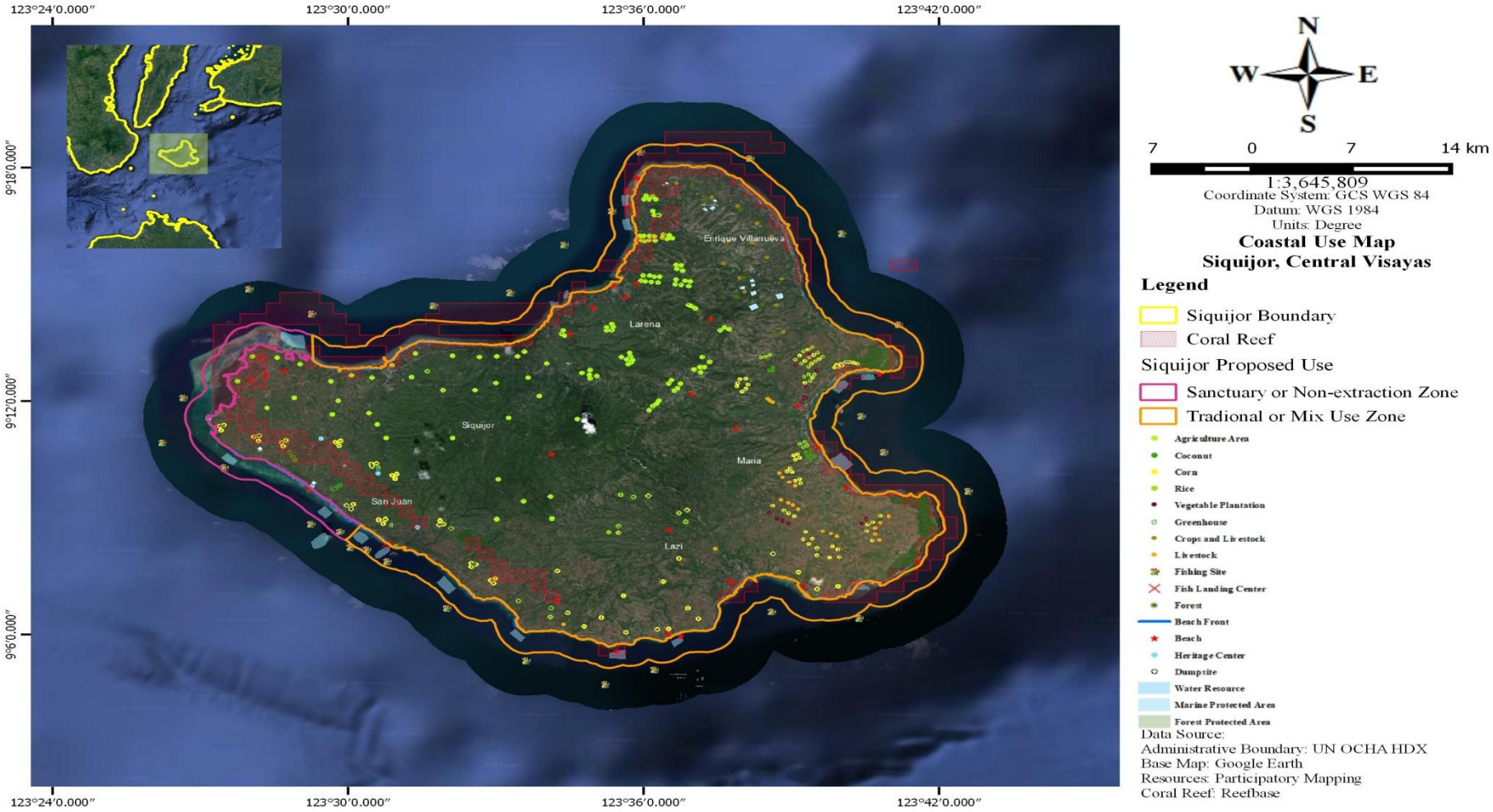
**E1-2 Sabtang Island Coastal Use Map**



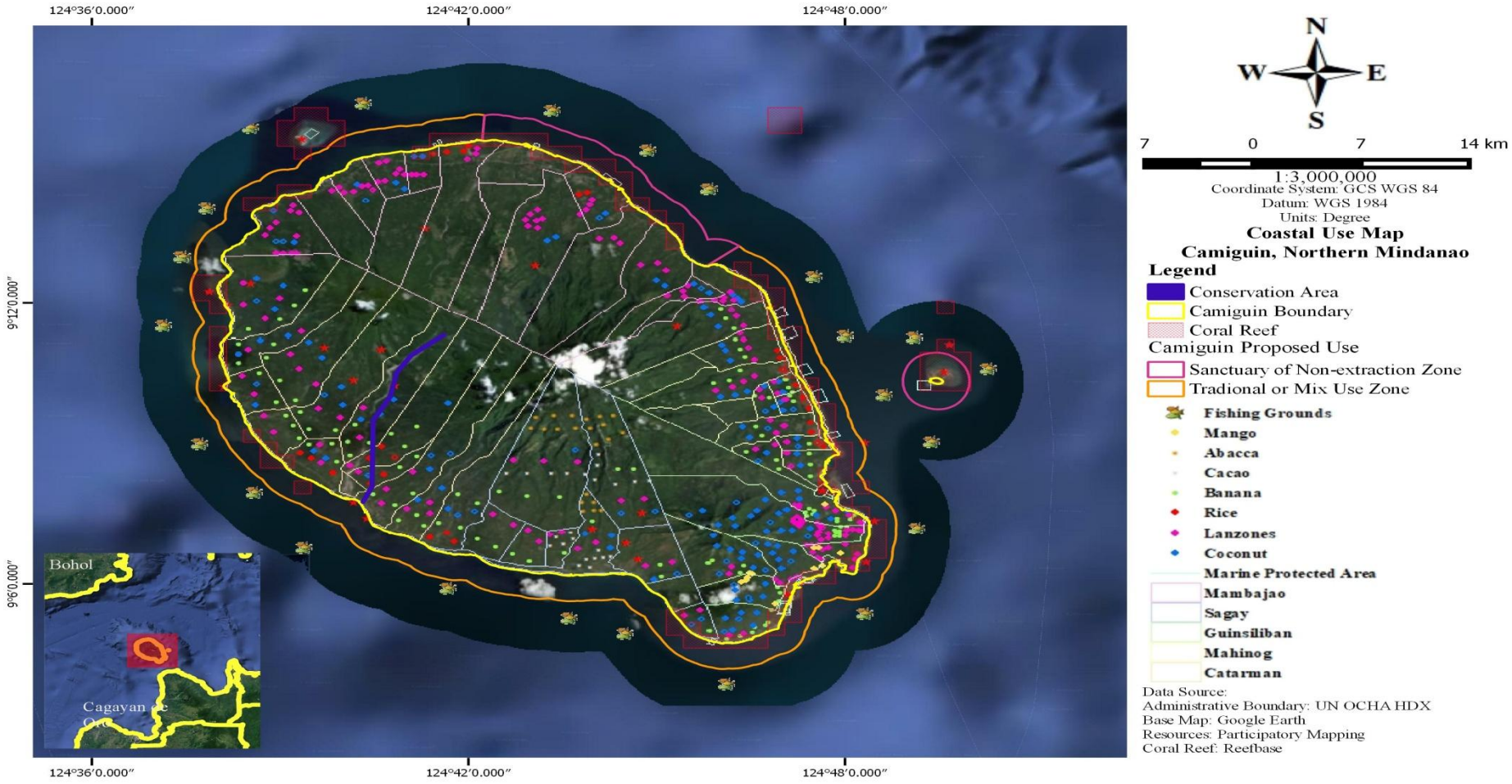
**E1-3 Itbayat Island Coastal Use Map**



**E2 Siquijor Island Coastal Use Map**



**E3 Camiguin Island Coastal Use Map**



# ANNEX

**ANNEX A**

(Data Gathering Instruments)

**A. 1 FOCUS GROUP DISCUSSION**

**(GUIDE QUESTIONS for the Fisher folk)**

1. **Fishing as a primary source of income**
    a) How often do you go fishing?
    b) How do you do fishing?
    c) How much income do you get from this activity?
    d) What other sources of income do you have?
    e) What type of fishing equipment do you use?
    f) Are you able to directly benefit from the harvest?

2. **Fishing as an economic resource**
    a) What are the primary fish stocks harvested
    b) Where do you usually trade these goods? Which municipalities/ provinces?
    c) How are these goods priced?
    d) Are there any other sources of fishery goods other than the ones you harvest (competition)?
    e) What problems do you usually encounter in this economic resource? How are you trying to resolve such problems?
    f) What infrastructural support or services do you need to improve this livelihood?

**(GUIDE QUESTIONS for the BantayDagat, Tourism Officers)**

1. **Ecotourism as a primary source of income**
    a) What are the forms of Water-based ecotourism in your area?
    b) Is/are this/these your primary source of income?
    c) What other sources of income do you have?
    d) Is this activity able to suffice your day to day needs?
    e) What problems do you usually encounter in these activity? How are you trying to resolve such problems?

2. **Tourist Information**
    a) How much does a tourist spend per day?
    b) What other economic activities are influenced by the arrival of tourists?

3. **Ecotourism Support Facilities**
    a) What support services/facilities is/are available for you in terms of water-based ecotourism?
    b) What is/are the comparative advantage of other nearby provincein terms of the services/facilities they provide?
    c) How do these services affect your livelihood?

**A. 2 KEY INFORMANT INTERVIEW**

**(Province Agriculturist)**

**NAME:**
**DESIGNATION:**
**OFFICE/AFFILIATION:**

1. **Fishing as an economic resource**
    a) What are the primary fish stocks harvested
    b) Where do you get these stocks? (Illustrate in a Map)
    c) Is the supply of the commodity enough to feed the whole municipality/ province?
    d) Where do you usually trade these goods? Which municipalities/ Provinces?
    e) How are these goods priced?
    f) Are there any other sources of fishery goods other than the ones being harvested in the municipality/ province (competition)?
    g) What problems do you usually encounter in this economic resource?
    h) What actions from the municipality/ province are being done to address/ resolve such problems?

2. **Fishery resources flow**
    a) How much fish harvest do you get? (Kilogram or tons/ month or year)?
    b) What is the province's fish harvest trend in the last 10 years?
    c) Who are the primary consumers of the resources
    d) Are these harvests meeting the demand of the beneficiaries?
    e) Are these harvested goods going directly outside the municipality/ province? or some go for community's consumption? How is the fishery production distributed (Refer to commodity flow table)

3. **Fishery Harvesting Facilities**
    a) What support services/facilities is/are available for you in terms of fishing?
    b) How do these services affect your livelihood?
    c) Are there any actions/ programs/ projects that try to resolve this issue?

**(Provincial Planning Officer)**

**NAME:**
**DESIGNATION:**
**OFFICE/AFFILIATION:**

1. **Economic Development for regional/ provincial/ municipal development**
    a) What is the economic sector's contribution for the development of the municipality? Province?
    b) What further development path would the municipality/ province prioritize?
    c) What conditions/ situations may hinder the progressive development of the municipality/ province?
    d) Is there any economic sector problem prevalent in the municipality/ province?

2. **Province's Function?**
    a) Is the province's function as a human settlement being fulfilled at the regional level? National level?
    b) Is this assigned function working perfectly under the present situation of the province?
    c) What other function does the province serves in consonance to the development of the region? or the country?

3. **Linkages with other provinces**
    a) Is there any existing agreement, mutual development, charters that promote inter-province/ regional planning and management? How is this being done?
    b) What are the problems encountered that limits/hinders mutual/cooperative development among adjacent provinces (if there are any)? How is this being resolved?

**(ProvincialTourism Officer)**

**NAME:**
**DESIGNATION:**
**OFFICE/AFFILIATION:**

1. **Ecotourism as an economic resource**
    a) Is ecotourism a booming source of income in the municipality/ province?
    b) How is this activity organized?
    c) How is ecotourism activities related/ affected by other economic activity?
    d) How does this activity contribute to other economic activities in the area (multiplier effect/ Spread effect)?
    e) How is this activity in relation to other ecotourism activities of other provinces?
    f) What problems do you usually encounter in this economic resource? How are you trying to resolve such problems?

2. **Ecotourism Income flow**
    a) How much of the province's income is attributed the ecotourism sector?
    b) How is the income from the water-based ecotourism activities distributed? Within the municipality? and among the provinces sharing the income?
    c) How much does it cost for a tourist to stay in the province for a one whole day activity?

3. **Ecotourism Support Facilities**
    a) What support services/facilities is/are available for you in terms of water-based ecotourism?
    b) What is/are the comparative advantage of other nearby provinces in terms of the services/facilities they provide?
    c) How do these services affect your livelihood?

**A. 3 PARTICIPATORY MAPPING EXERCISE**

*(This activity will be done immediately after the FGD)*

**Step 1:** Using a Map, the participants will identify and trace the movement/ flow ofcommodity (fishery resources) and ecotourism activities guided by the following questions:

**Fishery resources flow**

a) How much fish harvest do you get? (Kilogram/ tons/ month)?
b) Where do you get these stocks?
c) Who are the primary consumers of the resources
d) Are these harvests meeting the demand of the beneficiaries?
e) Are these harvested goods going directly outside the province? Or some go for community's consumption?
f) What is/are the transport medium/media used to sell the fish harvest?
g) How long does it take (hours of travel) for such fishery resource to be transferred to the market?
h) Map out the direction of the fishery resources from point of harvest to market

**Ecotourism resources flow**

a) Where are these eco-tourism sites located?
b) Who are the tourists/visitors?
c) Are these tourists directly heading to the island?
d) What is the estimate cost for a 1 day stay of a tourist in the province?
e) Are the local people able to benefit from the tourists? In what way/s?
f) What tourism support services/ infrastructures are being offered by the province?
g) What are the tourism support services and infrastructures/facilities offered by other provinces?
h) Map out the direction of the activities the point of origin to the intended effects (spill over/ multiplier effect)

**Step 2:** Identify key areas in the map (resources point source and sink); transportation media and distance travelled; support services and facilities; markets; etc

**Step 3:** Present, confirm and validate the diagram (map) and resources flow/movement with the participants.

**ANNEX B. PARTICIPATORY MAPS**

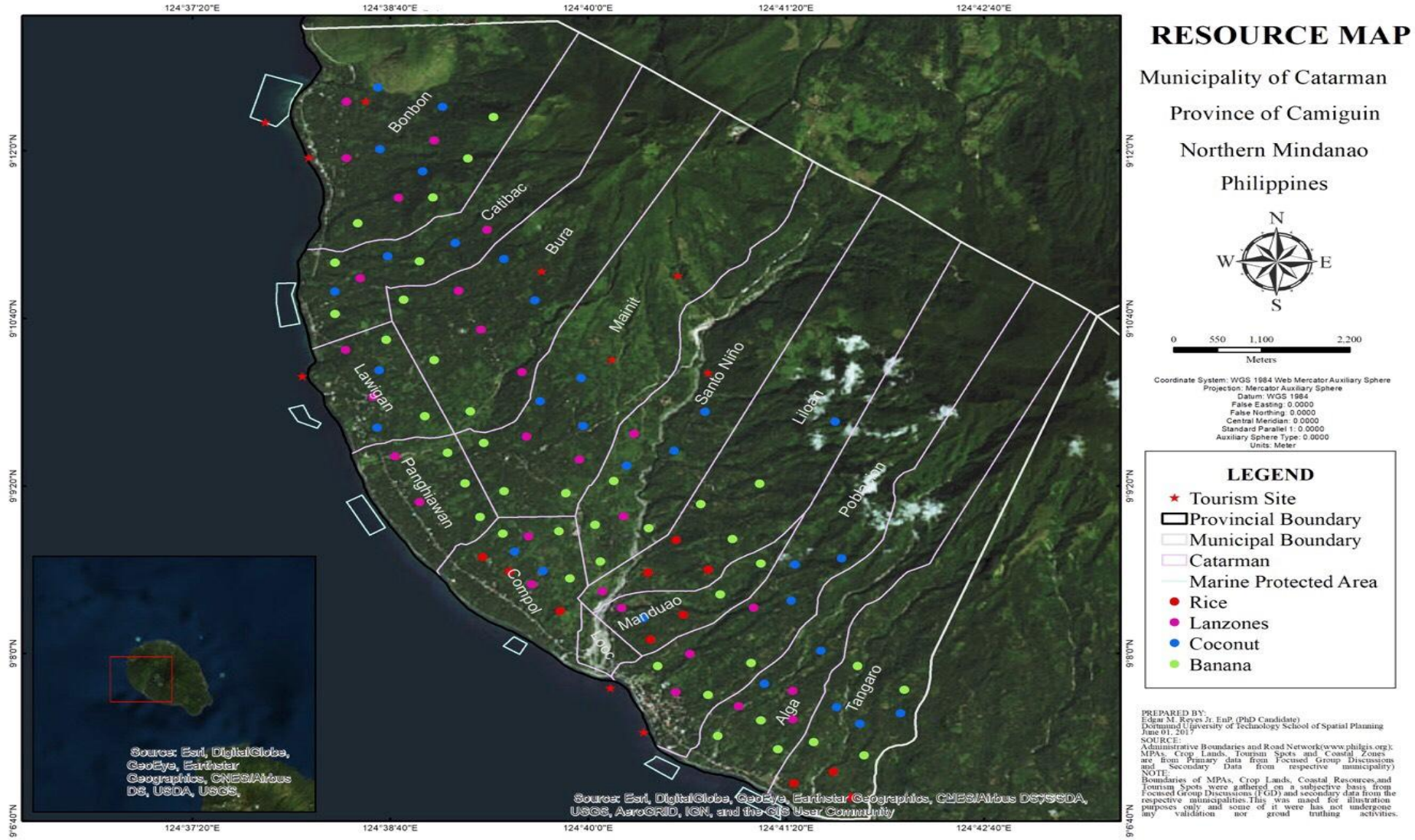



**Plate 1. Participatory Resource Map of the Municipality of Catarman, Camiguin**

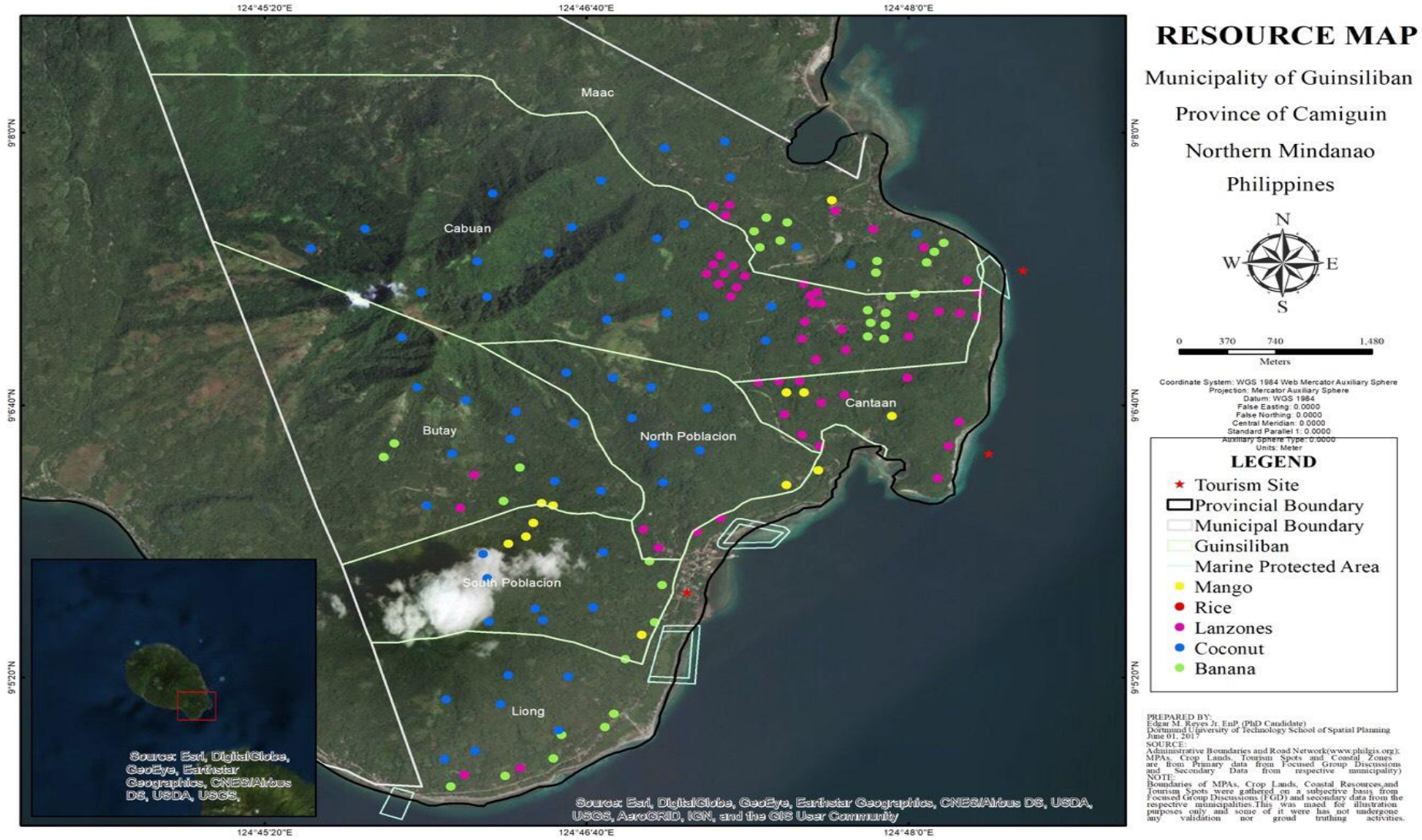



**Plate 2. Participatory Resource Map of the Municipality of Guinsiliban, Camiguin**


**Plate 3. Participatory Resource Map of the Municipality of Mahinog, Camiguin**


**Plate 4. Participatory Resource Map of the Municipality of Mambajao, Camiguin**


**Plate 5. Participatory Resource Map of the Municipality of sagay, Camiguin**

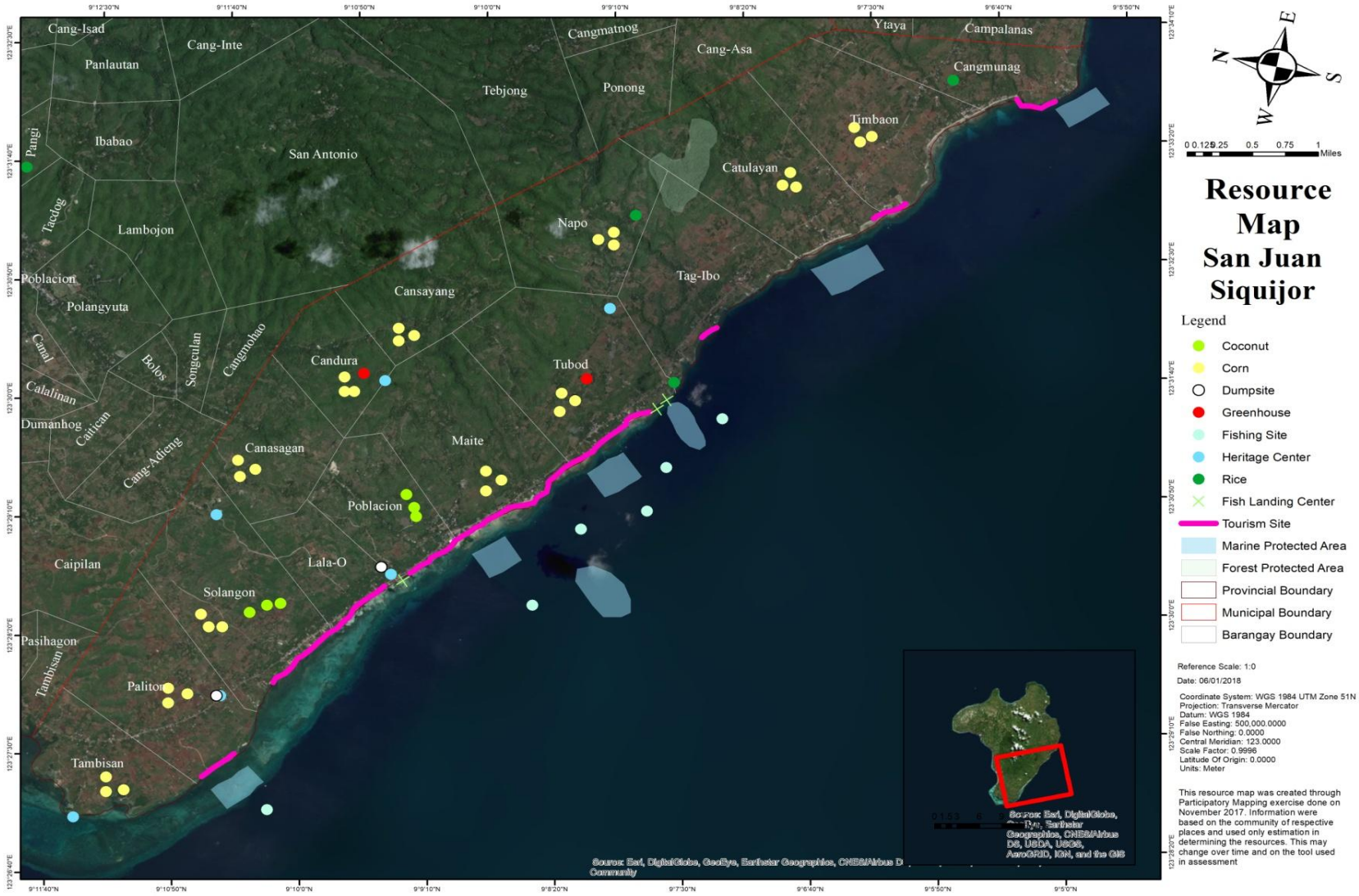



**Plate 6. Participatory Resource Map of the Municipality of San Juan, Siquijor**

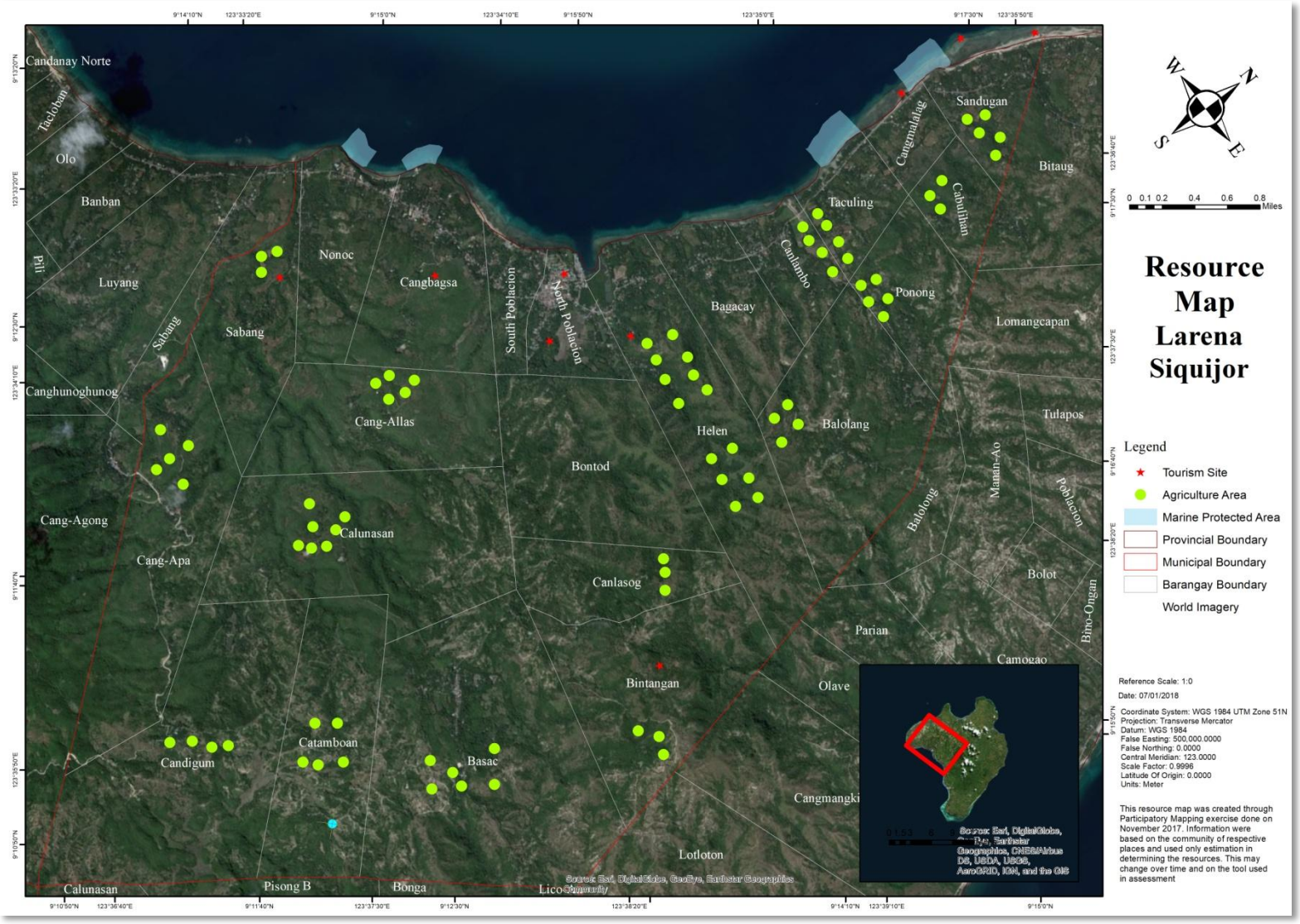



**Plate 7. Participatory Resource Map of the Municipality of Larena, Siquijor**

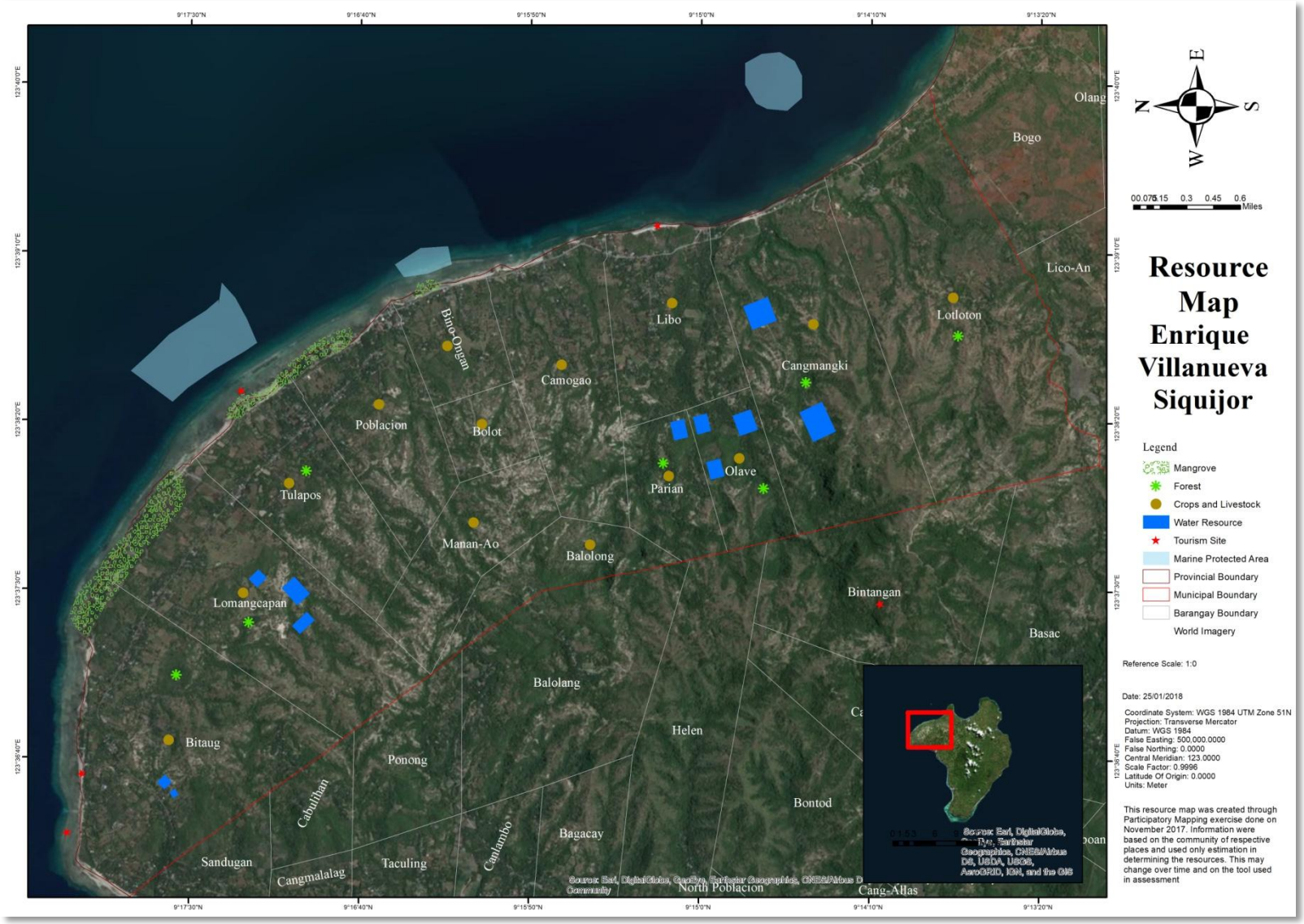



**Plate 8. Participatory Resource Map of the Municipality of Enrique Villanueva, Siquijor**

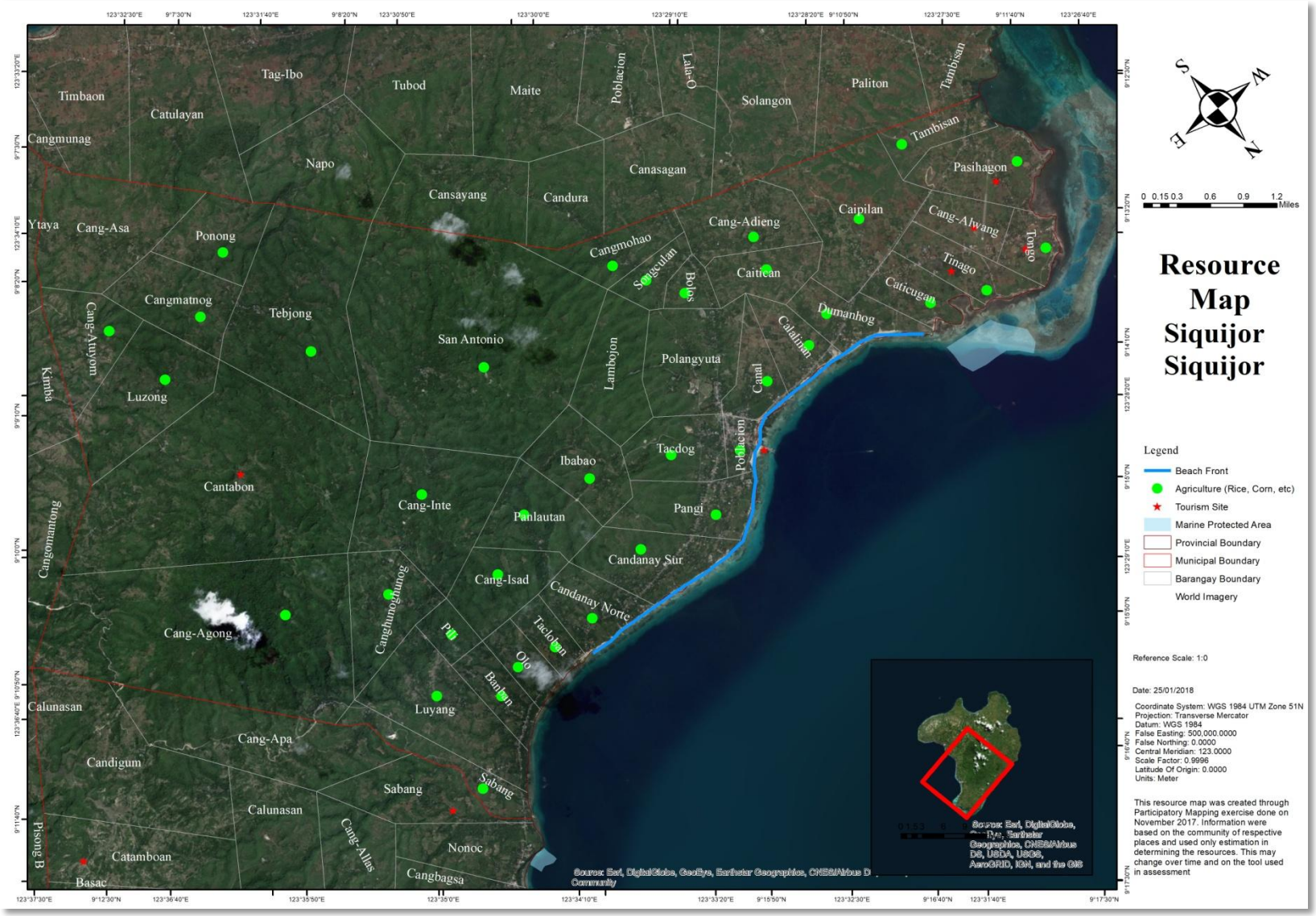



**Plate 9. Participatory Resource Map of the Municipality of Siquijor, Siquijor**

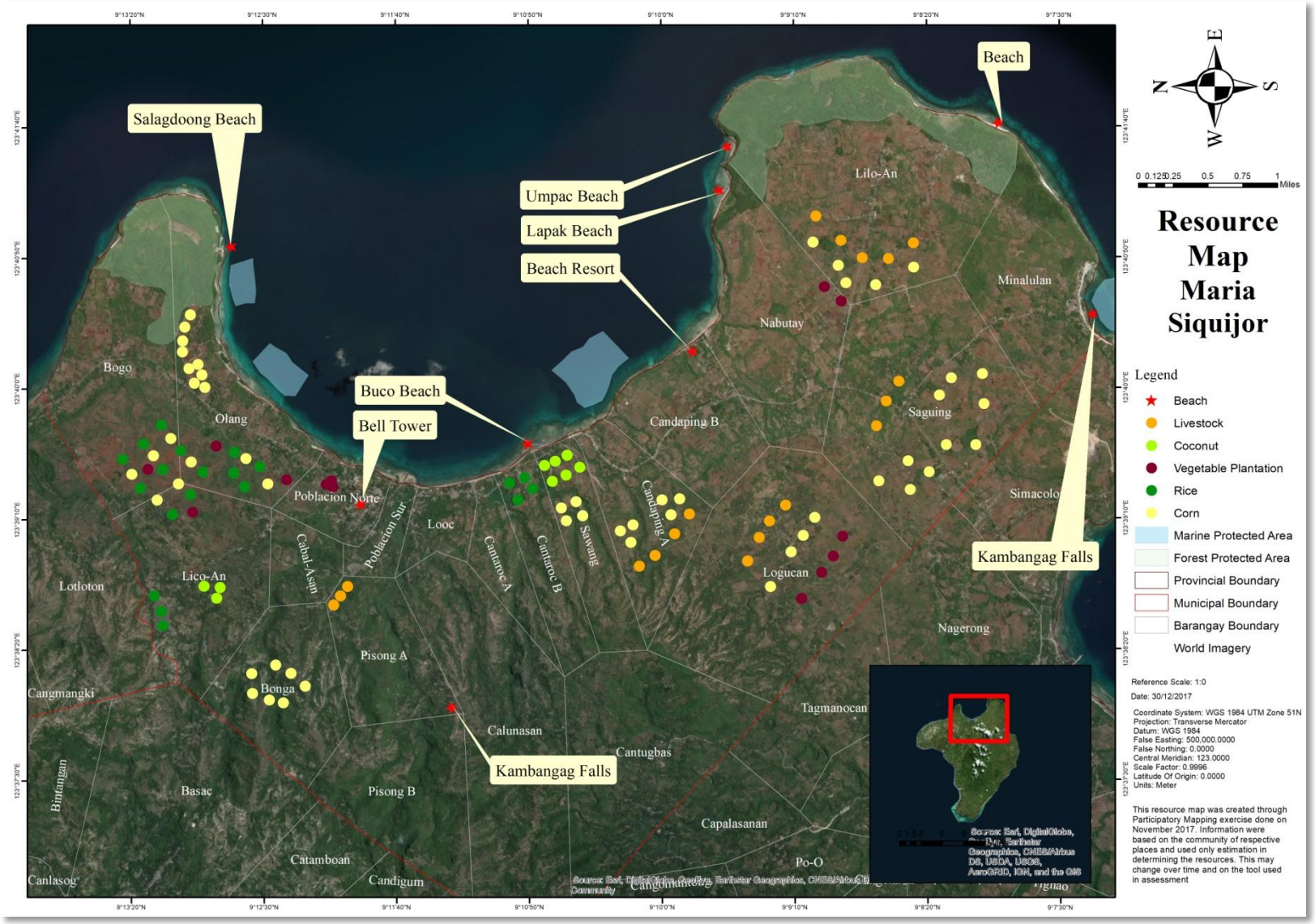



**Plate 10. Participatory Resource Map of the Municipality of Maria, Siquijor**

**ANNEX C. PROBLEM ANALYSIS**

**FOCUS GROUP DISCUSSION CATARMAN**

**PROBLEM ANALYSIS**

| | **Problem** | **Challenges** |
|---|---|---|
| **Coastal** | • Various problems regarding health are recorded especially to those living along the coast of the municipality since majority of them dispose waste directly in the ocean where they get their foods also.<br>• There are problems with regards to the proper disposal of waste products.<br>• There is an unregulated settlement plan in the area since there are residents who live on the coastal area.<br>• Presence of illegal fishermen in the area is evident.<br>• Problems regarding land ownership in the area are evident (government wants to penetrate to privately – owned lands).<br>• Coastal degradation is one of the main problems | • Over time, there is a continuous draining of sand and gravel from the river down to the seas that causes siltation.<br>• More efforts on disaster mitigation for the municipality especially to the coastal areas since they are vulnerable to disasters caused by typhoons, earthquakes, etc.<br>• Improvement of coastal roads is necessary for the area.<br>• Rising of sea level are observed in the area which challenges the municipality to further develop plans to address the issue. |
| | **Problem** | **Challenges** |
| **Tourism** | • There is an unregulated use of karaoke and other amenities that uses sounds especially during t night which distracts the resting period of the residents.<br>• Overpricing of products is observed in the area.<br>• Livestock wastes affect the tourism industry since it goes directly to the municipal waters.<br>• There is no presence of public transportation during at night (7 P.M. beyond)<br>• Majority of the houses and tourism sites do not own septic tanks for the regulation of wastes materials.<br>• Stores usually close early in the evening. There is no presence of 24/7 stores. | • Distribute more trash bins with proper segregation labels<br>• Establish solar street lights<br>• Promote the employment of lifeguards specially to resort owners and public pools and resorts<br>• Establish more dive sites since the municipality has a lot of potential<br>• Since, trafficking of vehicles is very rare in the area, drivers tend to be reckless<br>• Provision of more trainings and programs in relation to tourism development |
| | **Problem** | **Challenges** |
| **Agriculture** | • Price of Lanzones is controlled by middlemen<br>• There is lack of interest for the young generation to engage in protecting the environment<br>• There is a low production of crop goods in the area | • Major problems<br>• in the croplands are affected due to climate change<br>• There is a presence of pest and diseases that are very hard to control (Scale insects, Japanese Snail) |

**FOCUS GROUP DISCUSSION GUINSILIBAN**

**PROBLEM ANALYSIS**

| | Problem | Challenges |
|---|---|---|
| **Coastal** | • Lacks docking areas for shipments and cargos transported from the sea<br>• There is a presence of illegal fishermen in the area<br>• There is a minimal catch during low season and there are no enough alternative livelihood activities in the area<br>• There are no established fish sanctuary aside from the existing marine Protected Area | • Further assessment of established and potential dive sites in the area<br>• Assessment and defining buffer zones of all MPA's<br>• Encourage inactive fisher folk's association or establish a new fisher folk organization<br>• Empower wife & children of fisher folk to engage in livelihood activities<br>• Provision of patrol or speed boat for surveillance and monitoring of the MPAs<br>• Establish Jicduff Reef Marine Park Tourism Zone<br>• Activation of fish warden activities especially in balbagon |
| **Tourism** | **Problem** | **Challenges** |
| | • Lacks coordination with the schedule of garbage pick up<br>• There are no enough streetlights present along the road making the place dark and close to accidents<br>• There is no enough public transportation in the municipality.<br>• Electricity is not stable in the island.<br>• Foods are expensive especially to the resort owners.<br>• Dead spots of telecommunication signals are evident in the municipality.<br>• There are a lot of stray dogs along the road that makes it prone to accidents especially to the tourists.<br>• There is an insufficiency of tourism staffs in the government both provincial and municipal.<br>• There is a presence of open pipe mufflers. | • Distribute more trash bins with proper segregation labels<br>• Establish solar street lights<br>• Promote the employment of lifeguards specially to resort owners and public pools and resorts<br>• Establish more dive sites since the municipality has a lot of potential<br>• Since, trafficking of vehicles is very rare in the area, drivers tend to be reckless<br>• Provision of more trainings and programs in relation to tourism development |
| **Agriculture** | **Problem** | **Challenges** |
| | • Price of Lanzones is controlled by middlemen<br>• There is lack of interest for the young generation to engage in protecting the environment<br>• There is a low production of crop goods in the area | • Major problems in the croplands are affected due to climate change<br>• There is a presence of pest and diseases that are very hard to control (Scale insects, Japanese Snail) |

**FOCUS GROUP DISCUSSION MAHINOG**

**PROBLEM ANALYSIS**

| | | |
|---|---|---|
| **Coastal** | **Problem** | **Challenges** |
| | • Traders dictate the price of the primary fish products.<br>• There is a "Pakyaw System" in the municipality which prohibits the economic growth of the fisheries.<br>• Fishers overpass fish sanctuaries and uses underwater flashlights to attract fishes.<br>• Fisher folks are usually non - cooperative with the LGUs.<br>• There are existing problems with regards to solid waste management, especially to those living near the coastline. | • There is a challenge on the enhancing the shelf life of the fish products in the area.<br>• There is a time with less harvest due to strong waves and current.<br>• Marketing of seaweeds is a challenge for the municipality due to low supply. |
| **Tourism** | **Problem** | **Challenges** |
| | • The municipality lacks of adequate barriers as well as sign boards and CCTVs on the streets to control traffic.<br>• Porters in Benoni Port are unruly<br>• Majority of motorcycle drivers are careless<br>• There is no available public transportation beyond 7PM except to "habal-habal". | • Dive sites maintained by LGU should contain dive guards especially in Mantigue area.<br>• Retrain LTO personnel.<br>• There is no accredited DOT facilities/infrastructure in the area. |
| **Agriculture** | **Problem** | **Challenges** |
| | • The presence of scale insects and bark borers affect the production of Lanzones and coconut. | |

**FOCUS GROUP DISCUSSION MAMBAJAO**

**PROBLEM ANALYSIS**

| | **Problem** | **Challenges** |
|---|---|---|
| **Coastal** | • Lacks docking areas for shipments and cargos transported from the sea<br>• There is a presence of illegal fishermen in the area<br>• There is a minimal catch during low season and there are no enough alternative livelihood activities in the area<br>• There are no established fish sanctuary aside from Port Protected Area | • Further assessment of established and potential dive sites in the area<br>• Assessment and defining buffer zones of all MPA's<br>• Encourage inactive fisher folk's association or establish a new fisher folk organization<br>• Empower wife & children of fisher folk to engage in livelihood activities<br>• Provision of patrol or speed boat for surveillance and monitoring of the MPAs<br>• Establish Jicduff Reef Marine Park Tourism Zone<br>• Activation of fish warden activities especially in balbagon |
| | **Problem** | **Challenges** |
| **Tourism** | • Lacks coordination with the schedule of garbage pick up<br>• There are no enough streetlights present along the road making the place dark and close to accidents<br>• There is no enough public transportation in the municipality.<br>• Electricity is not stable in the island.<br>• Foods are expensive specially to the resort owners.<br>• Dead spots of telecommunication signals are evident in the municipality.<br>• There are a lot of stray dogs along the road that makes it prone to accidents especially to the tourists.<br>• There is an insufficiency of tourism staffs in the government both provincial and municipal.<br>• There is a presence of open pipe mufflers. | • Distribute more trash bins with proper segregation labels<br>• Establish solar street lights<br>• Promote the employment of lifeguards specially to resort owners and public pools and resorts<br>• Establish more dive sites since the municipality has a lot of potential<br>• Since, trafficking of vehicles is very rare in the area, drivers tend to be reckless<br>• Provision of more trainings and programs in relation to tourism development |
| | **Problem** | **Challenges** |
| **Agriculture** | • Price of Lanzones is controlled by middlemen<br>• There is lack of interest for the young generation to engage in protecting the environment<br>• There is a low production of crop goods in the area | • Major problems in the croplands are affected due to climate change<br>• There is a presence of pest and diseases that are very hard to control (Scale insects, Japanese Snail) |

**FOCUS GROUP DISCUSSION SAGAY**

**PROBLEM ANALYSIS**

| | | |
|---|---|---|
| **Costal** | **Problem** | **Challenges** |
| | • Lacks fishing gears for the fisher folks to use.<br>• There is presence of outsiders that catch goods in the municipal waters; they usually came from the other municipalities or region.<br>• There are issues regarding sanitation in the area since majority of the piggeries in the area dump directly the wastes in the river which go through the ocean directly.<br>• There is a limited communication between the local government of Sagay and the fisher folk in the area. | • Establish a more secure and regulated permitting method for the fisher folks in the municipality. |
| **Tourism** | **Problem** | **Challenges** |
| | • Lack in accommodation facilities in the area such as lodging, pension houses, hotels, etc.<br>• There is a minimal number of restaurants and restobars for the tourist in the area.<br>• There is an insufficient funding for the development of tourism sector of the municipality.<br>• There are no/lack of trained tourism personnel in the area.<br>• There is a low internet connectivity in the area. | • Even though there is a presence cellular site in the area, it is still limited to some places only. Therefore, establishment or more collaboration with the telecommunications company is needed to further expand the range of signal in the area.<br>• Further collaboration with the landline and telecommunications company for local phone calls. |
| **Agriculture** | **Problem** | **Challenges** |
| | • There is a presence of pest and diseases that affects the crop production.<br>• There are cases of stealing of agricultural products and equipment in the municipality.<br>• Farmers tend to have an attitude where they are all active only when harvesting the crops. | • Adaptation of modern and efficient agricultural technology would suffice the need for an enhanced production the area.<br>• More financial assistance from the local government down to the non – government bodies should be done for the agricultural development.<br>• There is the need for the implementation and promotion of organic farming.<br>• There is a challenge on the planning and development of rice – from planting to harvesting. |

**FOCUS GROUP DISCUSSION SAN JUAN**

**PROBLEM ANALYSIS**

| | | |
|---|---|---|
| **Coastal** | **Problem** | **Challenges** |
| | • Illegal fishing (using active gear)<br>• Illegal entry to the marine protected areas<br>• Alleged usage of chlorine as aid in fishing<br>• Encroachment of commercial fishing | |
| **Tourism** | **Problem** | **Challenges** |
| | • Sustainable eco-tourism<br>• Security<br>• Waste disposal<br>• Noise pollution<br>• Cultural values | |
| **Agriculture** | **Problem** | **Challenges** |
| | • Kaingin system<br>• Illegal cutting of trees<br>• Charcoal making<br>• Water becomes muddy during rainy days | |

**FOCUS GROUP DISCUSSION LARENA**

**PROBLEM ANALYSIS**

| | | |
|---|---|---|
| **Coastal** | **Problem** | **Challenges** |
| | • Lack of fishing nets<br>• Fishing gear<br>• Marine protected areas management<br>• Illegal fishing<br>• No other source of income in times of typhoons or bad weather | |
| **Tourism** | **Problem** | **Challenges** |
| | • Lack of agricultural products<br>• Possible occurrence of local prostitution<br>• Lack of tourist entertainment activities<br>• Tourism site signages<br>• Low internet connection<br>• Solid waste management<br>• Lack of tourism site promotion<br>• Infrastructure airport, road<br>• Lack of financial support for tourist site development<br>• Power supply | |
| **Agriculture** | **Problem** | **Challenges** |
| | • Limited post harvest facilities<br>• Aging farmers<br>• Kaingin<br>• Weak marketing linkages<br>• Limited water supply<br>• Soil erosion<br>• Unpredictable weather condition, climate change<br>• Expensive fertilizer<br>• Pest and diseases | |

**FOCUS GROUP DISCUSSION ENRIQUE VILLANUEVA**
**PROBLEM ANALYSIS**

| | Problem | Challenges |
|---|---|---|
| **Coastal** | • Fishing with the use of compressors by Badjaos from Bohol within MPA<br>• Damaged coral reefs<br>• Inactive fisherfolk association/organization<br>• Low of percentage of fishermen who pays permit to fish<br>• Low percentage of banca registration<br>• Collecting/selling of prohibited shells (budyong)<br>• Users' conflict between pot fishers and net users<br>• Chlorine fishing<br>• Rampant use of triple or double nets | |
| | **Problem** | **Challenges** |
| **Tourism** | • Lack of infrastructure facilities for tourism<br>• Inadequate water supply<br>• No Municipal Tourism Development Plan<br>• High Cost of electric power rates<br>• Underdeveloped tourist spots | |
| | **Problem** | **Challenges** |
| **Agriculture** | • High cost of farm inputs<br>• Climate change<br>• No river control to corn and vegetation area (Molave, lira)<br>• Absentee land owners for vacant agricultural lands<br>• Underdeveloped farm to market roads<br>• Few people engaged in farming<br>• Aging farmers; no young generation follows | |

**FOCUS GROUP DISCUSSION SIQUIJOR**
**PROBLEM ANALYSIS**

| | Problem | Challenges |
|---|---|---|
| **Coastal** | • Lack of livelihood for fishermen<br>• Destruction of fish corals<br>• Illegal fishing<br>• Overfishing<br>• Low fish catch | |
| | **Problem** | **Challenges** |
| **Tourism** | • Inadequate budget for infrastructure projects for tourism<br>• Limited potable water supply<br>• Tourism management<br>• Solid waste management in the coastal areas<br>• Environmental management<br>• Low internet and cellphone signals | |
| | **Problem** | **Challenges** |
| **Agriculture** | • High cost of farm labor<br>• Idle land<br>• Negative attitude of farmers<br>• Aging farmers<br>• Absentee land owners | |

| | | |
|---|---|---|
| | • High cost of farm inputs | |

**FOCUS GROUP DISCUSSION MARIA**

**PROBLEM ANALYSIS**

| | | |
|---|---|---|
| **Coastal** | **Problem** | **Challenges** |
| | • Bantay Dagat Enforcement | |
| **Tourism** | **Problem** | **Challenges** |
| | • Inadequate budget for infrastructure projects for tourism<br>• Limited potable water supply<br>• Tourism management<br>• Lack of permanent tourism officer | |
| **Agriculture** | **Problem** | **Challenges** |
| | • Idle lands | |