

Provincial Commodity Investment Plan (With Climate Change Adaptation PAPs)





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List of Abbreviations and Acronyms

ACFT ACPT AES AIP ARMM BEMO BFAR BOI BPSFPC CCA CDA CLUP CPT CSO DA CLUP CPT CSO DA DENR DOLE DOST DRRM DTI ELA EO E-VSA FA FMR GAP GEF	Annual per Capita Food Threshold Annual per Capita Poverty Threshold Agro-Edaphic Suitability Annual Investment Plan Autonomous Region in Muslim Mindanao Bohol Environment Management Office Bureau of Fisheries and Aquatic Resources Board of Investments Bohol Provincial Seaweed Farmers Producers Cooperative Climate Change Adaptation Cooperative Development Authority Comprehensive Land Use Plan Commodity Prioritization Tool Civil Society Organization Department of Agriculture Department of Environment and Natural Resources Department of Environment and Natural Resources Department of Science and Technology Disaster Risk Reduction and Management Department of Trade and Industry Executive Legislative Agenda Executive Order Expanded Vulnerability and Suitability Assessment Farmers' Association Farm-to-Market Road Good Agriculture Practices Global Environmental Facility
GAP GEF I-BUILD IEC IP	Good Agriculture Practices Global Environmental Facility Intensified Building-Up of Infrastructure and Logistics for Development Information Education Campaign Indigenous People

I-PLAN	Investment for AFMP Planning at the Local and National Levels
I-REAP	Investments for Rural Enterprises and Agricultural and Fisheries Productivity
LGU	Local Government Unit
M&E	Monitoring and Evaluation
MCPI	Marine Colloids for Pilipino Integrity
MLGU	Municipal Local Government Unit
MOA	Memorandum of Agreement
MPA	Marine Protected Area
NCIP	National Commission on Indigenous Peoples
NGA	National Government Agency
NOL	No Objection Letter
NPCO	National Project Coordination Office
NSCB	National Statistical Coordination Board
OPA	Office of Provincial Agriculturist
OPV	Office of Provincial Veterinarian
PCA	Philippine Coconut Authority
PCC	Philippine Carabao Center
PCIC	Philippine Crop Insurance Corporation
PCIP	Provincial Commodity Investment Plan
PCPT	Provincial Core Planning Team
PDC	Provincial Development Council
PDPFP	Provincial Development Physical Framework Plan
PGBh	Provincial Government of Bohol
PLGU	Provincial Local Government Unit
PMIU	Provincial Program Management and Implementing Unit
PO	People's Organization
PPDO	Provincial Planning and Development Office
PRDP	Philippine Rural Development Project
PSA	Philippine Statistics Authority
RBMES	Results-Based Monitoring and Evaluation System
RDS	Raw Dried Seaweed
RPC	Rice Processing Center
RPCO	Regional Project Coordination Office
RROW	Road Right-of-Way
SEAFDEC	South East Asian Fisheries Development Center
SES	Social Environmental Safeguard
SIAP	Seaweed Industry of the Philippines
SP	Sangguniang Panlalawigan
SRC	Semi Refined Carrageenan
SSS	Social Security System
SWCF	Soil and Water Conservation Foundation
TWG	Technical Working Group
VCA	Value Chain analysis

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Executive Summary

The Provincial Commodity Investment Plan (PCIP) reflects agreement between the Department of Agriculture - Regional Field Office (DA-RFO's), Provincial Government of Bohol (PGBh) with strong participation of the various stakeholders and other government agencies in the context of convergence to leverage resources in helping develop the province's agri-fishery sector. It also aims to maximize the synergy among various players of the value chain (industry players and enablers). The CIP also represents an overarching platform in expanding opportunities in the value chain. The CIP not only rallies around the value chains that are being prioritized, but generate commitments to address the identified bottlenecks of the value chain based on the result of the Value Chain analysis.

Bohol is the fourth seaweed producing province in the country. Seaweed is the leading source of income of the inhabitants in the island barangays particularly in Danajon Bank area. Incorporating the natural biodiversity conservation mechanism and coastal and fisheries management to the GEF covered PLGU–PCIP to ensure better foundation of the natural resources management and institutionalize within the PLGU governance towards a sustainable rural enterprise and agri-fishery productivity in GEF covered site. The PCIP- Seaweeds will serve as the guiding framework for the PRDP I-PLAN component in facilitating the Watershed Ecosystem Approach Analysis. The concerned five (5) GEF pilot municipalities are on the stages of implementation of their Marine Protected Area and Seaweed Enterprise sub-projects with consideration of the Vulnerability and Suitability Asessment (VSA) and Climate Change Resiliency. The sub-project implementation is imperative and essential towards sustainable development and management for the Natural Biodiversity Conservation, and Coastal and Fisheries Resource Management in its administrative jurisdiction. It is a coordinated activity between the concerned GEF-NRM, I-PLAN, I-REAP and I-BUILD Components to come up with the right decision making in order to harmonize management strategies and approaches for the in-depth analysis and appreciation on the importance of natural resources biodiversity conservation and coastal and fisheries resource management.

The conceptualization of Seaweeds PCIP with the integration of Biodiversity Conservation and Fisheries and Coastal Resource Management came to fruition after a series of workshops which started in Camelot Hotel, Quezon City last August 25-29, 2018 with the guidance of the Natural Resource Management of the Project Support Office of PRDP and the I-PLAN group. The workshop was participated by the representatives from the PPMIU of five (5) GEF pilot provinces including Bohol. This was the first step towards the conduct of series of workshops commencing in a final stakeholders' consultation held on October 22, 2018. The final consultation engaged several commodity growers including seaweeds farmers, traders and enablers in order to validate information and to present the industry's challenges and proposed interventions.

Moreover, the inability to apply such defined strategies and approaches embodied in the PCIP could have an adverse effect both on the chances for long term success in the seaweed enterprise and the sustainability of the resource base where these enterprises are based upon.

Introduction and Rationalg

Bohol is one of the selected recipient provinces of the Philippine Rural Development Project (PRDP). It is a six-year project designed to establish an inclusive and market-oriented agri-fishery sector through strategic investments in priority commodity value chains. It is a poverty reduction program that aims to improve the incomes and food security of the rural poor. Externally, it will focus on expanding market access and improving competitiveness. Through a Memorandum of Agreement, the Department of Agriculture (DA) and the Province of Bohol have come into a joint partnership in implementing the PRDP. Both the DA and the Province will partner with Local Government Units (LGUs) and the private sector in providing key infrastructure, facilities, technology, and information that will raise incomes, productivity, and competitiveness in the countryside.

One of the requirements of PRDP is the formulation of the Provincial Commodity Investment Plan (PCIP). The PCIP is a 3-year rolling plan based on the value chain analyses of the commodities conducted with strong participation of the various stakeholders in the chain. Moreover, it is a strategic plan that rationalizes the interventions within the various segments of the value chain of commodities. These interventions are significant to the province and will contribute to the national goals of the agriculture and fishery sector. The PCIP be the basis for selecting eligible interventions and sub-projects for funding PRDP's I-BUILD and I-REAP project components. However, the CIP is not only focused on the investments of PRDP but also leveraging resources from other NGAs and the private sector.

Furthermore, the PCIP reflects agreements between DA-RFOs, PLGUs with strong participation of the various stakeholders and other government agencies in the context of convergence to leverage resources in helping develop the province's agri-fishery sector. It aims to maximize the synergy among various players of the value chain (industry players and the enablers), and the CIP represents an overarching platform in expanding opportunities in the value chains. The CIP not only rallies around the value chains that are being prioritized, but generates commitment to address the identified bottlenecks of the value chain based on the results of VC analysis.

The adopted planning approach for PCIP formulation is anchored on the use of the value chain approach (VCA) to objectively identify interventions to develop or enhance priority commodities. A value chain is defined as *the full range of activities that are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use.*¹ It involves an analysis of the vertical and horizontal process and players that add value to the product.

To enhance the value chain approach of planning, scientific tools are used, such as the Expanded Vulnerability and Suitability Assessment (E-VSA). It is a user-based online tool available at the PRDP website that uses the VSA result as a database and is collaborated with socio-economic parameters. A map will be generated as visual presentation of municipal ranking based on the parameters used per commodity.

¹J. Hellin and M Meijer. *Guidelines for Value Chain Analysis*, (FAO) November 2006, p. 4.

Another important tool used to identify priority commodities is the Commodity Prioritization Tool (CPT). The major criteria for this tool are: suitability, market potential, impact on the poor, and the number of beneficiaries. The identified priority commodities of the province ranked as to the results of the CPT are the following: coconut, dairy, native chicken, high-value vegetables, cassava, inland fishery, mariculture (seaweed), swine, cacao and coffee. These identified commodities that are important to agricultural development will undergo the value chain analysis and will be integrated into the PCIP.

To ensure the successful implementation of the Project, the Governor issued Executive Order No. 05, Series of 2015, creating the Provincial Core Planning Team (PCPT) that is chaired by the Provincial Agriculturist. The PCPT is tasked as the principal mechanism through which the Provincial Commodity Investment Plan (PCIP) will be prepared. The enhanced PCIP of Bohol is a 3-year strategic plan (2019-2021) that rationalizes the interventions within the various segments of the value chain of identified significant priority commodities and will contribute towards the vision of a strong and balanced agri-industrial province.

The Bohol PCIP had undergone series of consultation with various stakeholders. After the National Project Coordination Office (NPCO) issued a No Objection Letter (NOL) for the Value Chain Analysis of the priority commodities, it was presented to the Provincial Governor, the Provincial Project Management Implementing Unit (PPMIU) and to the PCPT. The PCPT started the integration of the approved commodity to the PCIP after it was presented. The planning process being participatory includes technical reviews and stakeholders' consultation with various actors along the chain from the input supplier, producer, processor and traders. All six (6) priority commodities of the province had been subjected to a Stakeholders' Consultation. The final PCIP was presented to the Provincial Development Council for approval and endorsed to the Regional Project Coordination Office (RPCO) for inclusion to the Regional Development Investment Program (RDIP) for possible funding by other agencies. The approved PCIP served as the basis for identifying eligible I-REAP and I-BUILD sub-projects. Likewise, the PLGU also used the PCIP to mobilize resources from other sources such as other National Government Agencies (NGAs), NGOs and the private sector.

The Enhanced Bohol PCIP for 2019-2021 is an updated version and integration of the six (6) approved priority commodities of the province, namely: seaweeds, native chicken, highland vegetables, buffalo dairy, cassava and virgin coconut oil (VCO). Enhancement of the Bohol PCIP is done by mainstreaming biodiversity conservation, climate change resiliency and natural resource management practices.

Aside from the champion commodities prioritized by the Province of Bohol, e.g. seaweed, etc. other lesser important or underutilized commodities will be supported by the LGU, such as biodiversitybased Value Chains (VCs). Biodiversity-based VCs are lesser important commodities which may have business or value-added opportunities only in local markets but these commodities are sources of income and provide opportunities for employment of poor communities attached to the resource base or key biodiversity areas (KBAs) in marine and terrestrial ecosystems. These are; mudcrab, grouper, nature-based ecotourism, sea cucumber, bangus, siganid, etc. These commodities or livelihood activities are so important for these communities in GEF sites, KBAs and critical ecosystems for these will generate income from biodiversity and can help alleviate poverty and conserve biodiversity. In current trends of biodiversity conservation and natural resource management, biodiversity-based VCs are used as strategy in biodiversity conservation and environmental protection. To fully utilize its prospects, value chain development approach has been applied to these commodities and has increasingly gained attention in recent years as a tool for linking supply capacities to market opportunities. This approach has been experimented by the World Agroforestry Center (ICRAFT) and GEF in some key biodiversity areas in Africa, Palau, and other areas in the Caribbean.

The Value Chain approach is gaining significant results in combining agri-fishery production in harmony with nature for sustainable production. This approach, which integrates poor communities, their land and biodiversity resources in local markets, forms the basis of policies and projects that promote the development of biodiversity-based value chains. For example, in some of the pilot sites in Africa and Palau, ICRAFT and GEF projects are supporting the development of biodiversity-based VCs and nature-based tourism as an income generating activities of KBA communities to alleviate poverty and conserve biodiversity (Conservation International, as cited by Leeuw, et. al., 2016). Based from this experience, there is now an increasing interest to develop initiatives that promote the growth of biodiversity-based value chain approaches that utilize biodiversity in and outside critical watersheds, KBAs and natural resource conservation areas (ICRAFT, Biodiversity-Based Value Chains, Leeuw, et. al., 2016).

Promoting lesser important commodities or underutilized species is one of the priorities of the province for pro-poor growth and biodiversity conservation. Among these commodities that the Local Government of Bohol would like to support are: mudcrab, grouper, sea cucumber, bangus, siganid, etc., to include nature-based tourism. These are also the source of livelihood of communities attached to the resource base/ecosystem in the GEF sites. The province believes that agro-biodiversity plays a fundamental role in the livelihoods of the rural poor. Also, the province recognizes that "commercializing" these biodiversity-based VCs which are embedded in the traditional household systems of the poor resource-based communities will provide significant potential for:

- Improving food security and achieving more balanced nutrition for the coastal areas (social benefits);
- Conserving biodiversity and stabilizing agro-ecosystems (environmental benefits); as well as
- Generating income for the rural poor and creating employment along the value chain (VC) (economic benefits)

Among the communities that this approach will be pilot-tested in the province are the GEF municipalities, i.e. Bien Unido, Talibon, Ubay, Buenavista and Pres. Carlos P. Garcia. This will be expanded to other non-GEF municipalities with potential for biodiversity conservation. Initially, among the projects being implemented which are funded by PRDP-GEF are: Seaweeds Livelihood Enterprise and Enhancement/On- the- Ground Improvement of eight (8) Marine Protected Areas. These will provide the MPA Proponent Groups / communities in GEF sites income and employment generation activities while at the same time protecting the coastal and marine ecosystems. These livelihood/enterprise activities will also veer the stakeholders away from further exploitation of the marine protected areas. Moreover, these projects will provide additional income to the fisher folks while providing the resource base room to recuperate.

Since seaweed is considered as one of the vulnerable commodities, measures have to be taken into consideration to mitigate the impact of climate change and reduce losses. The integration of Biodiversity Conservation and Coastal and Fishery Resources Management approaches is a step to address a climate change resilient agri-fisheries production towards sustainable enterprise

operations, Climate Change Adaptation and Disaster Risk Reducation measures. Strengthening Natural Resource Management Program and Biodiversity Conservation measures at the LGU level would mean preparedness for any changes in climate and vulnerabilities of the commodity. The growing eco-tourism with the influx of tourists due to the opening of Bohol-Panglao International Airport which started operation last November 2018 and other nature-based attraction in the province would mean increase in tourist arrivals from all over the world and may pose a threat to the resource base where these seaweeds are based upon.

The interim approach in updating the PCIP for PRDP Scale-Up implementation focuses on the integration of Climate Risk Vulnerability, particularly the incorporation of Major Climate Risks and Risk Adaptation Measures in the existing PCIP Matrices. This approach will likewise serve as a bridge for planners at all levels to progressively familiarize themselves on climate-resilient investment planning.

Chapter I. Development Background

Agriculture is one of the economic drivers of Bohol and is the main source of livelihood of majority of the Boholanos. It provides income and livelihood to farmers and fisherfolks and their dependents. Agriculture also enables traders, processors, retailers, and other groups to, directly or indirectly, make a living. Given these facts, it is only logical that the agriculture sector needs to be fully harnessed to enhance agricultural productivity and improve the incomes and welfare of farmers and fisherfolks.

Consistent with this drive and with consciousness that agriculture is one of the main economic drivers of Bohol, the Provincial Government has been steadfast in implementing agri-based support programs and projects to achieve food sufficiency and attain economic growth through agriindustrialization. The Province of Bohol is fortunate to be selected as a one of the sites of the Philippine Rural Development Project (PRDP) that aims to develop an inclusive, market-oriented, climate-resilient agri-fishery sector by strategically investing in priority value chains. Based on suitability, market potential, impact on the poor and number of growers/ producers, identified provincial priority commodities that go through prioritization are the following: coconut, dairy, native chicken, swine, high-value vegetables, cassava, inland fishery, mariculture, cacao and coffee.

The Provincial Government also desires to develop other commodities like banana, mango, balut and other economically beneficial crops like palm oil. Fishery development in the province is also being prioritized, considering that Bohol has rich marine resources. As to livestock and poultry development, the Provincial Government has been continually responsible in improving and safeguarding the said industries with the promotion of native chicken and the research on the development of a Boholano strain of native chicken.

Geographic Profile

Location

Bohol is an island province of the Philippines located in the Central Visayas Region (Region 7) consisting of Bohol Mainland and 75 minor surrounding islands. It is one of four provinces in Region VII with 47 municipalities and one city, Tagbilaran City, serving as its capital. About 1,109 barangays comprise its administrative area of jurisdiction grouped into three congressional districts.

Bohol is the tenth largest island of the Philippines, with a land area of 4,117.26 square kilometers (1,589.68 sq. mi) and a coastline of about 261 kilometers (162 miles) long. To the west of Bohol is Cebu Province, to the northeast is the island province of Leyte and to the south, across the Bohol Sea is Mindanao.

Map 1. Bohol Location Map



Topography and Slope²

• Topography Range

Bohol's terrain is variable from nearly flat at the plains to low rolling, moderate to very steep sloping with 5 to 50 meters high cliffs in the Sierra-Bullones limestone formation. The more rugged terrain is found in the southern part of the province although the Ubay volcanic rocks and Boctol serpentinite in the north and northeast are of moderate and rugged slopes in most of their outcrop areas. The central valley is almost rolling to moderately steep.

There are several mountain ranges found in Bohol. Two sets of them are found in the northeastern side of the mainland and located between the municipalities of Alicia and Ubay that generally trend to the north and south directions with a maximum elevation of about 404 meters above sea level. Farther east are two other mountain ranges, the Mt. Tanawan and Mt. Candungao with 460 meters and 500 meters elevation, respectively. Both are prominent landmarks rising as they do several meters above the surrounding landscape. From Mt. Tanawan going southwestward, it declines gradually in height until it finally joins southwestwardly the

foothills of Calape. The main range of hills extending from Calape joins to the southwestwardly trending mountain range from the interior, runs south and out to Loon Peninsula terminating in Punta Cruz, Maribojoc. The Sierra Bullones Range follows roughly the trend of the south coast. The highest point of this range and in the entire province is Mt. Mayana in Jagna town with a height of 827 meters above sea level.

• Slope Range³

The province has six slope ranges from level to very steep. Level to nearly level sloping areas are mainly located along the coast and in the outer islands. The steep slopes are prevalent in the mountainous area, covered mainly by carbonate rocks (Wahig Limestone), volcanic extrusive and magmatic rocks (Ubay Volcanics and Jagna Andesite). Map 2 and Table 1 show the slope categories and corresponding the area covered in hectares.





Table 1. Slope Classification, Bohol Province								
Slope Category	Classification	Area Covered (has.)	% Distribution					
0 - 3 %	Level to nearly level	71,289.00	17.31%					
3 - 8 %	Gently sloping to undulating	37,519.00	9.11%					
8 - 18 %	Undulating to rolling	84,902.00	20.63%					
18 - 30 %	Rolling to moderately steep	62,473.00	15.17%					
30 - 50 %	Steep hills& mountains	89,507.00	21.75%					
50 % >	Very Steep hills	6,040.00	16.04%					
Total		411,726	100%					



Source: BSWM, DA, Region7, 1992

According to the Bureau of Soils and Water Management (BSWM Region 7, Cebu) there are 22 different types of soil that can be found in Bohol, which differ mainly in physical, chemical and morphological characteristics. The soil depth is relatively thin ranging from a minimum depth of 24 centimeters to a maximum of 30 centimeters. Most of the hills and ridges have meager to no soil cover due to fairly rapid surface drainage over most of the province's land. Clay soils with fine textures are predominant throughout the island province. The dominant soil type is Ubay Clay found in the northeastern part of Bohol constituting 19.34 percent or 79,644 hectares of the total land area of Bohol.

The soil derived from all rock types are generally clay and silty with sandy soil limited in some parts to the coastal area. Soils on steep to very steep side slopes (18-50%) are clay loam to clay. Gently sloping to undulating (3-8%) is clay while the narrow alluvial valleys are silty clay to clay. The soils in the province are predominantly brown having moderate to high inherent fertility (*Map 3*).



Map 3. Soil Map, Bohol Province

Existing Land Use and Vegetative Cover⁵

The province of Bohol has five major land uses, i.e., agricultural land, grassland/shrubland, woodland, wetland and miscellaneous land that includes built-up areas, reservoirs and mine sites (*Map 4*). Almost one-half of the province's total land area is covered by grassland/shrubland, while one-third of its total area is utilized for agricultural activities. About 67% of Bohol's land is used for agriculture while forestland occupies 25% of the province's total land area.

The province has a larger coverage of woodland (10.69%) compared to Cebu and some other provinces in the region. Wetland constitutes 4.92%, which includes mangrove, nipa, beach sands and fishponds while built-up areas comprise 10.22%.⁶

⁴ Bureau of Soils and Water Management, Department of Agriculture 1992, Region 7, Cebu City

⁵ Bohol Ecological Profile of DENR, 1992

⁶ Bohol Ecological Profile, DENR 1992

Table 2. Existing Land Use Distribution in Bohol							
Land Use Category	Area	Percent					
Built-up	21,882	5.32%					
Forestland	101,271	24.61%					
Parks/plaza	196	0.05%					
Agricultural	273,950	66.56%					
Industrial	2,672	0.65%					
Tourism	3,663	0.89%					
Roads/bridges	4,612	1.12%					
Mining	1,138	0.28%					
Cemetery	115	0.03%					
Easement	1,916	0.47%					
Housing	69	0.02%					
Landfill	102	0.02%					
Total	411,586	100.00%					



Source: Approved Municipal/ City Land Use Plan



Mangrove forests play a very vital role in shaping the ecology and economy of the Boholanos. Ecologically, mangroves are among the most productive coastal resources of Bohol as they serve not only as feeding, breeding and nursery grounds for many aquatic and terrestrial animals, but also as a protective structure against destructive waves and currents along the shoreline. Bohol has the biggest mangrove area in Central Visayas at 16,287.42 hectares. The biggest mangrove stands are located in Getafe, Talibon, Ubay, Pres. Garcia, Mabini and Candijay municipalities. The province also has the most diverse mangrove ecosystem in the Philippines with some 32 identified species. The largest and most diverse mangrove area is found in Cogtong Bay, which

Map 4. Land Use and Vegetation Map, Bohol

is bounded by Mabini and Candijay towns and covers an area of 2,200 hectares⁷. The most popular man-made mangrove forest in Bohol is around Banacon Island in Getafe town comprising an area of 1,750 hectares.

Land Classification⁸

The total land area of Bohol Province is approximately 411,726 hectares representing 43% of the region's land area and 1.4% of the total land area of the Philippines. About 75% are classified as alienable and disposable (A & D) land. The total area devoted to agricultural use is 273,950 hectares or 66 percent of the total land area of the province. Of the total agricultural area, 54 percent or 148,673 hectares is utilized for the planting of major crops such as rice, corn, coconut and rootcrops. The estimated land area as potential irrigable areas in the province is 40,800 hectares. The existing irrigable and non-irrigable rice lands are classified as priority focus for agricultural production.

Bohol's public forestland or timberland occupies an area of about 101,271 hectares or roughly 25 % of its total land area. Almost 15% or 75,766 hectares of the province's land area is under protection through NIPAS System and are classified as environmentally constrained and critical areas.





Physical Resources

Bohol is endowed with a rich biodiversity and natural resources that play an essential role in guiding its future development for agriculture, industry, tourism, settlements, culture and

⁷ Bohol Coastal Environment Profile of 2002

⁸ Department of Environment and Natural Resources (DENR), 2000

infrastructure in both the medium and long-term time frame. It has a high diversity of flora and fauna found in the different ecosystems of the island such as its forests, reefs, farmlands, in zones along creeks and rivers, caves and marine areas. The quality of life in any given area is extremely dependent on the vibrant condition of these ecosystems and biological resources.

Bohol has a total land area of 411,726 hectares with 654 kilometers of coastline and 6,245 square kilometers of municipal waters covering its major islands and islets. The province is within four major resource boundaries, i.e., upland/forestry, lowland/agriculture, coastal/marine and water boundaries.

Bohol's water supply system for domestic, agricultural and industrial uses is mainly based on 2,224 springs, 59 rivers and 200 creeks. There are 22 rivers basins/watersheds that are valuable sources of water for drinking and irrigation. Surface water from rivers and streams in these basins are impounded and distributed for irrigation, electric generation, industrial use as well as for domestic use.

Surface water in Bohol feeds its watersheds. There are 3 major watersheds in the province that have been declared as protected areas under the NIPAS. The largest reserve is the Wahig-Inabanga Watershed covering 16 municipalities with an aggregated area of 14,000 hectares. The second largest, and first to be proclaimed as a watershed forest reserve in Bohol, is the Loboc Watershed with an area of 10,450 hectares, part of which is inside the Rajah Sikatuna Protected Landscape. The third is the Duero Watershed (that covers an area of 3,620 hectares. The map below shows the location of these watersheds.



Bohol's public forestland or timberland occupies an area of about 101,271 hectares or roughly 25 % of its total land area. Almost 15% or 75,766 hectares of the province's land area is under protection through NIPAS System and are classified as environmentally constrained and critical areas.

The Province has the biggest mangrove forest in Southeast Asia which is located in Banacon, Getafe. There are about 1,200 species of crabs and shrimps with over 6,000 mollusks species found in 15,000 hectares of Baclayon, Dauis and Panglao (Bohol Marine Triangle). Bohol has one of the the six (6) world-renowned Double Barrier Reefs-the Danajon Double Barrier Reef, covering 13 municipalities. The province has a total of 1,920 hectares of coral reefs and its coastal ecosystem provides the major source of animal protein for the populace.

Biodiversity

Bohol has a high biodiversity level of plant species categorized as: upland, mangrove, coastal areas, cave entrances, cultivated cropland and intensively used lands. Several plant species noted to be abundant before are already extinct, others are becoming rare. Data about Bohol's terrestrial and freshwater flora and fauna is scarce except for studies conducted in Rajah Sikatuna Protected Landscape (RSPL) conducted by Soil and Water Conservation Foundation, Inc. (SWCF) and University of Bohol Community Development Foundation, Inc. (UBCDFI).

The greater part of the tourism industry is based on Bohol's biodiversity. Unless we get very serious about conserving and protecting it, we will lose the tourism to other sites in the Philippines and other Southeast Asian Countries.

There is a diverse wildlife species in the province including: 33 mammals, 29 reptiles, 8 amphibians, several bat species, the Philippine tarsier and flying lemurs, 192 butterflies, 29 ants, 20 dragon flies, 116 birds species belonging to 28 families, 411 fish species and 60% of country's marine mammal species found in Pamilacan, Baclayon and almost 16% of deptirocarp species including the rarest in the country (30% of the total national deptirocarp) are found in Bohol (Source: SWCF Research Study & BMT 2006).

However, the biodiversity is under threat due to persistent and excessive utilization and sale of different species coupled with conversion of forests to agricultural and urban areas, monoculture farming with exotic species, farming on steep hillsides and mountains, coral reef destruction and over-fishing. In fact, several plant species noted to be abundant before are already extinct on the island while others are becoming rare and endangered.

• Caves in Bohol

Caves, we are losing them to exploitation for tourism, guano collection, swift-nest collection, vandalism. Maybe one in ten caves could be used for tourism purposes but only after careful study as to how to use it. In the meantime, with present activities, the bats move out, swiftlet young are killed and surface areas deforested causing siltation in the caves.



• Flora in Cultivated Croplands and Intensively Used Lands

Generally, the extremely diverse and dispersed vegetation in open fields could well evolve into forests without human intervention. However, most of these potential lands are within alienable and disposable areas and if these are within timberland areas, they are covered under the Integrated Social Forestry Program with a Certificate of Stewardship Contract (CSC). Constant cultivation and burning inhibit forest evolution and encourage the proliferation of grasses such as cogon (Imperata cylindrical) and other shrubs like kanding-kanding (Lantana camara). To develop systems closer to natural forests, agroforestry shall be established in these areas.

Data about terrestrial fauna in Bohol are scarce. In the few studies conducted in Rajah Sikatuna Protected Landscape eight mammal species have been identified. These do not include the recent identification of 14 bat species (including one endangered species) inside the protected area. Forest regeneration by bats as keystone species for the reason that they are pollinators and seed dispersers of greater ecological value.

Most fauna classes such as reptiles, amphibians and insects have not been studied. Recent bird studies have positively identified 56 bird species with 18 more species still unidentified. Actually, recorded bird observations in Bohol, mainly near Bilar, go back to the mid-1800. However, there are now birds previously seen on the island that are not positively identified. This includes the Philippine Cockatoo last seen in RSPL in 1995. The most well-known animal in Bohol is the Philippine tarsier, one of the smallest primates in the world. Although not on international endangered lists, it is fast losing its habitat areas on the island. This is true of Bohol's flying lemurs, civet cats, wild pigs, grey squirrels and Philippine monkies.

Water Resources⁹

Bohol's water supply system for domestic, agricultural and industrial uses is mainly based on 2,224 springs, 59 rivers and 200 creeks. There are 22 rivers basins/watersheds that are valuable sources of water for drinking and irrigation. Surface water from rivers and streams in these basins are impounded and distributed for irrigation, electric generation, industrial use and potable water. The province has an average rainfall varying from 1,331 mm/yr along the coastal areas to 2,006 mm/yr in the mountainous part of the island that supplies the island.

At present, the quality of water in the province's catchments and streams is poor and will continue to deteriorate as human development activities increase. The water resources should be managed in order to meet the growing demand for domestic, agricultural, tourism, industrial, recreational and commercial uses. Proper management should prevent public health hazards associated with increasing incidence of water contamination and pollution from negligent human activities.

Surface Freshwater and Groundwater Resources¹⁰

Bohol has eleven watersheds (see Table 8 Watershed Map). The biggest one is Inabanga Watershed followed by Loboc, Abatan, Ipil, Carood, Manaba, Soom, Mualong, Alijawan, Lumbay and Panampan watersheds. Three of the major watersheds are declared as protected areas under the NIPAS. The largest reserve is the Wahig-Inabanga Watershed (PP No 468, amended to PP No. 223), covering 17 municipalities with an aggregate area of 14,000 hectares. The second largest, and first to be proclaimed as a watershed forest reserve in Bohol, is the Loboc Watershed (PP No. 450) with an area of 10,450 hectares, part of which is inside the Rajah Sikatuna Protected Landscape (PP No. 127 as amended April 2000). The third is the Duero Watershed (PP No. 881) that covers an area of 3,620 hectares.



The rivers and river estuaries are used in many ways. They commonly serve as harbors and navigation routes, areas for aquaculture development (Inabanga River), fishing and sand quarrying areas (Abatan River), and recreation and tourism (Cambuhat River in Buenavista and the Loboc River in Loboc and Loay, Bohol). They also provide water for irrigation (Malinao Dam on the Wahig River that feeds the Bohol Irrigation Project Stage I) as well as domestic and industrial uses such as power supply (Loboc River hydro-power plant and mini hydro-power plant in Balilihan.

¹⁰ DENR Bohol and Region 7

• Protection of Bodies of Water

Water is a vital resource for Bohol's future prosperity. Its sustainability and management for economic, social and environmental gains underpin activities in government, industry, business and communities. The Bohol Environment Code contains a number of policies intended to preserve, protect and conserve the island province's water resources, including minimization of pollution in ground and surface waters. Data on surface and groundwater quality are scarce in the province. Based on the survey of wells conducted by SWECO revealed that the water for drinking do not satisfy the water quality standards for safe and potable. An estimated of 5000 wells have water quality problems caused by higher salinity content, excessive amounts of iron and manganese and bacteriological pollution (*see River Network Map below*). Water for home consumption is often prone to contamination due to inadequate sanitation practices and characteristics in limestone inherent substrate (karst). It is important to designate strict water production areas for drinking water purposes and establish buffer zones to protect the same from activities that will harm them.



Coastal/ Marine Resource Management

Bohol has a total area of 624,506 hectares of municipal waters (6,245.06 square kilometers) and a total shoreline length excluding offshore islands of 654 kilometers.¹¹ It has 30 coastal municipalities with 304 coastal barangays and 72 islets. Approximately 33 percent of Bohol's population is directly dependent on fishing and fisheries-related activities as major sources of income (see Maps 10 and 11). Based on the records of the Regional Office of BFAR, the total area granted for fishpond development is 2,909.97 hectares. This data is, however, still subject for verification as BFAR is conducting an on-going inventory of fishpond areas in Bohol.

Map 9. Coastal Resources Map of Bohol LEGEND: 1st District Coastal Law Enforcement Council 2nd District Coastal Law Enforcement Council 3rd District Coastal Law Enforcement Council **Unofficial Municipal Water Boundaries** Beach Seine, Fine Mesh Push and Pull Nets (Small Scale) Trawl, Seine Net and Other Fishing gears using Scaring Devices Use of Natural Fish Poisons (Vines/Roots) Commercial Fishing (Ring Net) t Semi-Commercial Lift Net and Bag Net Small Scale Commercial Fishing **Dynamite Fishing** Fish Aggregation Devices Illegal Cutting of Mangroves Illegal Sand Extraction Muro-ami Fishing Coral Extraction Cyanide Fishing × **PROVINCE OF BOHOL** \odot Smuggling; Piracy Superlight Ð Anda Source: Jurce: Coastal Law Enforcement Councils 1, 2 & 3 . Bohol Environment Management Office (BEMO), 2001. Natural Resources Database (NRDB), 2001. Coastal Besource Management × t 0 Dimia t Lila Ð 🗖 ×o 0 0 0 Coastal Resource Manage Project (CRM), 2001. φ

The joint DA/BFAR and DENR General Memorandum Order No. 3, Series of 1991, tried to respond to the problem of idle, unproductive, abandoned and/or illegal fishpond areas by reverting them into their original classification of timberland. Fishpond areas with FLAs that are found to be violating this policy will be reverted to the administration of DENR. All applications within timberlands, which have not been released for fishpond development by DENR, shall automatically be returned without being acted upon. However, not even one idle unproductive, abandoned or illegal fishpond has been reverted to the category of timberland.



Map 10. Bohol Municipal Waters

• Coastal Habitats

Bohol boasts of its white, sandy beaches that are commonly used as sites for tourism development (hotels, restaurants, beach resorts among others), fish and boat landings, and as a source of construction materials. These areas are evidence of healthy coral reef ecosystems. Many environmental issues focus on the beach ecosystem as it is prime land for commercial and household development due to its aesthetic value. It attracts the interest of many people to the shoreline, mangroves, coral reefs and fisheries that inhibit the near shore waters.

The area covering municipal waters is measured 15 kilometers seaward from the furthest inhabited shoreline to one kilometer inland if the shoreline contains estuaries, mangrove forests or marshlands.¹² This means the total municipal waters of the 29 towns and one city is two and one-half times larger that Bohol's land area. It also indicates that there is a remarkably huge area to consider in planning, yet only a few coastal LGUs have started to manage coastal areas. With the enactment of the Philippine Fisheries Code of 1998 and the Bohol Environment Code, the national government recognized that a paradigm shift is needed to adequately provide for the development, management and conservation of coastal resources.

¹² Republic Act 8550 (The Philippine Fisheries Code of 1998, Chapter 1, Section 4(58))

• Danajon Bank Double Barrier Reef

The Danajon Bank is a double barrier reef that runs parallel to the northern coast of Bohol and is proposed as a designated provincial rehabilitation, conservation and protection area (see Danajon Map). The Danajon Double Barrier Reef is one of the six double barrier reefs in the world and the only one in the Philippines which could likely be nominated as national heritage site. Because of its unique coral reef ecology, Danajon Bank is a major breeding ground and habitat of many different species of fishes, marine mammals, mollusks, seagrasses and seabeds.





It is composed of the outer Caubyan and inner Calituban barrier reefs. It runs along the coastline of four municipalities, Getafe, Bien Unido, Talibon and Ubay in the south and into the Camotes Sea in the north. To the west it runs all the way to Cebu and to the east and northeast to Leyte and Southern Leyte. The establishment of the protected reef area should serve as an excellent example of how northern coastal towns of Bohol, from Tubigon to President C. Garcia can work together to implement an inter-provincial Coast Resource Management program to protect and preserve this unique treasure. However, marine resources like coral reef ecosystems, seagrass beds, mangrove forests, estuaries and inter-tidal seascapes are fragile and have limited potential if they are utilized improperly. Because these ecosystems are stressed by increasing population, environmentally-degrading consumption patterns, pollution wastes and human encroachment in coastal zones, there is an urgent need to protect and conserve the integrity of the ecosystems in order to continue to provide benefits to the present and future generations.



Map 12. Map of Danajon Bank Double Barrier Reef

Status of Coral Reefs and Sea Grass Beds

Coral reefs, commonly known as rainforest of the sea, while serving as a buffer against underwater current also constitute one of the provinces most productive and diverse ecosystems. They cover an estimated area of 1,920 hectares that include the Danajon Bank Reef in Inabanga, Buenavista, Getafe, Talibon, Trinidad, Bien Unido, Ubay, President Garcia and Mabini. However, the state of the province's reefs is classified as 35% poor condition, 40% fair condition, only 25% in good condition and o% excellent (BFAR, UP-MSI, CRMP and DENR surveys, FISH Project-USAID Survey 2005). This means that Bohol has already lost more than three guarters of its known



corals. This has had a significant effect on the breeding grounds of many marine biodiversity. Significant human threats to coral reefs include collecting and exporting, blasting, use of cyanide, siltation, boat anchorage (especially diving boats), illegal fishing methods, storms, coral bleaching due to increase temperature, pier wharf and breakwater and other construction activities.

• Initiatives to Danajon Bank under the Philippine Rural Development Project – Global Environmental Facility (GEF) (PRDP-GEF)

Bohol is one of the six (6) pilot provines in the Philippines funded by the Global Environmental Facility (GEF). It is a 5-year World Bank grant package included under the Philippine Rural

Development Project. The project aims to strengthen the conservation of the coastal and marine base in targeted program areas through biodiversity conservation and fisheries resources management. Among the pilot municipalities for the GEF sites are Ubay, Talibon Pres. Carlos P. Garcia, Bien Unido and Buenavista.

Risk Profile¹³

The Province of Bohol is prone to a wide range of natural and human-induced hazards such as flooding, rain-induced landslides, earthquake, storm surges, liquefaction, fire, air and water pollution, and contaminated land. Inappropriate location and design of developments can aggravate exposure to and impact of hazards and climate change impact like sea-level rise, storm surges, among others.

Hydrometeorological Hazards

Bohol's climate, as classified by PAGASA, belongs to Corona's 4th Type which is characterized by rainfall more or less evenly distributed throughout the year. Intensification of the southwest monsoon usually occurs during the months of July to October. The rainfall varies from about 1,200 mm/yr. around the coast to slightly more than 2,200 mm per year in the mountainous areas in the province. Based on the climatological records of Tagbilaran City weather station, the province has an annual average of 161 rainy days. Average rainfall and trend have illustrated a declining trend of 250 mm over a period of 35 years of about 7mm a year due likely to climatic change in the Southeast Asian Region. The coastal area of the province is warm in contrast with the interior part, which is colder especially during the night. Mean temperature is at 27.40 degrees Celsius.

• Flooding

Flood-prone areas in Bohol include the influence areas of the eleven major rivers namely: Inabanga, Loboc, Abatan (Maribojoc), Moalong (Loon), Ipil (Trinidad), Soom (Trinidad), Carood (Mabini), Lumbay (Pilar), Alejawan (Duero), Manaba (Garcia) and Panangatan (Dimiao) Rivers. Aside from the areas where the rivers are located, the following towns were sites of flooding in 2011, namely: Jagna, Valencia, Guindulman, Alicia, Bien Unido, Clarin, Sagbayan, and Antequera. These areas adjacent to the rivers have been the subject of seasonal destructive flash flooding which caused substantial damage to agricultural land and crops, infrastructure, dwelling and occasional loss of lives. The primary factor which contributes to the occurrence of these hazards is the denudation of the forest cover in the upper watershed areas and river tributaries. This causes heavy siltation resulting in the incapability of the river waterways to handle heavy flash flood water flow from the rain catchment area (PDPFP 2016-2028).

¹³ Bohol Provincial Disaster Risk Reduction and Management Plan 2023-2025

Based on the disaster risk analysis data as of 2020 (PDPFP 2016-2028) and on historical data, the municipalities with agriculture at risk to flooding are the following: Candijay, Alicia, Pilar, Batuan, and Mabini in terms of Agri-fisheries while Buenavista, Mabini, and Sevilla for fisheries alone, and they are considered as priority LGUs. Livestock at risk are mostly in Alicia, Candijay, Guindulman, and Mabini.

Map 13. Flood Susceptibility Map, Bohol Province



Source: PPDO Bohol

Storm Surge

Storm Surge, as defined by the PAGASA, is **the abnormal rise in sea level that occurs during tropical cyclones**. It is caused by strong winds and low atmospheric pressures produced by tropical cyclones. Most of the storm surge-prone areas are located in the southeastern, southwestern, northern and western portions of Bohol. The inundation coverage is estimated based on geomorphologic analysis and observation in the areas during interviews/surveys. The surge heights are computed using the data gathered during surveys in reference to the significant tropical cyclone occurrences and from storm surge model results.



Source: PPDO Bohol

The 30 coastal LGUs (Tagbilaran City, Dauis, Panglao, Baclayon, Alburquerque, Loay, Lila, Dimiao, Valencia, Garcia Hernandez, Jagna, Duero, Guindulman, Anda, Candijay, Mabini, Ubay, Trinidad, Pres. Carlos P. Garcia, Bien Unido, Talibon, Getafe, Buenavista, Inabanga, Clarin, Tubigon, Calape, Loon, Maribojoc, Cortes) with island barangays are prone to storm surge if aggravated by strong typhoons (PDPFP 2016-2028). Among the listed municipalities: Getafe, Panglao, Talibon, Calape, Tubigon, Inabanga, Candijay, Ubay, Loon and Tagbilaran City are the notably with high population at risk.

Based on current data available, 30 coastal LGUs are under high risk in agricultural areas to Storm Surge. The highlighted municipalities with agriculture at risk of storm surge are Talibon, Bien Unido, Ubay, Pres. Calros P Garcia, Panglao, Baclayon, Getafe, Anda, Mabini and Guindulman based on observation and discussions. Fish cages and seaweeds production areas are mostly affected.

Landslides, as defined by the Philippine Institute of Volcanology and Seismology (PHIVOLCS), is the mass movement of rock, soil, and debris down a slope due to gravity. Landslides triggered by intense rainfall are called Rain-Induced Landslides (RIL).

There are seven (7) municipalities in the province which are determined to be the priority LGUs considering frequent landslide occurrence and their severity, namely: Jagna, Valencia, Sagbayan, Sierra Bullones, Garcia-Hernandez, Dimiao and San Isidro. In addition to these, the municipalities of





Source: PPDO Bohol

Duero, Bilar, Loboc and Sevilla are also considered to be more exposed than the risk analysis data and considered the priority LGUs as well.

The agriculture areas at risk to RIL are highly observed in Sagbayan, Sierra Bullones, Jagna, Garcia-Hernandez and Duero, based on experience. A total of 176,775 hectares are potentially affected by rain-induced landslides in Bohol Province.

• Drought/El Niño

El Niño is the projected increase in temperature that will result in drought and drought-like conditions in the municipality. Drought is projected to have a high impact on the municipalities with mostly agriculture and fisheries.

Geological Hazards

Outline of geological hazards in Bohol Province

Geological hazards result from geologic processes acting on or beneath the earth's surface. These include earthquake, earthquake-induced **Map 16. Active Fault Map**, Bohol Province

include earthquake, earthquake-induced hazards (ground shaking, ground rupture, earthquake-induced landslide, liquefaction, and tsunami), and volcanic hazards.

Bohol is prone to geologic hazards like ground shaking, liquefaction, earthquake-induced landslide and tsunami because of the presence of East Bohol Fault and another fault located in the Bohol Sea going to Mindanao Sea facing the southern part of Bohol. The presence of Negros Trench and PFZ Central Leyte Fault may also contribute to the generation of earthquake. Geologic hazards result from geologic processes



Source: PPDO Bohol

acting on or beneath the earth's surface. These include movement of plates in the earth's crust or from local concentration of heat and are a source of hazards to people and their natural and builtup environment on the earth's surface.

• Ground Shaking

The immediate effect of an earthquake is **Ground Shaking**. PHIVOLCS describes ground shaking as the *disruptive up, down and sideways vibration of the ground during an earthquake*.



Source: PPDO Bohol

According to recent hazard map, majority of the provincial agricultural lands are highly exposed to ground shaking with a total exposed agricultural area of about 168,307 hectares or 70% of the total agricultural land area is within the very high to high exposure area.



Source: PDPFP 2016-2028, PPDO Bohol

At very high risk to ground shaking are the 36 municipalities and one (1) city of the province of Bohol with agricultural areas exposed to ground shaking. Out of these towns, the 27 municipalities and one (1) city have their entire agricultural areas highly exposed to ground shaking. At risk are the municipalities of Carmen, Ubay, Pilar, San Miguel, Alicia, Guindulman, Trinidad, Sierra Bullones, Candijay, Dagohoy, Garcia Hernandez, Jagna and Valencia having more than 10,000 hectares of their agricultural area highly exposed to ground shaking (PDPFP 2016-2028).

• Liquefaction

Liquefaction is the phenomenon wherein sediments, especially near bodies of water, behave like liquid similar to a quicksand. Such could lead to sinking and/ or tilting of structure above it, sand boils and fissures.

According to current data, all coastal municipalities and one (1) city, including island barangays of Bohol are highly susceptible to liquefaction. The municipalities of Ubay, Bien Unido, Panglao and Pres. Carlos P. Garcia are observed to be highly affected by liquefaction based on data and discussions. The moderately susceptible areas include some





barangays located in the different municipalities of Ubay, Trinidad, San Miguel, Talibon, Candijay, Duero, Jetafe, Buenavista, Tubigon, Calape, Panglao, Dauis and Cortes. The coastal municipalities located in the southeastern, northeastern and northwestern portions of Bohol have more areas exposed to the liquefaction hazard compared to those situated in southern Bohol. Municipalities with low exceedance liquefaction are portions of Ubay, Alizia, Pilar, Dagohoy, Carmen, Batuan and Bilar. The worst scenario is when there is high excess liquefaction which would affect the Central Business District (CBD) and urban barangays of coastal municipalities (Bohol PDPFP, 2016-2028).

There are agricultural areas that at risk to liquefaction along coastal municipalities as well and these are located in the municipalities of Ubay, Pres. C.P. Garcia, Bien-Unido and Panglao.

• Earthquake-Induced Landslide

Earthquake-Induced Landslides (EIL) are described by PHIVOLCS as the *down slope movement of rocks, solid, and other debris commonly triggered by strong shaking.* It causes erosion as well as burial and blockage of roads and rivers. Similar to rain-induced landslides (RIL), an earthquake-induced landslide could destroy houses and cause injury or death to residents living near sloped areas. It could likewise damage vegetative cover and croplands, as well as access roads to agritourism, commercial, residential, and other key built-up areas.

Map 20. Earthquake-Induced Landslide Hazard Map, Bohol Province



Source: PPDO Bohol

The municipalities of Lila, Dimiao, Valencia, Loboc (man-forest), Bilar (eastside), Garcia-Hernandez, Sierra Bullones, Duero, Jagna, Sevilla, Loay, and Candijay are observed to be with the highest susceptibility based on current data and experience.

The agricultural areas, except fishery areas, at risk to EIL are in Dimiao, Loboc, Valencia, Sierra Bullones, Garcia-Hernandez, Guindulman, Jagna, Pilar, Alicia and Carmen. In relation to this, the municipalities such as Dimiao, Lila, and Loboc have agricultural land areas that

are highly susceptible to EIL. Furthermore, the agricultural areas of Loon, Calape, Tubigon, Inabanga, Clarin, Buenavista, Valencia, Pilar, Bilar, Guindulman, Candijay, S. Bullones, Carmen are also at risk to EIL.

• Tsunami

Tsunami refers to the *series of waves caused commonly by an earthquake under the sea*. It causes flooding, coastal erosion, drowning of people, and damage to properties.

According to current data, all coastal municipalities are highly susceptible to tsunami. The population, agriculture, including fisheries at risk to Tsunami are located in 30 coastal LGUs. Inundation of rivers caused by pressure from tsunami may affect the municipalities of Inabanga, Pres Carlos P. Garcia, Candijay, Loay, Loon, Anda, Maribojoc, Cortes, Duero and Loboc, hence they are considered as priority LGUs.



Source: PPDO Bohol

Disaster Risk Reduction Management (DRRM) and Climate Change Adaptation (CCA)

• Climate Change Mitigation and Adaptation

Climate change is one of the strongest development agenda of the 21st century; global scientific studies conducted by the Intergovernmental Panel on Climate Change (IPCC) have already confirmed that the change in global temperature is already unequivocal. In the Philippines, the

manifestation of extreme weather events that resulted to losses in terms of livelihoods, infrastructure, and even lives, have become more frequent in recent years.

With the passage into law of Republic Act 9729 or the Climate Change Act of 2009, local government units (LGUs) were tasked to serve as frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas. Cognizant of the fact that climate change is a multi-sectoral concern, the involvement of all levels of government in the urban resilience planning process is crucial in order to attain higher probability of desired outcomes.

In **Section 14 of RA 9729** which is the *Local Climate Change Action Plan*, further states *that the* Local Government Units (LGUs) shall be the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas, consistent with the provisions of the Local Government Code, the DRM-CCA Framework, and the National Climate Change Action Plan. Barangays shall be directly involved with municipal and city governments in prioritizing climate change issues and in identifying and implementing best practices and other solutions. Municipal and city governments shall consider climate change adaptation as one of their regular functions. Provincial governments shall provide technical assistance, enforcement and information management in support of municipal and city climate change action plans. Interlocal government unit collaboration shall be maximized in the conduct of climate- related activities.

Resilience to extreme weather and climate change will greatly impact the communities as adaptation and mitigation measures provide opportunities for local governments to enhance the well-being of communities by lessening its impacts/vulnerability to them.

• Climate and Hazard Profile

The effects of climate change are now being felt in the Province of Bohol. The impact of this change has affected Bohol's forest, its biodiversity, water, agricultural, fishery resources and cultural assets with wide-range adverse impact on human health and loss of life. The ten (10) warmest years on record in the world all occurred in the years 1880 to 2000. Temperature changes are known to affect the transmission of infectious diseases like malaria, dengue and respiratory tract infections. Rising incidence of morbidity cases from these infectious diseases, particularly respiratory tract infections has been recorded in Bohol with pneumonia as a leading cause of illness in the province affecting 10% of Bohol's population in 2008, mostly children.

Bohol is among the areas in the Philippines threatened by drastic effects of global warming. It is ranked 9th among top 20 provinces in the Philippines vulnerable to a one (1) meter sea level rise.¹³ Its seascape, as an eco-tourism asset, is vulnerable to threats of global warming that may result in sea-level rise, causing loss of tourism and business investments. Cutting of trees in the upland communities is commonly practiced. There is degradation of marine environment due to pollution from industries, agriculture, including animal husbandry and settlements. Coastal erosion and sedimentation are not properly addressed and resulted to occurrence of sea level

¹³ Source: Climate Hotspot, Climate Change Impacts in the Philippines conducted by Greenpeace Southeast Asia, Climate and Energy Campaign, 2007

rise. Dumping and burning of solid wastes that include toxic materials and chemicals still pose a problem as well as the overflowing of sewers. There is an increase in frequency and intensity of the El Niño and La Niña phenomenon resulting to agricultural and ecological problems (e.g., disruption of wildlife) and damage to property.

Changes in rainfall patterns, typhoon frequency and the irregular period of occurrence, and sea level rise are now becoming noticeable. The connection between local environmental threats and climate change is an emerging concern among local government units. It is in the context that local government must play a major role in implementing measures on climate change mitigation and adaptation due to their authority to control the necessary changes.

Based on the distribution of rainfall during the year, Bohol's climate as classified by PAG-ASA belongs to Corona's 4th Type, characterized by rainfall more or less evenly distributed throughout the year. Intensification of the southwest monsoon usually occurs during the months of July to October. The rainfall varies from about 1,200 mm/yr around the coast to slightly more than 2,200 mm/yr in the mountainous areas in the province. Based on the climatogical records of Tagbilaran City weather station, the province has an annual average of 161 rainy days. Average rainfall and trend illustrated a declining trend of 250 mm over a period of 35 years or about 7mm a year, which is likely due to climatic change in the Southeast Asian Region. The coastal area of the province is warm in contrast with the interior part, which is colder especially during the night. Mean temperature is at 27.40 degrees centigrade. Prevailing wind direction is towards northeast with an average speed of 2 miles per record. Bohol is not included in the so-called typhoon belt of the country, as typhoons rarely pass in the province. Those passing below or above the island contribute to the greater volume of precipitation. The frequency of typhoon passage is 0-10% from the average of 20 typhoons passing over the Philippines per year.¹⁵

Based on the data on climate change scenario, the projected seasonal temperature increase, seasonal rainfall changes and frequency of extreme events in 2020 and 2050 under the medium-range emission scenario in the provinces in Region 7 are presented in Table 3, Table 4 and Table 5, respectively.

• Climate Projections in 2020 and 2050 of Bohol and other Provinces in Region 7

Bohol is facing the real impacts of climate change that are threatening its development prospects and exacerbates the vulnerability of its poor communities. With projected changes in precipitation, temperature, intensity of tropical cyclones and frequency of extreme weather events, considerable efforts would be required to prepare in dealings with the impacts of climate change on the different climate-sensitive sectors e.g. agriculture, forestry, biodiversity, water, coastal/marine resources and health. Adaptation will be an essential part in response to the threats of climate change.

Scientific basis for adaptation and vulnerability assessment studies were already conducted by PAGASA which provides the opportunity to understand the future changes in climate and how these changes will affect the province in the future and what adaptation efforts will be done.

¹⁵ DENR-BSWM 1991 Preliminary Climatic Classification of 15 selected Provinces in the Philippines

Based on the data on climate change scenario, the projected seasonal temperature increase, seasonal rainfall changes and frequency of extreme events in 2020 and 2050 under the medium-range emission scenario in the provinces in Region 7 are presented in Tables 3, 4 and 5, respectively. To use the tables and arrive at values of seasonal mean temperature and seasonal rainfall in 2020 and 2050 in any of the provinces, the projections are added to the observed values (presented in each of the tables). For Bohol province, the projected values are:

- DJF mean temperature = (26.6 °C +0.9 °C) = 27.5 °C;
- DJF rainfall = {376.1mm+376.1(9.8%) mm} = (376.1+36.9m) or 413mm;
- Number of days with Tmax> 35 °C in Tagbilaran City during the 2006-2035 period (centered at 2020) = 1,710;
- Number of dry days in Tagbilaran City during the 2006-2035 period (centered at 2020) = 6,836; and

Map 22. Location Map of Region 7



Number of days with rainfall > 300mm in Tagbilaran City during the 2006-2035 period (centered at 2020) = 1.

Table 3: Seasonal temperature increases (in °C) in 2020 and 2050 under medium-range emission scenario in provinces in Region 7												
Provinces	OBSERVED BASELINE (1971-2000)				CHANGE in 2020 (2006-2035)				CHANGE in 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Bohol	26.6	28.0	28.2	27.8	0.9	1.2	1.2	1.0	1.8	2.3	2.3	1.9
Cebu	26.8	28.4	28.2	27.9	0.9	1.2	1.1	1.0	1.9	2.4	2.1	1.9
Negros Oriental	27.0	28.4	28.0	27.8	0.9	1.2	1.0	1.0	1.9	2.3	2.0	1.9

Table 4: Seasonal rainfall change (in %) in 2020 & 2050 under medium-range emission scenario in **Provinces in Region 7**

Drovincos	OBSER	CHANGE in 2020 (2006-2035)				CHANGE in 2050 (2036-2065)						
Provinces	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Bohol	376.1	209.6	412.9	514.5	9.8	-7.1	4.5	6.8	21.2	-11.9	18.9	22.6
Cebu	324.0	228.3	595.1	607.4	17.7	0.8	7.7	7.7	19.6	0.5	18.9	17.8
Negros Oriental	225.8	226.0	639.5	636.9	15.0	-4.9	9.3	4.7	17.4	-6.8	20.7	10.5
Table 5: Frequency of extreme events in 2020 & 2050 under medium-range emission scenario inProvinces in Region 7												
--	------------	------------------------------	------	------	-----------------	------	------	-----------------------------------	------	------		
		No. of Days w/ Tmax>35 °C			No. of Dry Days			No. of Days w/ Rainfall >100mm				
Provinces	Stations	OBS (1971- 2000)	2020	2050	OBS	2020	2050	OBS	2020	2050		
Bohol	Tagbilaran	260	1710	3413	8176	6836	6473	15	21	23		
Cebu	Mactan	25	1488	2463	7112	5720	5693	12	4	17		
Negros Oriental	Dumaguete	66	826	1499	8451	6032	5642	5	7	6		

• Climate Change Threats and Potential Impacts

Table 6: Trends in C	limate Change Impacts			
Climate Change Impacts	Areas or location affected (Municipalities/Barangays)	Trend	Intensity	Frequency of Occurrence
Sea level rise	30 coastal towns including Tagbilaran City	Same areas	Every year	Increasing every year
Prolonged drought	47 towns and 1-city	Expanding to coastal areas	Every year	Every year
El Nino events	47 towns and 1-city	Expanding to coastal areas	Every year	Every year
Floods	336 out of 1,109 brgys (47 towns and 1-city)	Expanding to other areas	Increasing	Increasing every year (flash flooding, seasonal, river overflow, coastal flooding due to heavy rains, dam overflow
Storm surge	30 coastal towns and 1-city	Same areas	Increasing	Increasing every year
Monsoon rains a) Southwest Monsoon or Habagat; b) Northeastern Monsoon/ Amihan	47 towns and 1-city	Expanding to interior part of the province	Increasing even dry season	Increasing every year

• Disaster Risk Management Resiliency to Disasters and Climate Change

Bohol, as an island province, is vulnerable to various hazards resulting from natural and manmade disasters such as flooding, rain-induced landslides, earthquake, storm surges, liquefaction, fire, air and water pollution and contaminated land. Inappropriate location and design of developments can aggravate exposure to and impact of hazards and climate change impacts like sea-level rise, storm surges, among others.

Infrastructure 16

In 2022, Bohol's total road length is 6,152.19 kilometers. Of these roads, 12% are classified as national roads and 14% provincial roads. The city roads only account for 1% while municipal roads 5%. Barangay roads have the longest stretch of roads, accounting for 68%. In terms of type of pavement, most of the province's roads are still gravel, which may be attributed to local roads. Concrete roads account for 35%, and continue to increase in length as both national and local governments sustain their projects for road concreting. Asphalt roads, on the other hand, shared 3% of the total road length. Meanwhile, 18% of the province roads remain to be earth roads, which are mostly classified as barangay roads.

As to bridges, there are 8,419.64 linear meters of bridges within the road network in the province and 64% of this total length is composed of concrete. Steel bridges account for 27% while bailey bridges are 7%. There are still timber bridges in the province, which shared a total length of 2%.

Majority of the bridges in the province are under the jurisdiction of the national government, account for 61%. The Provincial which Government is maintaining 1,509.00 linear meters or 18% of these bridges. The rest of the bridges are managed and maintained by the city/ municipal and barangay local governments.





Source: Department of Public Works & Highways (DPWH)



As to **seaport**, there are 16 ports in Bohol serving as the gateways of people and goods to and from the province. Of the 16 ports, there is only 1 baseport, located in Tagbilaran City. There are 4 terminal ports, 9 outports and 2 private ports located in several coastal municipalities. The Port of Tagbilaran is considered a major port of entry while the Port of Tubigon, the busiest among the terminal ports, offer more than ten daily round trips plying the Cebu-Bohol route. The Port of Jagna offers services that ply between Bohol to Cagayan, Nasipit and Camiguin with roll-on, roll-off route.

For **air travel**, the Province of Bohol is being served by two airports, namely, the Bohol-Panglao International Airport (BPIA) and the Ubay Airport which classified as a community airport with a runway of 1.2 km that serves as a feeder airport. Only the BPIA handles commercial flights and passenger traffic with direct flights to and from Manila and international flights. Number of flights to the province has been irregular for the past 6 years brought about by airline competition, level of demand for air travel, and changes in aviation regulations.

For land transportation, the road network in Bohol consists of circumferential road along the coastline and interior that connects the interior municipalities. The Tagbilaran Eastern Road (TER) connects Tagbilaran to Ubay via Jagna while the Tagbilaran Nothern Road (TNR) completes the loop from Ubay to Tagbilaran via the northern town of Tubigon. However, the province experienced the number of registered vehicles had a decreasing trend in 2018-2023 but increased slightly in 2021 to 2022. Before the COVID-19 pandemic in 2018, the number of vehicles registered in Bohol reached 124,744, yet this has decreased to 108,093 in 2023.

Socio Economic and Demographic Profile

Population

Based on the latest 2020 Census on Population, Bohol's population reached 1.394 Million, showing a 1.06% average annual increase from the 2010 population count. Such annual growth rate is lower than the Central Visayas' growth rate of 1.74%. Bohol's population growth, however, is lower than that of the 1.67% national annual growth rate. With this growth, estimated population of the province in 2024 is pegged at 1.398 Million and will further increase to 1.402 Million in 2025.

Among the 48 localities, Tagbilaran City has the highest population with 104,976, followed by municipalities of Ubay, Talibon, Dauis, Carmen, Inabanga, Tubigon, Loon, Panglao and Jagna. Sikatuna is the least populated municipality with only 6,906 population.

The population of Bohol has been fluctuating from 0.97% average annual increase (2000-2010) down to 0.87% (2010-2015) and bounced back to 1.26% (2015-2020).

The municipality of Panglao has the highest growth rate in the Province (3.37%). Among the top 10 localities with high growth rates include Dauis, Corella, Trinidad, Sagbayan, Getafe, Baclayon, Cortes, and Tubigon. The municipality of Dimiao has remained to have a negative population growth rate of -0.18% (2010-2020).

Based on the 2020 Census, the population structure of Bohol shows bigger group of younger people (with 29.7% belonging to age group under



BASIC FACTS OF BOHOL PROVINCE





No. of Islets: 72 islets

15 years old). Female reproductive Age (Child-bearing age) comprised 49.6%. Males outnumbered females in the 0-59 years old. Females outlived the males in the older age groups. Those aging 60 and over comprised 10% of Bohol's Population. From 24.5 in 2010, the median age for Boholanos rose to 25.7 years old for both sexes. This means that half of the total population was below 25.7 years old. For the female population, the median age was 26.3, higher by 2.4 years against their male counterpart. Moreover, 50.9 percent of the total population were males and 49.1 were females. This translated to a sex ratio of 104 males for

Bohol's population density is 292 persons per sq. km in 2020, which is higher compared to the 275 persons per sq. km in 2015. In 2010, the province's population density was only 263 persons per sq. km. Most of the densely populated areas in the province are found along the coast, concentrated along the north to northeastern part of Bohol. Among the top 10 most densely populated areas in the province include Tagbilaran City (2,876/km²), Dauis (1,211/km²), Bien Unido (974/km²), (834/km²), Panglao Cortes (671/km²), Baclayon $(652/km^2),$ Tubigon $(585/km^2)$,



Source: OpenSTAT, PSA

Talibon (507/km²), Maribojoc (449/km²), and Calape (439/km²). On the other hand, the least densely populated areas include Sevilla (97/km²), Dimiao (110/km²), Danao (124/km²), Antequera (126/km²), Sierra Bullones (131/km²), Bilar (143/km²), Balilihan (147/km²), San Isidro (165/km²), Trinidad (180/km²) and Sikatuna (181/km²).

Bohol's Indigenous Peoples (IP)

• Eskaya Tribe

The Eskaya is an indigenous tribe found in the hinterlands of the towns of Duero, Guindulman, Pilar and Sierra Bullones, in Bohol's southeast interior. They are a gentle community of about 4,000 people hardy peasants. Likewise known as the "Visayan-Eskaya", the community is only found in the island province of Bohol. They have a unique cultural heritage, use a distinct language and literature, and have traditional practices that dates way back to pre-Spanish times. The Eskaya people have their own language quite unlike the local Boholano or Cebu dialects, a system of writing, and an intrinsic written literature. While their whole week is devoted to tilling and communal forms, Sundays are set aside for Eskaya classes. Young and old alike learn the Eskaya ways in an attempt to relive and revive the almost forgotten Eskaya legacy.



The first settlement of this tribe is at Biabas, Guindulman, established in the early 20th century by one Mariano Datahan who died in 1949. A second settlement was established in Taytay, in the municipality of Duero in the year 1951 founded by Fabian Baja under Datahan's instructions. Eventually, the group spread to nearby Barangays of Canta-ub, Lundag, Tambongan, Cadapdapan and Abihilan.

The group was recognized and the community awarded a Certificate of Ancestral Domain Claim (CADC) in 1996 by President Fidel V. Ramos. CADC No. R7-CADC-14 was deemed as an ancestral domain consisting of 3,173 hectares of land in Taytay (Duero), Biabas (Guindulman), Lundag



(Pilar), Canta-ub (Sierra-Bullones), and Cadapdapan (Candijay).

Legally, the Eskaya are now classified as an indigenous group under Republic Act No. 8371 entitled "The Indigenous People's Rights Act of 1997". No official census has yet been made of the group but a report in 1991 mentioned 130 Eskaya families living in Bohol.

• Ati

The Ati community in the Municipality of Loay, Bohol consists of about 200 people with an average family size of 5. Some of them settled along the shorelines of Loay, Bohol which is about 0.30 kilometers from the national highway. Their primary sources of income are fishing, hunting and selling herbal plants and medicines. Most head of families go fishing while mothers with their children sell herbal medicines.



The Atis are believed to have originally come from Panay Island. They are from the Negrito ethnic group in Panay, located in the Visayas Islands of Cebu, Bohol, Siquijor, Leyte, Samar, Masbate, Negros and Guimaras. They are genetically-related to other Negrito ethnic groups in the Philippines such as the Aeta of Luzon, the Batak of Palawan, and the Mamanwa of Mindanao.

• Badjao

The Badjaos are an indigenous ethnic group of Malaysia and the southern Philippines. In Bohol, they are found largely in Brgy. Totolan, a coastal barangay at the northern part of Dauis, 1.5 kilometers away from the City. This cultural community migrated to this barangay during the tumultuous years in Mindanao in the 70's and have since then found a haven in the shorelines of said Municipality. Since then, this cultural group of Badjaos had established a community in said area.



The Badjaos are what are considered as sea gypsies. The Bajaos have been a nomadic, seafaring people, living off the sea by trading and subsistence fishing. They generally live in the sea using "bankas" as houses if not on stilt houses along the seashore. Their primary source of income is deep sea fishing. At present, there are 78 families in the community and a population of 545 people.

The reduction, if not the elimination of poverty continues to be a challenge in Bohol with a number of its families still considered as poor. Bohol's Poverty Incidence as well as its Subsistence Incidence¹⁷ among families has been steadily decreasing since 2015 despite the pandemic in 2020. From 21.7 percent in 2015, poverty incidence among families lowered to 15.5 percent in 2018, which rose to 19.1 percent in 2021 post-COVID pandemic and eventually lowered to 14.8 percent om 2023.In the same period, the proportion of Boholanos in extreme poverty whose incomes are not sufficient to meet basic food needs registered at 4.0 percent in 2023.

Furthermore, the Annual Per Capita Poverty Threshold of the province had been decreased from Php 26,853 in 2021 to Php 15,175 in 2023. The Annual Per Capita Food Threshold of Php 18,743 in 2021 to Php 10,602 in 2023. In terms of income gap in 2023, the measured amount of income required by the poor in order to uplift from poverty was estimated at 25.4% based on PSA preliminary results.

Table 3. Poverty Profile, Bohol Province

Annual Per Capita Poverty & Food Thresholds, Poverty & Subsistence Incidence & Magnitude of Poor Families & Other Poverty Indicators in Region 7 & Bohol Province, 2015, 2018, 2021 and 2023

Region/	Annua	l Pe	r Capita	Po	verty Th	res	hold		Poverty Familie	/ Inciden s (%)	ce among		Magnitude of Poor Families					
Province	(in Pes	sos)							Estimat	:es (%)			Estimate	e ('000)				
	2015		2018		2021		2023		2015	2018	2021	2023	2015	2018		202	21	2023
PHILIPPINES	21,753	3	25,814		28,794		33,296	5	16.5	12.1	13.2	10.9	3,747	3,005		3,4	82	2,992
Region VII	21,914	ţ	25,968		32,423		34,553	3	23.6	12.2	22	12.3	394	181		354	4	207
Bohol	20,437	7	26,108		26,853		30,981	L	21.7	15.5	19.1	14.8	60	47		61		49
Cebu	21,740)	25,914		33,657		35,605	5	17.9	11.3	22.8	11.7	179	134		293	3	157
Region/	gion/ (in Percapita Food Threshold					Subsistence Incidence among Families (%)				Magnitude of Subsistence Poor Families								
Province	(in Pes						Estimates (%)				Estimate	Estimate ('000)						
	2015		2018		2021		2023		2015	2018	2021	2023	2015	2018		202	21	2023
PHILIPPINES	15,18	89	18,126		20,046		22,994	ļ	5.7	3.4	3.9	2.7	1,303.55	839.5	4	1,0	32.63	741.73
Region VII	15,3	57	18,033		22,679		24,049)	9.8	2.6	8.1	3.2	164.50	38.24		130	0.18	53.42
Bohol ^{b/}	14,24	49	18,245		18,743		21,636	5	7.2	2.9	6.2	4	20.14	8.90		19.	94	13.33
Cebu	15,13	39	17,959		23,400		24,798	3	6.8	2.5	8.6	3	68.35	29.34		11(0.25	40.09
/		Inc	come Ga	ар						Poverty	r Gap			Severity	of Pov	verty	/	-
Region/Provinc	ce	20	15	20	018	20	021	202	23	2015	2018	2021	2023	2015	2018	3	2021	2023
PHILIPPINE	5																	
Region VII		27	.9	19	9.2	2 25.8 20.5		53	6.6	2.34	5.69	2.52	2.6	0.72		2.15	0.81	
Bohol		25	.7	18	3.11	23	3.92	21.	53	5.6	2.8	4.57	3.19	2.1	0.79		1.58	1.05
Cebu		26	.3	19	9.58	26	5.19	20.	21	4.7	2.22	5.97	2.36	1.8	0.7		2.29	0.75

¹⁷ Families with income below the food threshold; subsistence incidence is often referred to as the proportion of Boholanos in extreme or subsistence poverty

2024

Bohol's poverty incidence among families reduced by 39% in 2018, however in 2021 the poverty incidence gradually increased until 2023, this may be caused by COVID-19 pandemic and Typhoon Odette that brought devastating effect to the province. From a low percentage in 2018 (15.50%) to increased percentage in 2023 (23.10%). In terms of magnitude of poor families, a total of 76,850 families were considered poor in 2023, which was higher compared to year 2018.



Source: 2023 Full Year Poverty Statistics, (PSA)

Source: 2023 Full Year Poverty Statistics, (PSA)

Employment

In terms of employment in the Province, employment rate has improved over the past three years. Based on the Labor Force Survey of the Philippine Statistics Authority (PSA), employment rate in the year 2015 is pegged at 95.6%, which is higher to the 93.6% and 94.8% in the year 2013 and 2014, respectively. It can also be noted that the employment rate of Bohol is consistently higher compared to the national and regional averages for the three-year period. Meanwhile, labor force participation rate of the Province has also increased during the same period, with 66.3% in 2015, higher than the 58.2 in 2013 and 60.2% in 2014.



Source: Philippine Statistical Authority (PSA)

Economy and Priority Industries

The economy of Bohol is largely based on agricultural activities that focused on the cultivation of crops on its vast agricultural land. With this, home-based industries, which are mostly of the micro and cottage types, play a vital role in the economy. The government continues to provide support to sustain the development and production of major crops such as palay, corn, high value commercial crops, and fisheries through upland and marine aquaculture, organic agriculture and livestock. The development of dairy products is also being pursued in collaboration with appropriate government agencies and livestock farmer's groups. Support for this program would allow further value-adding processing of cow and carabao's milk, which in turn, will provide higher income for farmers.

Agriculture is the largest sector in terms of providing employment, as well as in land use. Of the total land area of the province, 273,950 ha (66%) are available and use for agriculture. Meanwhile, 149,598.74 hectares of this area is planted and harvested with major crops. Among the major crops in the area includes palay (47%), coconut (36%), corn (6%), fruits (4%), other crops (4%), root crops (2%) and vegetables (1%).

Figure 13. Area Harvested to Major Crops, Bohol: 2023

Source: OpenStat, Philippine Statistics Authority



Source: OpenStat, Philippine Statistics Authority

At the regional setting, Central Visayas rice production is largely dependent on the Province of Bohol. In 2024, the province accounted 74% of the region's rice production, which is significantly higher compared to the production share of the other provinces.

Crops Production

Rice. A staple food for many Boholanos wherein producing locally ensures food security for the province. It is mainly produced by small farmers, with a total of 72,630 hectares area planted. The irrigated and rainfed rice area is approximately 41,738 and 30,892 hectares, respectively. The total palay production in 2024 was about 234,801.78 metric tons.

The province of Bohol remains to be rice sufficient with a sufficiency level of 90.34% and continued to hold its title as "Rice Basket "in Central Visayas. The volume of production and area planted with palay has been increasing from 2019 to 2024. This came as the rice harvest season in Bohol is mid-way and the Boholano farmers have registered high yield performance both in hybrid and inbred rice being planted in rain-fed and irrigated areas in the province.





Source: Department of Agriculture Region VII





Corn. A staple crop to many Boholanos next to rice. There are two varieties of corn produced in the province, white corn and yellow corn. The total area planted for corn was about 8,589 hectares, produced by local farmers. In 2024, area planted for white and

yellow corn is approximately 6,905 and 1,684 ha., respectively. The total corn production in 2024 was about 11,340.75 metric tons.



Vegetables. There are two types of vegetables grown in the province, the leafy and fruit vegetables. The leafy vegetables include pechay, kangkong and green onions while the fruit vegetables are ampalaya, eggplant, okra, squash, string beans, tomato and ginger. Some lettuce, cabbage and chayote are commonly grown in the highland areas of Duero, Jagna, Sierra Bullones, Candijay and Guindulman. Eggplant has the most extensive area of 318 hectares and showed the highest volume of production of 1,626.84 metric tons in 2023.



Coconut. Coconut is a major commercial crop in Bohol. The towns with vast areas planted with coconuts are Balilihan, Antequera, Valencia, Garcia Hernandez, Ubay and Inabanga. As of 2023, in terms of agricultural land usage with an approximate area of 53,585.45 hectares, of which 4,028,713 bearing trees. Furthermore, there were 89,322 coconut farmers registered in the National Coconut Farmers Registry System (NCFRS).



Rootcrops. In 2023, Bohol's major rootcrops posted a production of 18,974.35 metric tons. The decline in production was brought by the damaging effect of Typhoon Odette.

Cassava remains to be the dominant crop with a total production of 9,456.60 metric tons. Camote and ubi produced 3,677.13 metric tons and 3,546.77 metric tons, respectively. Gabi, on the other hand, posted 2,293.85 metric tons. As of 2023, a total of 3,151.68 hectares of land have been harvested with major rootcrops.



Fruit Crops. As of 2023, the total area planted was 6,398.49 hectares with banana having the largest area covering 3,148.77 hectares, followed by mango with 2,215.68 hectares. PSA report shows an overall production of fruits in the province with an output of 19,867.53 metric tons where banana is the dominant fruit in the province in terms of production volume at about 15,498.36 metric tons compared to pineapple with a total production of 792.28 metric tons.

Livestock and Poultry Production •

Bohol is self-sufficient in livestock and poultry such as swine, carabao, cattle, goat, chicken and duck. Bohol's livestock poultry industry is and a major contributor to the region's total production. In terms of **livestock** inventory, the livestock numbers have been gradually decreasing from year 2021 to 2024. Moreover, hog still remains to be the largest in number composing 53% of the entire livestock inventory of Bohol which accounted 257,038 heads in 2024, followed by goat (91,694 heads), carabao (73,919 heads), and cattle (66,150 heads). In addition,

Bohol, being one of the top producers of



Source: OpenStat, Philippine Statistics Authority

hog, has remained to be free from African Swine Fever (ASF) and has tightened its borders from any possible entry of transboundary diseases including the Avian Influenza or bird flu.

Carabao. As of 2024, carabao inventory reached to 68,001 heads, decreasing compared to previous years. The province plays a vital role in providing good quality carabaos for breeding, draft and meat for its neighboring provinces. In terms of production, Bohol had a total production at about 2,520.68 metric tons, as of 2024.



Cattle. The inventory of cattle in 2024 indicated 66,150 heads showing a downward trend from previous years. Based on the PSA data, Bohol ranks second to Cebu and accounted for 19.06% of the total 346,994 cattle in the region. Moreover, Bohol ranked third in terms of volume of production in the entire region at about 3,755.06 metric tons, as of 2024.



Goat. The production of goat in the province showed 589.52 metric tons, as of 2024. In terms of goat inventory, Bohol ranked third which had 91,694 heads, accounted 14.94% of the total 613,628 goat in the region, as of 2024.

Hog. Hog population of the province as of 2024 is recorded at 257,038 heads (PSA), where 165,604 heads on smallhold farming, 89,778 heads on commercial farming and 1,656 heads on semi-commercial farms. In region 7, Bohol ranks third contributing 27.45% of the regional total population of 936,452 heads as of 2024. The Province of Bohol still remained free from African Swine Fever (ASF) which helped sustained the production of hogs. In terms of production, Bohol showed 46,939.90 metric tons in 2024 which ranked third of the total 218,202.62 metric tons production of the region.

The operation of government-operated artificial breeding centers for swine in the municipalities and in some private farms and the mobile boar for hire services, has contributed to the upgrading of existing stocks. On the other hand, native pig production is becoming popular on a "back to basics" husbandry with starter breeders distributed through dispersal projects.

On the other hand, **poultry inventory** in the province showed irregular trends from 2020 to 2024. Bohol poultry inventory in 2024 accounted for more than 3 million birds that are predominantly composed of chicken.



Chicken. The chicken population in the

province include broiler, layer and native or improved. As of 2024, Chicken remains as the top poultry commodity of Bohol with 3,227,974 heads, much lower than 2023 inventory that accounted 4,029,559 heads. Out of these inventories, 56% is attributed from native chicken production, followed by broiler with 56%, layer with 17% and gamefowl which accounted for 0.5%. In terms of production, Bohol produced 36,644.20 metric tons of chicken, as of 2024.



Source: OpenStat, Philippine Statistics Authority

• Fisheries Production

In terms of **fisheries production**, aquaculture still remains to be the highest contributor to the volume of fishery production in the province. In 2024, aquaculture posted 44.3% share in the total volume of fishery production where the 24.22% came from seaweed production and 20.09 percent contributed from brackishwater/freshwater production, followed by municipal fisheries accounting 41.45%, next was the commercial fisheries which accounted 14.24%.



Source: OpenStat, Philippine Statistics Authority

Comparing the production and consumption of major food commodities, the province of Bohol has surplus production for corn, rootcrops, carbeef, beef, pork, chevon, chicken and eggs. Food commodities where the province have recorded deficit in terms of production include vegetables, fruits and fish.



Source: OpenStat, Philippine Statistics Authority

Tourism

Tourism is another industry, which is sustained by both the private sector and government. The tourism industry further boomed after the province was designated as Bohol Island UNESCO Global Geopark in 2023 - the only one in the Philippines and largest in Asia. In 2023, the tourist arrivals increased by 89 percent compared to 2022. Domestic visitors hold the majority share of the total arrivals accounted 68 percent in 2023. Meanwhile, foreign visitors shared 32.95 percent and OFW's with 0.05 percent in 2023.



Source: Department of Tourism Region 7) and Bohol Provincial Tourism Office (BPTO)

	Domestic		Foreign		OFW's		TOTAL	
2019	854,853		720,364		6,687		1,581,904	
2020	109,237		68,104		0		177,341	
2021	178,654		1,127		0		179,781	
2022	503,368		32,310		125		535,803	
> 2023	686,875		325,499		480		1,012,854	

Figure 22. Visitor Arrivals, Bohol: 2019-2023

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Table 8. Top 10 Foreign Tourist Travelers,Bohol: 2023								
	Korea	41.90%						
*1	China	9.98%						
*	Taiwan	7.82%						
	USA	5.98%						
	Germany	2.72%						
	France	2.64%						
	Japan	2.64%						
55	Hongkong	2.02%						
*	Canada	2.00%						
	United Kingdom	1.62%						
	Others	20.70%						

In terms of foreign visitors in the province for 2023, Koreans dominated the tourism market, sharing 41.90%. It is followed by Chinese with 9.98% share, Taiwan (7.82%), USA (5.98%), Germany (2.72%), France and Japan (2.64%), Hongkong (2.02%), and United Kingdom (1.62%).

In terms of regional scale, as of 2023 Bohol accounted 18% of the total visitor arrivals in Central Visayas. Meanwhile, Cebu as the major gateway and hub in the region accounted a significant share of 74%.

Source: Department of Tourism Region 7) and Bohol Provincial Tourism Office (BPTO)

Local and foreign industry players continue to pour in investments in this sector considering the consistent and stable growth of the tourism industry in the province and bright outlook of the industry prospects. Improvement of infrastructure and support facilities in the province has also enticed larger investments through the years. In terms of accommodation facilities, the number of available rooms increased by 20% from year 2019 to 2023.



Source: Department of Tourism Region 7 (DOT 7) and Bohol Provincial Tourism Office (BPTO)

Bohol opened its doors to entice more investments into the province. Investment areas in the province are focused on eco-tourism, light industries and agro-industrial development. Recently, two major investors are opening up in Bohol, namely, the **SM Supermalls**, the country's largest

2024

retail mall (in the city) and the **JW Marriot Panglao Resort and Spa** (Marriot remains the world's largest hotel chain in terms of the number of rooms globally) located in Panglao - among many other resorts and hotels. Another promising industry in Bohol is the Information and Communications Technology, particularly for business process and knowledge process management outsourcing. In 2019, two major BPO companies (TaskUS and iBex.) had been established in the province which are currently employing around 5,000 with 85% being Boholanos. This sector has a potential in contributing to the economic growth of the province. Furthermore, with the improvement of information and communications technology highway, following the installation of fiber optic technology in Bohol by private telecommunication firms, the province may soon provide significant employment opportunities to its capable workforce for such related services.

Additionally, in terms of **trade**, **investments and livelihood**, an estimate of more than Php 1 billion worth of investments were poured in the province for new hotels, resorts and malls. Furthermore, the Bohol Economic Development and Promotion Office reported a total of Php 29.3 billiion new investments in 2023.

The **micro, small, and medium enterprises (MSMEs)** in the province has an important role in the province local economy, stimulating economic activities even in rural and far-flung areas. However, MSMEs sector had shown irregularities over the period, with yearly increases and decreases observed. Additionally, number of business name registered decreased from 9,344 in 2022 down to 7,763 registered business names in 2023. The employment generated from MSMEs also decreased from 34,473 in 2022 to 6,640 in year 2023. Meanwhile, the investment generated was Php 1,163,731,619.85 in year 2023.

Gener	Generated, Province of Bohol											
	BN	I Registratio	ns	Emplo	oyment Ger	nerated	Bui	isness Own	ers	Investments Generated		
Year	New	Renewal	Total	Male	Female	Total	Male	Female	Total	(in million pesos)		
2019	7,280	1,049	8,329	3,560	2,757	6,317	3,120	5,209	8,329	994,419,278.00		
2020	7,595	1,007	8,602	11,645	11,336	22,981	3,225	5,377	8,602	10,866,297,832.33		
2021	7,264	1,135	8,399	6,868	26,781	33,649	3,322	5,077	8,399	1,725,935,647.38		
2022	7,859	1,485	9,344	7,472	27,001	34,473	3,631	5,713	9,344	11,795,279,732.17		
2023	6,166	1,597	7,763	3,261	3,379	6,640	3,129	4,634	7,763	1,163,731,619.88		
Total	36,164	6,273	42,437	32,806	71,254	104,060	16,427	26,010	42,437	26,545,664,109.76		

Table 9. Micro Small Medium Enterprises (MSMEs) Business Name Registration and EmploymentGenerated, Province of Bohol

Source: Department of Trade and Industry- Bohol

Moreover, the operation of cooperatives in the province is also thriving to provide socio-economic benefits to its member. As of 2023, there are 701 Registered Cooperatives in Bohol. Of the total cooperatives registered, only 191 cooperatives are operating and compliant to CDA requirements, operating with a total asset of Php 6,196,761,233.58 and with a total membership reaching to 158,798.

The banking sector of the province had been growing with an increasing number of banks established in Bohol. As of 2022, there were 125 banks established in the province where 8 banks were added from the 117 banks in year 2021. In terms of total number of accounts, it also rose from 724,999 in 2018 to 857,454 in 2022. Additionally, total bank deposits grew from 50,934,448 in 2018 to 69,329,749 in 2022.





Source: Philippine Deposit Insurance Corp. (PDIC)

In terms of **Gross Domestic Product (GDP)**, the Province of Bohol posted a growth of 7.05% in 2022 estimated at Php 171.09 billion, higher than the 4.3% growth rate registered in the previous year. Bohol Province represents the third largest economy in the ntral Visayas region following Cebu Province and Cebu City.

In 2022, all industries in the province grew except for Agriculture, forestry, and fishing which declined by 9.5%. In terms of





Source: OpenStat, Philippine Statistics Authority (PSA)

share of the major industries to the economy of the province, wholesale and retail trade, and repair of motor vehicles and motorcycles had the largest share, accounting 33.1%, followed by,

Agriculture, forestry and fishing with a share of 11.7%, then, closely followed by financial and insurance activities at 8.8%.



Source: Philippine Statistics Authority (PSA)

Chapter II. Development Framework of Bohol

Over-all Vision Statement and Development Goals

The Province of Bohol's development has been guided by its vision and mission statements. These statements, which have been crafted through consultative and participatory processes with practically all stakeholders and sectors represented, continue to serve as the overall guiding beacon of what Bohol wants to be, summarizing the aspiration of its people and the foundation of government's continued efforts of providing services, facilities and overall governance of the province.

The vision and mission statements, for several provincial administrations, have been adopted and revalidated to ensure that the province's goals, strategies and programs are aligned with such long-term development state. Below are the vision and mission statement of the Province of Bohol.



To effectively achieve this vision, the Provincial Government of Bohol (PGBh) has periodically updated its Development Framework, which basically covers the medium-term (term-based) development priorities for the next three years. Such priorities are attuned to current realities and situation, to make government-led interventions as pro-active as possible to address issues and concerns of all sectors.

Recognizing the important role of planning in governance, the Provincial Governor, Vice Governor, members of the Sangguniang Panlalawigan and the members of the Management Executive Board (MEB) crafted a roadmap, which specify the priority strategies that will serve as its Agenda in next three years. The Strategic Governance Roadmap 2025 of the Provincial Government of Bohol (PGBh) aims to position Bohol as a "Smart-Resilient Province advancing Climate-Smart Agriculture and Sustainable Tourism." It still identifies the two economic drivers of agriculture and tourism as the primary industries that will bring the progress of its constituents and bring back the normalization of the economic and social activities that were greatly affected by the COVID-19 pandemic.

Strategic Governance Roadmap of the Provincial Government of Bohol (PGBh)

While supporting the existing Vision and Mission for the Province of Bohol, the Roadmap establishes to position Bohol as a Smart-Resilient Province advancing Climate-Smart Agriculture and Sustainable Tourism. It means that information and communication technology will be utilized to support the further progress of the two economic drivers of agriculture and tourism and the processes of governance for the welfare of the public. The roadmap, likewise, contains the Strategic Change Agenda and the Core Values that are expected from each employee of the PGBh.



Contained in the roadmap are nine (9) Strategic Change Agenda that are envisioned to provide the impetus for accelerating the necessary development of Bohol, which will benefit the majority of the Bol-anons.

• Strategic Change Agenda Mind Maps

The means to achieve this position is through the Strategic Change Agenda, which are divided into the 5 Core of *Sustainable Environment, Climate-smart Agriculture, Sustainable Tourism, MSMEs/Entrepreneurship, Human Capital/Workforce* and the 4 Support of *Governance, Infrastructure and Utilities, Health and Social Services* and *Information and Communication Technology (ICT)*. Each of the Change Agendum is contextualized in a Mind Map that shows the Objective, Measures, and the Key Results Areas (KRAs).

- a) Develop a resilient and green Bohol through the implementation of sound environmental program for *Environmental Sustainability*;
- b) Transition from conventional agricultural practices to *Climate-smart Agriculture*;
- c) Innovate tourism management practices in the province for *Sustainable Tourism*;
- d) Foster a business-enabling environment for resilient and competitive MSMEs that will contribute to the provincial economy for *MSMEs/Entrepreneurship*;
- e) Expand workforce in agriculture and tourism sectors and align their skills to match the current and emerging industry demands for *Human Capital/Workforce*;
- f) Institute reforms and improvements to shift from compartmentalized to strategic local *Governance*;
- g) Build resilient Infrastructure and Utilities anticipating future demands;
- h) Make resilient communities by creating an inclusive *Health and Social Services* in the province; and
- i) Integrate information systems to digitalize government, agriculture, and tourism processes to streamlined services for the *Information and Communication Technology*.

• Deliverables for the Planning Period

A presentation of the deliverables for each year of the planning period is presented after each Mind Map. Each table contains the proposed programs, projects and activities (PPAs) that will support each Key Result Areas (KRA). The targets will be the measure upon which assessment will be made to know the status of its accomplishment.

• Core Values

The Roadmap also contains the Core Values of Competence, Professionalism and Integrity, which each officer or employee of the PGBh is expected to adhere and put at heart.

Agriculture Sector Vision and Goals

Agriculture is one of the economic drivers of Bohol and is the main source of livelihood of majority of the Boholanos. It provides income and livelihood to farmers and fisher folks and their dependents. Agriculture also enables traders, processors, retailers, and other groups to, directly or indirectly, make a living. Given these facts, it is only logical that the agriculture sector needs to be fully harnessed to enhance agricultural productivity and improve the incomes and welfare of farmers and fisherfolks.

Consistent with this drive and with consciousness that agriculture is an economic driver of Bohol, the Provincial Government has been steadfast in implementing agri-based support programs and projects to achieve food sufficiency and attain economic growth through agri- industrialization. The province is fortunate to be selected as a one of the sites of the Philippine Rural Development Project (PRDP) that aims to develop an inclusive, market- oriented, climate-resilient agri-fishery sector by strategically investing in priority value chains. Based on suitability, market potential, impact on the poor and number of growers/ producers, identified provincial priority commodities that go through prioritization are the following: coconut, dairy, native chicken, swine, high-value vegetables, cassava, inland fishery, mariculture, cacao and coffee.

The Provincial Government also desires to develop its high-value crops, vegetables, banana, mango, coconut and other economically beneficial crops like palm oil and cassava. Fishery development in the province is also being prioritized, considering that Bohol is a major source of fishery products in Region VII. As to livestock and poultry development, the Provincial Government has been continually responsible in improving and safeguarding the said industries with the promotion of native chicken and the research on the development of a Boholano strain of native chicken.

Much attention has been focused in the agriculture sector, Bohol being predominantly agricultural with more than half of its total land area devoted to agriculture. The development effort of the province is guided by its vision for a Green Bohol, a Competitive and Sustainable Agro-industrial Province in the Visayas. The figure below presents the mind map of the agriculture sector with the overall goal for a Climate-Smart Agriculture aiming for a transition from Conventional Agriculture to Climate-Smart Agriculture through resilient agriculture production, agri-fishery modernization and agri-clustering.



Chapter III. Priority Commodity Value Chain Development

The priority commodities identified in the province are: coconut, livestock-dairy, native chicken, vegetable, cassava, inland fishery, swine, mariculture (seaweeds), cacao and coffee. The identified commodities were ranked using the criteria as to suitability, market potential, impact on the poor and as to the number of growers or producers.

Table 10. Priority Commodities, Bohol, 2015											
					Prior	ity Commodities					
Commodity Prioritization Worksheet	Woi	aht	COCONUT		LIVES	TOCK-DAIRY	NATIVE CHICKEN				
(CRITERIA)	i cigit		Raw Score	Weighted Score	0	Weighted Score	Raw Score	Weighted Score			
I. Suitability	20%		_	0.00	<u>0</u>	0.00	<u>0</u>	0.00			
II. Market Potential	30%			2.70		2.70		2.34			
1. Market size		20%	<u>9</u>	1.80	<u>9</u>	1.80	<u>9</u>	1.80			
3. Market growth potential		20%	<u>9</u>	1.80	<u>9</u>	1.80	<u>9</u>	1.80			
4. Ease of entry		20%	<u>9</u>	1.80	<u>9</u>	1.80	<u>6</u>	1.80			
5. Potential for value addition		40%	<u>9</u>	3.60	<u>9</u>	3.60	<u>7</u>	2.40			
III. Impact on the Poor	20%			1.80		1.80		1.80			
1. Number of Poor People Involved		50%	<u>9</u>	4.50	<u>9</u>	4.50	<u>7</u>	4.50			
2. Potential to Raise/Create Income		50%	<u>9</u>	4.50	<u>9</u>	4.50	<u>6</u>	4.50			
IV. Number of Growers/ Producers	30%		<u>9</u>	2.70	<u>6</u>	1.80	<u>3</u>	1.80			
Total Weighted Score	100%			7.20		6.30		5.94			
RANK				1st		2nd		3rd			

			Priority Commodities								
Criteria	Wo	iaht	HI-HV	HI-HV VEGETABLE		CASSAVA		IA-HITO -IF			
chena		igin	Raw	Weighted	Raw	Weighted	Raw	Weighted			
			Score	Score	Score	Score	Score	Score			
I. Suitability	20%		0	0.00	0	0.00	0	0.00			
II. Market Potential	30%			1.98		2.34		1.62			
1. Market size		20%	9	1.80	9	1.80	6	1.20			
3. Market growth potential		20%	9	1.80	9	1.80	6	1.20			
4. Ease of entry		20%	9	1.80	9	1.80	9	1.80			
5. Potential for value addition		40%	3	1.20	6	2.40	3	1.20			
III. Impact on the Poor	20%			0.90		1.80		0.60			
1. Number of Poor People Involved		50%	3	1.50	9	4.50	3	1.50			
2. Potential to Raise/Create Income		50%	6	3.00	9	4.50	3	1.50			
IV. Number of Growers/Producers	30%		6	1.80	6	1.80	3	0.90			
Total Weighted Score				4.68		5.94		3.12			
RANK				4th		5th		6th			

						Priority Co	mmoditie	es		
Critoria	Woi	aht	SWINE		MAR	ICULTURE	CACAO		COFFEE	
Citteria	weight		Raw	Weighted	Raw	Weighted	Raw	Weighted	Raw	Weighted
			Score	Score	Score	Score	Score	Score	Score	Score
I. Suitability	20%		0	0.00		0.00		0.00		0.00
II. Market Potential	30%			2.52		1.50		1.50		1.50
1. Market size		20%	9	1.80	6	1.20	6	1.20	6	1.20
Market growth potential		20%	9	1.80	6	1.20	6	1.20	6	1.20
4. Ease of entry		20%	6	1.20	7	1.40	7	1.40	7	1.40
5. Potential for value addition		40%	9	3.60	3	1.20	3	1.20	3	1.20
III. Impact on the Poor	20%			0.60		0.90		0.80		0.50
1. Number of Poor People Involved		50%	3	1.50	3	1.50	2	1.00	2	1.00
2. Potential to Raise/Create Income		50%	3	1.50	6	3.00	6	3.00	3	1.50
IV. Number of Growers/Producers	30%		6	1.80	2	0.60	2	0.60	2	0.60
Total Weighted Score	100%			4.92		3.00		2.90		2.60

COMMODITY PROFILE¹⁴

• Product Discription

Seaweeds refer to a wide range of photosynthetic non-flowering plant-like organisms that live either in marine or brackish water environment. Scientists classified them as algae because these are plants that have no true roots (rhizoids), stems and leaves. They are also called macro algae which differentiates them from micro-algae (Cyanophyceae), which are microscopic in size and are often unicellular.

Seaweeds are often classified into three main groups based on pigmentation i.e. green (Chlorophyceae), brown (Phaeophyceae) and red (Rhodophyceae). Brown seaweeds are usually large, with the Giant Kelp as one of the most popular examples. Red and Green seaweeds are usually smaller, generally ranging from a few centimeters to about a meter in length. Red seaweeds however, are not always red in appearance: their color can range from being purplish to brownish though they are still classified as Rhodophyceae due to their relative characteristics (McHugh, 2003).

In the Philippines, commercial domestication of seaweeds started in the late 1960s to early 1970s. The country's long coastlines proved to be ideal to cultivate *Euchuema cottonni, Eucheuma spinosom,* especially in Tawi-tawi, Sulu, Zamboanga del Sur, Sacol Islands, Palawan, Cuyo Island, Danajon Reef of Central Visayas, and Southern Leyte. ¹⁵ These are red seaweeds which are processed for food processing and pet food uses. Other species grown in the country are *Gracilaria, Caulerpa. Sargassum, Hydroclathrus, Porphyra.*¹⁶

Commodity Uses

Aside from being a primary producer in the marine ecosystem and as a habitat and breeding ground for various organisms, several species of seaweeds are identified to be commercially valuable for food consumption and industrial applications. The main uses of seaweeds are: as a source of agar, as a source of carrageenan, as a source of alginate, and for culinary or food use. The species used for each purpose also differs. However, there are also seaweeds species that can both be eaten raw or cooked or processed into agar, alginate, or carrageenan. There are at least 221 species of seaweeds exploited globally. Of these, 145 species are for food and 101 species for phycocolloid production (Zemke-White and Ohno 1999).

¹⁵ The Economics of Seaweed Farming in the Philippines, Jose E. Padilla & Harlan C. Lampe ¹⁶ Seaweed Industry of the Philippines by Rizalina M. Legasto,

http://www.fao.org/docrep/field/003/AB719E/AB719E09.htm

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¹⁴ Value Chain Analysis: Seaweeds (Carrageenan) Visayas Cluster, DA-PRDP

Product Forms in the Philippines

In the Philippines, there are about 893 species of seaweeds recorded (Ang, et. al, 2013). About 350 of these species are found to have some economic value however, less than 5% of these are economically important and most have still to be developed (Trono, 1999).

The Kappaphycus, Euchema, Caulerpa, and Gracilaria species are the most collected and cultivated species in the country. About 98% of the total seaweed production is made of Kappaphycus and Euchema species which are mainly used for the production of carrageenan. The figure below shows the major species used by farmers in the country. Each species has many cultivars or varieties and strains that differ in color, branching, thallus characteristics, and preferred environment.



Source: BFAR Region VI/BFAR Region VII

Aside from processing into carrageenan, these red seaweeds can also be served as salads or pickled or processed into seaweed crackers and noodles. The technology of processing of seaweed crackers and noodles have already been transferred to several fisherfolk associations in the provinces through the efforts of BFAR and DTI. These value-added products are often sold at trade fairs or product expos that are arranged by DTI or private companies. Some also sell their seaweed chips and crackers at school canteens and sarisari stores though this is not done regularly and only depends on availability of labor and raw materials.



Caulerpa and Gracilaria though cultivatable in some areas, are still mostly from wild harvest. Caulerpa ("sea grapes" or "green-caviar") is consumed raw or served as salad. Gracilaria can be processed to produce agar or cultured to feed sea abalones. It can also be eaten in the form of salad.

The product forms of carrageenan in the Philippines are the following:

- a) **Raw Dried Seaweeds (RDS)** Raw material for processing into carrageenan; can either be cottonii or spinosom; with 38% or less moisture content. Farmers, traders, local processors, and exporters maybe engaged in the trading of RDS.
- b) Alkali Treated Cottonii (ATC) or Alkali Treated Cottonii Chips (ATCC) These are dried alkaline treated RDS. Alkaline treatment enhances the gelation properties of carrageenan. These are sold to carrageenan processors for further refining though most carrageenan processors undertake the alkaline-treatment activities themselves.
- c) Semi-Refined Carrageenan (SRC) The SRC is milled dried ATC and sold in powder form. There are two major grades for SRC, namely: pet and food grade. Food grade SRC is also labelled as Philippine Natural Grade (PNG) or Processed Eucheuma Seaweed (PES) in the world market.
- *d)* **Refined Carrageenan (RC)** The RC consists of two types: alcohol precipitated and the gel pressed. Gel pressed RC is cheaper than the alcohol precipitated RC. Alcohol precipitated RC is generally used when retaining true color of food is very critical.
- e) **Carrageenan Blended Products** These are SRC and RC blended with other hydrocolloids and ingredients (i.e., sugar, salt, gum, etc.) to produce custom-made formulations for end-user clients.

• Production Trends

Production in the Philippines fishery sector was valued at Php 316.7 billion in 2012. The biggest contributor is aquaculture, accounting for 29% of total value of fishery production.

Seaweeds contribute 60% of the total aquaculture production. Milkfish is second, contributing 13% of the overall aquaculture production. Tilapia is also a major aquaculture product, contributing 9% of total production.

The fishery sector is a major export earner for the Philippines, reaching US\$ 883 million in revenues. Seaweeds is the second top export of the Philippines from the fishery sector, accounting for 24% of total export earnings for the sector.



The local seaweed industry contributes at least P10 billion (US\$ 200 million) to the Philippine economy. Growth in the industry is said to be inclusive because seaweed growers are said to capture 60% of total value added. The Philippine seaweed industry provides livelihood for up to 200,000 coastal families involving 1.2 million people.

Seaweed growing is also known to benefit the marine ecosystem. It attracts other marine species to thrive in the area by providing food, shelter and breeding grounds. Seaweed growing also promotes ecological stability and sustained productivity in the reef. In the Danajon Reef, it reduced destructive fishing practices by providing an alternative livelihood for fishing households.

Eucheuma, Gracilaria and *Caulerpa* are the most commonly cultured and collected species of seaweeds in the country. Majority or 91% of total seaweeds produced is of the *Eucheuma* variety. The *Eucheuma cottonii* is the most popular among seaweeds grower because it is easy to cultivate and has a high market price.

The *spinosum* variety is easier to produce because less capital is needed compared to *cottonii*. Unlike *cottonii* which is grown in monolines, *spinosum* can be grown in the rocky seabed and when managed properly, can be harvested all year round without the need for further replanting. But there are reports that some seaweed growers have





begun to grow *spinosum* in mono lines and productivity is higher compared to growing in the seabed.

Majority or 98.4% of local seaweed production is sold in the export market in raw dried seaweed (RDS) form or carrageenan extracts. Majority of the RDS being exported from the country is *E. cottonii*. But because of the opening of new markets, particularly in China and South Korea, *E. spinosum* is now up to 50% of RDS exports. The major suppliers of *cottonii* are ARMM, which contribute 55%-60% of Philippine production, and Zamboanga Peninsula and Palawan which contribute 35% and 10% of total production, respectively. The major suppliers of *Eucheuma spinosum* are Bohol, Palawan and ARMM. Bohol reportedly contributes 80% of national production.

The Philippines used to be the top supplier of raw dried seaweeds in the world, providing 70% of global supply of RDS. Now, the Philippines only contribute only 40% of global RDS supply. But the country remains the top supplier of Carrageenan in the world, serving 65% to 70% of worldwide demand. 54% of global seaweed production comes from China. This is equivalent to 12.8 million MT of fresh seaweeds. Indonesia is the second largest producer of seaweeds, contributing 27% or 6.5 million MT of global production, while the Philippines is now third, contributing 7% or 1.8 million MT of fresh seaweed production.



Table 11: Global Seaweeds Production (in M.T.): 2012-2016										
	2012	2013	2014	2016	2017	AAGR%				
WORLD	20,609,818	23,870,512	26,775,211	28,452,624	28,960,921	9.01%				
China	9,958,670	10,638,585	12,819,685	13,082,005	13,360,280	7.88%				
Indonesia	6,514,854	9,298,474	10,076,992	11,269,341	11,631,000	15.54%				
Philippines	1,751,071	1,558,378	1,549,576	1,566,361	1,404,519	-5.20%				
South Korea	1,019,587	1,126,578	1,082,027	1,193,348	1,348,065	7.45%				
North Korea	444,300	444,300	489,000	489,000	489,000	2.52%				
Japan	424,070	402,252	353,742	384,992	375,423	-2.71%				
Malaysia	331,490	269,431	245,332	260,760	205,989	-10.60%				
Zanzibar	150,876	110,438	133,020	172,490	111,142	-3.06%				
Madagascar	1,400	3,575	6,970	15,377	17,423	96.06%				
Solomon	6.000	11 01 0	12 162	12 200	10 5 90	14 740/				
Islands	6,990	11,812	12,102	12,200	10,580	14.74%				
Tanzania	6,510	6,689	6,705	6,750	7,500	3.69%				
Note: These in	clude producti	on of other type	of seaweeds li	ike gracilaria, h	rown seaweeds	sargassum				

Note: These include production of other type of seaweeds like gracilaria, brown seaweeds, sargassum, fusiform, kelps, etc. of minimal quantity. The production is dominated by Red Seaweeds of Eucheuma variety.

Seaweeds production has always been dominated by East Asian and Southeast Asian countries, accounting for 99.49% of global production in 2016. Cultivated seaweeds in East Asia, mainly China, Japan, South Korea and North Korea, are for food consumption while the skyrocketing

demand for the hydrocolloids for the past years saw increased production of Eucheuma seaweeds in Southeast Asia and China. China leads in the volume of seaweeds production, holding 46.13% of the global supply, followed by Indonesia with 40.16%, and the Philippines with 4.85% farmed volume of the total world produce. For the past five years, total seaweed aquaculture production has steadily been increasing from 20,609,818 M.T in 2012 to 28,960,921 M.T. in 2016 with an average annual growth of 9.01%.

During the previous years, almost 70% of China's cultured seaweeds is made of brown seaweed varieties. The most notable of them is the Laminaria Japonica or Japanese Kelp which grows in temperate cold-water zones.

Both Indonesia and Philippines are red seaweed-producing countries. Red seaweeds which is mainly used for the extraction of carrageenan accounted for about 90% of the world production. From year 2000 to 2015, Indonesia's production has been rapidly increasing with an annual average increase of 31% while the Philippines had a slow growth of only 6% annually for the same period. In 2007, Indonesia overtook the Philippines in seaweeds production, with the latter even experiencing a dip in 2012. In 2015, the gap of the volume of production between Indonesia and Philippines reached over 9 million M.T. dominating the global production of Eucheuma seaweeds for carrageenan processing.

Ironically, seaweeds expert from the Philippines helped developed the seaweed industry in Indonesia, especially in improving farming practices and setting-up of seaweed processing facilities. Aside from having larger area suitable for seaweeds farming, more than double of the area of the Philippines, Indonesia's government has been very supportive in developing its seaweed industry.

Table 12. Top Carrageena	Table 12. Top Carrageenan Producing Countries								
Country	Estimated Production Capacity	% Share							
Philippines	36,400 M.T.	40.6							
Indonesia	17,000 M.T.	19.0							
China	12,000 M.T.	13.4							
South America	4,500 M.T.	5.0							
USA	4,500 M.T.	5.0							
France	3,500 M.T.	3.9							
Spain	3,300 M.T.	3.7							
Denmark	3,000 M.T.	3.3							
South Korea	2,000 M.T.	2.2							
Japan	1,700 M.T.	1.9							
Malaysia	1,700 M.T.	1.9							
Source: Adopted from PRDP Vi	sayas Cluster Value Chain Analys	sis (2014)							

In terms of carrageenan production, Philippines is still the top producing country accounting to more than 40% of the global suppy followed by Indonesia and China with 19% and 13% share respectively.

The development of carrageenan industry in the Philippines started in Cebu, where they established a semi-refined carrageenan processing facility for pet food in 1978. After constant

research and development, the first refined carrageenan processing facility was launched in 1986. From then on, carrageenan processing has been a highly important product in the country and in the world, being backbone of a multi-million-dollar global industry.

According to the Seaweed Industry Association of the Philippines (SIAP), the foremost Philippine seaweed association, the Philippines' top place in carrageenan production is also in danger of being taken over by Indonesia. Only 15% of the dried seaweed in Indonesia is locally processed. By 2020, the Indonesian government plans to domestically process 50% of its seaweed supply and has already taken efforts in encouraging local carrageenan processing through establishment of more warehouses and processing plants, and increased budget for development of seaweed supply. They have also invited China, their biggest seaweed market, to put up a processing plant in the country. At the rate Indonesia is going, SIAP estimates that the country is bound to overtake Philippines in two years' time. For the Philippines to remain competitive in carrageenan production, it has to increase its local seaweed supply at the most possible time.

Aside from the Philippines and Indonesia, other carrageenan- producing countries are China, South America and USA.

Domestic Production

Seaweeds farming is a commercial domesticated practice of fishermen families along the country's coastlines. Seaweeds contributed 63.82% to total volume of aquaculture production, followed by milkfish (18.09%) and tilapia (11.77%). The table below shows Philippines seaweed culture production from 2012 to 2016.

Table 13. Seaw	Table 13. Seaweed Production in the Philippines (in M.T.): 2012-2016										
REGION	2012	2013	2014	2015	2016	Ave. %					
						Growth					
Philippines	1,751,070.63	1,558,377.75	1,549,575,966	1,566,361.70	1,404,519.23	-5.20%					
ARMM	629,363.41	609,164.54	622,995.60	627,435.50	613,174.28	-0.62%					
Mimaropa	458,525.52	340,691.28	361,352.59	395,125.83	312,922.64	-7.77 %					
Zamboana	246 204 21	210 700 70	206 161 12	204 190 45	102 107 61	E 92%					
Peninsula	240,304.31	210,789.70	200,101.12	204,180.45	195,107.01	-3.85%					
Central Visayas	136,159.08	124,247.39	104,943.46	96,588.56	88,737.40	-10.09%					
Western Visayas	71,712.48	65,173.45	77,466.92	80,572.11	81,800.27	3.82%					
Northern	42 052 22	42 261 22	40 704 02	20 400 12	20.064.14	1 2 4 9/					
Mindanao	42,055.55	42,201.52	40,764.65	59,409.15	59,904.14	-1.24%					
Bicol Region	61,503.50	61,089.90	59,863.75	55,382.09	34,199.45	-12.10%					
Eastern Visayas	34,172.07	27,884.62	17,925.84	18,513.49	18,411.26	-12.85%					
Caraga	21,296.59	19,876.72	16,383.89	14,798.71	10,313.22	-16.06%					
Davao Region	1,937.17	3,686.46	6,005.49	8,384.02	7,652.49	46.02%					
Calabarzon	45,131.03	41,413.27	32,617.74	23,492.73	3,642.01	-35.49%					
Central Luzon	1,195.53	1,596.50	2,368.53	1,827.50	300.18	-6.13%					
Cagayan Valley	1,138.77	2,243.86	527.18	266.46	196.89	-10.24%					
Socsargen	506.8	20.58	144.05	358.65	71.36	143.22%					
Ilocos Region	69.04	58.16	34.97	26.47	26.03	-20.40%					

Source: PSA Fisheries Statistics of the Philippines, 2017

The table above shows that ARMM dominated seaweed production in the country with 43.66% share in 2016, followed by MIMAROPA (22.28%) and Zamboanga Peninsula (13.75%). In general, Philippines has experienced a negative growth in terms of seaweed production for the last five years. Based on reports from industry situationers published by PSA, weather disturbances such as typhoons and El Nino, high incidence of ice-ice, and decreasing farm productivity were the primary reasons for this decline.

The most notable decline in the recent years was recorded in two (2) consecutive years, 4.88 % 2011 to 2012 and 11.0% in 2012 to 2013. Major seaweed producing areas such as Palawan, Zamboanga Sibugay, and Bohol were confronted with various constraints such as heavy siltation of sea water, unavailability of planting materials, "ice-ice" disease, flash floods, strong current and several typhoons that washed out seaweed farms.

Damaged assessment by BFAR showed that more than 2,000 hectares of seaweed farms in MIMAROPA, Central and Eastern Visayas and the Bicol Region were affected by typhoon Yolanda in 2013.

Damages caused by "ice-ice" has reached about 15% production losses between 2011 and 2013, equating to a loss of over US\$ 310 million based on a value (Cook et.al 2016). In 2012, the top producing provinces in Visayas and Mindanao suffered from "ice-ice" disease throughout the year.

In 2014, the seaweed industry still experienced a decline though it was only reported to be a little less than 1%. Still, factors that contributed to the decrease were strong water current and flash floods which washed—out seaweeds farms, shortage of available planting materials, infestation of "ice-ice" and red tide, and intense heat.

Seaweed production only went up in 2015 with 1.08%. MIMAROPA, ARMM and Western Visayas were the top contributors to the incremental increase. Good weather conditions, less occurrence of diseases and continuous government assistance by way of provisioning planting materials, favored seaweed production all year round.

A huge decline was then again observed in 2016, with a 10.33% lower performance than the previous year. Lower harvest was mainly observed from seaweed farms in MIMAROPA, Bicol Region and CALABARZON. Most seaweed farms were affected by high water temperature brought by El Niňo phenomenon and others were attacked by "ice-ice" disease which resulted to stunted growth. Likewise, insufficient and poor quality of planting maerials prompted some operators to venture into other sources of livelihood like construction works.

This negative trend in the total national seaweed supply poses a serious threat to the Philippine Seaweed industry, especially to carrageenan production. If the local supply base can not support the requirements of its local processors, these companies will have to resort to importation of raw materials from mother seaweed producing countries to continue operating. Some multi-national companies may also resort to transferring their base of operations to other producing countries to ensure efficiency and lessen production costs.

The succeeding figure further illustrates the percentage share of regions in seaweed production. The top five (5) seaweed producing regions in the Philippines are ARMM (Region XV),

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MIMAROPA (Region IV-B), Zamboanga Peninsula (Region IX), Central Visays (Region VII), and Western Visayas (Region VI).



The production levels of ARMM and Zamboanga Peninsula comprise about 57% of the Philippines' total seaweed production. Out of the 21 provinces in Mindanao, only about 14 of these provinces have produced more than 100 MT of seaweeds. The top producing provinces in Mindanao are Tawi-tawi, Sulu, Zamboanga Sibugay, Maguindano and Zamboanga City.

MIMAROPA, which is composed of Marinduque, Oriental, and Occidental Mindoro, Romblon, and Palawan, is the second largest seaweed-producing region with more than 25% of the total supply. About 99% of the total seaweed in MIMAROPA is produced in Palawan. The Office of Provincial Agriculturist estimates its seaweed production area to be about 5,698 hectares with 80.0% located mostly in its northern side.

Region VI and Region VII which hold the 5th and the 4th place respectively in terms of seaweed production are both in the Visayan Region. Eastern Visayas or Region VIII is in the 8th place with 1.18% contribution to the total Philippine seaweed culture supply.

Visayas accounts for about 12.0% of the Philippines seaweed supply. Of the 15 carrageenan processors in the country, 7 have processing plants located in the cluster.

The succeeding table shows the production of the Visayas cluster from 2012 to 2016.

Table 14. Seaweeds Production in the Visayas, 2012-2016						
Province	2012	2013	2014	2015	2016	Ave % Growth
WESTERN VISAYAS	71,712.48	65,173.45	77,466.92	80,572.11	81,800.27	3.825
Antique	70,146.40	63,632.31	76,686.27	80.018.20	81,087.03	4.23%
Guimaras	1,552.88	1,518.44	748.93	530.75	685.76	-13.21%
Negros Occ.	7.24	4.36	2.87	2.93	18.58	115.57%
Iloilo	2.85	16.4	18.39	20.3	6.27	117.14%
Aklan	3.11	1.94	10.46	-	2.63	
Capiz	-	-	-	-	-	
CENTRAL	136,159.08	424,247.39	104,943.46	96,588.56	88,737.40	-10.095
VISAYAS						
Bohol	124,947.92	114,046.65	29,752.95	88,372.48	81,310.37	-10.16%
Cebu	10,398.62	9,788.59	4,742.91	7,965.88	7,428.08	0.01%
Negros	776.01	367.27	408.34	225.03	289.4	-14.44%
Oriental						
Siquijor	36.53	44.88	39.26	25.17	9.55	-21.90%
EASTERN	34,172.07	27,884.62	17,925.84	18,513.49	18,411.26	-12.85%
VISAYAS						
Leyte	21,541.62	16,331.80	17,571.80	18,085.43	17,948.97	-3.61%
Northern	301.87	371.74	353.86	354.95	284.39	-0.31%
Samar						
Eastern	12,326.83	11,181.07	0.18	73.11	176.82	10137.3%
Samar						
Samar -	-	-	-	-	1.08	
Southern	1.66	-	-	-	-	-
Leyte						
Biliran	0.10	0.01	-	-	-	-

Source: BFAR, 2017

Central Visayas is the highest seaweeds producing region in the cluster, contributing 46.96% of the total production in the Visayas. Bohol is the top producing province contributing about 92% of the region's total production followed by Cebu, Negros Orintal and Siquijor. In general, these four provinces experienced decreasing trend mostly attributed to the 7.2 magnitude earthquake in Bohol and the consecutive typhoons that affected the region in the last quarter of 2013 up to the end of 2014-Yolanda, Seniang, and Quennie. Seaweed growers were also not able to recuperate since the El Nino phenomenon heavily affected the region in 2015. Both Cebu and Bohol were declared to be in a state of calamity during this season.

Western Visayas accounts for about 43% of the total seaweed production in the Visayas. From 2012-2016, it has experienced an average of 1.52% annual growth rate. Though the region experienced a huge decline in 2013 due to bad weather conditions and presence of "ice-ice", there was increased support coming from BFAR, LGUs and NGOs to help fisherfolk in the region who were affected by super typhoon Yolanda.

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In Eastern Visayas, the top producing provinces are Leyte, Northern Samar and Eastern Samar. Same as in Central Visayas, there was a general decrease in production for the last five (5) years that was attributed to typhoons (Yolanda, Seniang and Queenie) which happened in the region. A massive decline was observed in Eastern Visayas after the typhoon Yolanda. Seaweed growers in the said province stopped farming and did not restock or replant after the typhoon even with the help and assistance from BFAR and NGOs. They opted for other sources of income since the low price of RDS in the previous months discouraged them from going back to seaweeds farming. Moreover, coastal municipalities of the province received assistance from Japanese International Cooperation Agency (JICA), United Nations Development Programme (UNDP) and other organizations to put up micro-enterprises which they now prefer as their main livelihood.

One of the biggest carrageenan processors in Cebu reported that Eastern Samar is a good source of RDS in terms of quality and is a good contributor to their supply base. There is also a carrageenan processing plant in Tacloban City which requires a stable and quality supply source.

Table 15. World Fresh Seaweed Production (In Metric Tons): 2008-2012							
Country	2008	2009	2010	2011	2012	%	%
						Share	Growth
World	15,878,931	17,356,607	19,009,667	20,978,933	23,776,449	-	50%
China	9,933,885	10,495,905	11,092,270	11,549,555	12,832,060	54%	29%
Indonesia	2,145,061	2,963,556	3,915,017	5,170,201	6,514,854	27%	204%
Philippines	1,666,556	1,739,995	1,801,272	1,840,833	1,751,071	7%	5%
S. Korea	921,024	858,659	901,672	992,283	1,022,326	4%	11%
N. Korea	444,300	444,300	444,300	444,300	444,300	2%	0%
Japan	456,337	456,426	432,796	349,737	440,754	2%	-3%
Malaysia	111,298	138,857	207,892	239,450	331,490	1%	198%
Vietnam	35,700	33,600	35,000	206,900	234,600	1%	557%

World Seaweed Production

The country is only growing seaweeds in 60,000 of the 200,000 hectares, or 30% of the areas suitable for seaweed growing. Because of the lack of growth in the seaweed production segment, capacity utilization of seaweed processors has dropped and importation of RDS into the country has increased. Indonesia has overtaken the Philippines in 2007 as the second largest producer of seaweeds. Indonesia accounts for 65% of the coral triangle seacoast, which has been identified to be highly suitable for seaweed production. Seaweed production is well-dispersed in small production farms all over the eastern part of the country.

Production Areas per Region

Based on the estimates provided by SIAP, the Philippines has a total of 700,000 hectares of farmable areas for seaweeds - 500,000 hectares are for deep-sea farming while the 200,000 hectares are located along the coastlines. However, only 60,000 hectares or about 12% has been used or planted. Out of the 60,000 ha. farm areas all over the country, 88% are highly developed or nearly fully utilized. There is still 7,200 hectares that are underdeveloped or undergoing development. This only shows that the country has still a lot of potential to increase production performance considering its untapped and underdeveloped seaweed farmable

areas. Out of the 11 areas identified to be highly developed, two are in the Visayas - Antique and Bohol.

The table below shows the existing production areas and potential areas for expansion per province in the Visayas cluster.

Table 16. Areas of Seaweeds Production and Potential Expansion in the Visayas					
Province	Estimated Potential Area (ha.)	Existing Area of Production (ha.)			
Region 6	2,014.31	2,924.60			
Aklan	1.15	5.15			
Antique	1,300	2,370			
Capiz	-	-			
Guimaras	28.66	39.0			
lloilo	674.50	482.95			
Negros Occidental	10.0	27.5			
Region 7	504.62	4,024.03			
Bohol	149.62	2,714.36			
Cebu	200.0	1,120.67			
Negros Oriental	150.0	185.0			
Siquijor	5.0	4.0			
Region 8	5,285.0	2,371.0			
Leyte	1,335.0	942.0			
Biliran	320.0	1.0			
Soutern Leyte	230.0	34.0			
Samar	990.0	35.0			
Eastern Samar	580.0	341.50			
Northern Samar	1,830	53.50			
Visayas Total	7,803.93	9,679.93			

Source: Consolidated from BFAR

In addition to the 9,679.93 hectares existing farm areas in the Visayas, an additional 7,803.93 has. is estimated by local BFAR offices as areas for expansion. Based on the estimate of BFAR PFO Cebu, assuming that a hectare of seaweed farm can contain about 40,000 plants, it can produce about 24,000 kgs. of seaweed or 3,428.0 kgs. of RDS. However, that estimate is not very helpful in projecting production volume considering the many methods and varieties that can be used for planting of seaweeds. In addition, there is no detailed mapping of these areas with the exact coordinates and description of its status that could help in providing baseline data for possible expansion efforts.

Among the regions, *Eastern Visayas* has the largest area for expansion with 5,285 ha. potential area and 1,830 of which is in Northern Samar. Despite the assistance from NGOs to growers in the area, the capacity to upgrade their production has not been fully realized or has not been taken advantaged of.

Western Visayas follows with the second largest area for expansion led by Antique province at 1,300 hectares. Caluya Island has already been crowded with seaweed farms, while other

municipalities in the province have not been fully populated yet. In the province, Caluya has displayed the most mature and developed seaweeds industry.

In Central Visayas, the total expansion area is about 504.62 ha. shared almost equally by Bohol, Cebu and Negros Oriental. Siquijor only has an additional 5.0 ha. of estimated expansion area in addition to the existing 4.0 ha. Bohol and Cebu showed the largest planted areas respectively, followed by Negros Oriental and Siquijor.

The table below shows the top 10 producing provinces per region in the Visayas area. The ranking is based on the size of production area however, the number of farmers per municipality is also provided to provide a view of how big is the operations in the area. No production volume was provided since not all municipalities are regularly monitoring volume of production in the area and some can only record those that pay auxiliary fees to LGUs which can not really reflect the production per municipality.

Table 17. Top Seaweeds Producing Municipalities Per Region							
Rank	Province	Municipality	Production Area (ha.)	No. of Farmers			
Region 6							
1	Antique	Caluya	2,308.50	3,078			
2	Antique	Culasi	308	615			
3	Iloilo	Estancia	300	84			
4	Iloilo	San Dionisio	131	1,004			
5	Iloilo	Concepcion	28.45	108			
6	Negros Occidental	Escalante City	25	48			
7	Guimaras	Sibunag	24	170			
8	Iloilo	Carles	23.50	261			
9	Antique	Pandan	19	38			
10	Guimaras	San Lorenzo	15	27			
Region 7							
1	Bohol	Bien-Unido	2,282	1,500			
2	Bohol	Talibon	1,200	1,700			
3	Cebu	Bantayan Is.	800	4,000			
4	Bohol	Candijay	417	1,100			
5	Bohol	Getafe	407	1,200			
6	Bohol	Mabini	330	450			
7	Bohol	Carlos P. Garcia	109	360			
8	Bohol	Panglao	66	75			
9	Bohol	Buenavista	55	176			
10	Cebu	Sta. Fe	50	80			
Region 8							
1	Leyte	Bato	910	1,500			
2	Eastern Samar	San Policarpo	99.0	145			
3	Eastern Samar	Guiuan	59.50	97			
4	Eastern Samar	Gen. McArthur	50	52			
5	Eastern Samar	Artetche	49	195			
6	Eastern Samar	Salcedo	40	118			
7	Samar	Daram	25	50			

Table 17. Top Seaweeds Producing Municipalities Per Region					
Rank	Province	Municipality	Production Area (ha.)	No. of Farmers	
8	Eastern Samar	Lawa-an	25	26	
9	Southern Leyste	Balagawan	19	60	
10	Southern Leyte	San Pedro	15	100	

Source: BFAR, 2017

In the whole Visayas, largest production areas are found in Caluya (Antique), Bien-Unido and Talibon (Bohol), Bato (Leyte) and Bantayan (Cebu). Antique and Bohol have highly developed seaweeds farms while Cebu and Leyte have semi-developed farms in selected coastal areas.

Caluya is a first-class municipality of seven islands, comprised of 18 barangays and located 36 km away from mainland Antique. The main livelihood of the coastal families in the area is seaweeds farming, especially in the islands of popular with tourists Sibato, Sibolo, Panagatan Cays and coastal barangays like barangay Imba. Aside from its rich waters that have also been recently popular with tourists, the municipality is also known for the open pit coal mines located in the island of Semirara.

In Central Visayas, Danajon Bank hosts the double barrier reef off the shared coastal waters of Bohol, Cebu, Leyte and Southern Leyte. The reef is a rare geological formation which is a center of marine biodiversity in the Pacific. Due to the protection offered by the double barrier reef, various species have thrived, with rich fishing grounds which has been a source of supply for provinces nearby. When seaweeds farming started in 1980's in the Visayas, the double barrier reef also offered protection to seaweeds cultivated in the areas within Danajon Bank proximity. Major seaweed production areas in Bien-Unido and Talibon, Bohol and Dawahon Reef off Bato, Leyte are an effect of this, as coastal communities who fish in the area also perform seaweeds farming as other means of livelihood. Methods and practices of farmers from Dawahon Island are even adapted from the Danajon area in Bohol since they have almost the same water conditions. Other major seaweeds producing areas with more than 300 ha. seaweed farms are located in municipalities of Candijay, Mabini and Getafe of Bohol.

Seaweeds production in Central Visayas increased by 2.5% from 121,273 MT in 2009, to 124,247 MT in 2013, while production in Bohol increased by 0.2% from 113,795 MT in 2009, to 114,047 MT in 2013, but production has been declining since 2012 up to 2018 (Figure 35).


Source: PSA OpenSTAT, 2018

Most of the seaweed production in the province is concentrated in the Danajon Bank of Bohol, covering the municipalities of Bien Unido, Talibon and Getafe. Hingotanan Island in Bien Unido, is a major producer of seaweeds. There are several seaweed processors buying RDS from the island. Marine Colloids for Pilipino Integrity (MCPI) buys 10MT of RDS from Hingotanan per month. Other buyers are able to buy more RDS from the municipality because they extend financing to their seaweed suppliers. Getafe is also another major seaweed producing municipality in Bohol. It produces both *cottonii* and *spinosum* seaweeds in roughly equal volumes. MCPI buys 6 MT of RDS from the municipality each month.

Seaweeds is а global commodity well-suited to the double barrier habitat because of the reef's shallow depth. The inner and outer reefs are divided by an inshore channel which is only 28 meters deep at most. Seaweeds is not only economically significant for Bohol but also for Region VII. Eighty-one per cent (81%) of seaweeds production in Central Visayas comes from Bohol, and 97% of Bohol's production seaweeds is





harvested from the Danajon Bank seaweeds farms. Thus, it is expected that when Bohol's production decreases, production in Central Visayas also decreases. For example, in the recent series of calamities from 2012 to 2014, Bohol seaweeds production decreased and so did the Region's production performance (Figure 37).



The province of Bohol has a very huge potential to expand its seaweed production areas. Bohol has 4,142 hectares of seaweed farms, which is mostly concentrated in the municipalities facing the Danajon Reef. But the province still has a potential for expansion of 4,673 hectares for shallow seaweed farming and 9,300 hectares for deep sea seaweed farming. Among the different municipalities of Bohol, Bien Unido is considered the top seaweed growing municipality in terms of existing and potential seaweed growing. Bien Unido has 7,600 hectares allocated as a mariculture zone. 3,700 hectares or 47% is suitable for seaweed growing and it is the biggest potential area for seaweed growing in the entire Visayas.

Table 18. Existing and Potential Areas for Seaweed Farming in Bohol												
		Areas in	Hectares									
Municipality	Planted	Potential	Deep Sea Potential	Total								
1. Bien Unido	2,282	1,733	2,000	6,015								
2. Talibon	1,200	1,200	1,700	4,100								
3. Inabanga	100	600	1,000	1,700								
4. Getafe	400	400	1,500	2,300								
5. CP Garcia	50	150	700	900								
6. Ubay	20	80	300	400								
7. Tubigon	30	170	700	900								
8. Mabini	10	90	400	500								
9. Buenavista	10	90	300	400								
10. Clarin	10	90	300	400								
11. Panglao	20	30	150	200								
12. Candijay	10	40	250	300								
TOTAL	4,142	4,673	9,300	18,115								

Nature and Structure of the Industry

Value Chain Mapping

In the case of Central Visayas, Bohol is the main source of RDS. Majority of the seaweeds in Bohol are delivered to Cebu for processing or further transported to Metro Manila and Laguna. These dried seaweeds are loaded to ferries or RORO vessels in local ports of Talibon, Getafe, and Ubay depending on the trader and the proximity to their consolidation areas. Some traders, especially those from island-areas, directly transport their seaweeds using their own motorized boats which can carry about 15-20 MT of dried seaweeds.

The following figure shows the carrageenan value chain map from input provision to final sale.



Figure 38. Value Chain Map of Seaweeds Carageenan Industry in the Visayas

The Carrageenan Value Chain covers five basic segments - input provision, production, drying, trading and processing - before the product is sold to final users which can either be export or local market.

The input supply segment functions as the provider of raw materials needed for seaweed farming such as seedlings, soft tie, PE ropes, and stakes. The cultivation stage or the production segment is responsible for planting, care and management, and harvesting.

After harvest, the seaweeds can either be sold in fresh or dried form. Wet seaweeds are mostly sold to local wet market for direct consumption or institutional buyers such as hotels and restaurants. There are also instances wherein farmers sell young seaweeds to be used as seedlings, often to BFAR for their seedling distribution projects. These however, are onetime transactions only.

The drying segment on the other hand basically include post-harvest activities such as cleaning, drying and packing seaweeds for carrageenan processing or export of dried seaweeds. The trading stage on the other hand involves the collection, consolidation, and delivery of raw dried seaweeds to processors or exporters. Processing turns raw dried seaweeds into Semi-refined Carrageenan and Refined Carrageenan and carrageenan-blended products.

Carrageenan is traded directly by the companies or through a distributorship agreement in a given area. In either mode, agents of carrageenan companies, who are almost always also food technologists, work closely with the user/buyer to develop the appropriate blend and mixture of carrageenan depending on the application. After working out the right formulation, the processor starts the production in mass quantity.

Expanded – Vulnerability and Suitability Assessment (E-VSA)

Project Area Prioritization

The need to make the agriculture sector sustainable and resilient has been a long-standing concern to withstand the realities of climate change. The DA-PRDP developed a science-based tool for assessing climate change vulnerability. The Expanded Vulnerability and Suitability Assessment (EVSA) is a decision-support tool that could incorporate biophysical variables and climate abnormalities through integration of identified relevant and available parameters and generate a ranking of municipalities based on the established framework.

The EVSA, however, is limited in applicability to non-land-based commodities such as seaweeds. The Provincial Core Planning Team (PCPT) customized a similar tool, nonetheless patterned largely after the EVSA, but which incorporates many other criteria for ranking municipalities according to priority in intervention implementation. The criteria for municipality ranking are as follows:

Poverty Incidence	10%
Number of Seaweeds Farmers	25%
Area Planted	25%
Potential for Expansion	20%
As a GEF site	20%
TOTAL	100%

The ranking results based on the above criteria is shown in Table 19 and Map 24.

Table 19. Rai	nking of N	lunicipalit	ies for Pr	iority Inte	rventi	ion Impler	mentation	Using Cu	stomized C	riteria f	or Seawee	eds
Municipalities	Poverty Incidence	No. of Seaweed Farmer's	Area Planted	Potential for Expansion	GEF Site	Poverty Incidence (10%)	No. of Seaweed farmer's (25%)	Area Planted (25%)	Potential for Expansion (20%)	GEF Site (20%)	TOTAL	Rank
Bien Unido	48.8	1108	2282	3733	1	4.88	277	570.5	746.6	0.2	1599.18	1
Talibon	36.4	919	1200	2900	1	3.635	229.75	300	580	0.2	1113.59	2
Getafe	43.5	705	400	1900		4.35	176.25	100	380	0	660.60	3
Inabanga	34.7	190	100	1600		3.474	47.5	25	320	0	395.97	4
Pres. Garcia	51.8	300	50	850	1	5.183	75	12.5	170	0.2	262.88	5
Candijay	34.5	400	10	290		3.45	100	2.5	58	0	163.95	6
Tubigon	26.7	16	30	870		2.669	4	7.5	174	0	188.17	7
Mabini	46.8	250	10	490		4.676	62.5	2.5	98	0	167.68	8
Buenavista	45.5	100	10	390	1	4.545	25	2.5	78	0.2	110.25	9
Ubay	39.6	76	20	380	1	3.964	19	5	76	0.2	104.16	10
Calape	25.4	370				2.542	92.5	0	0	0	95.04	11
Clarin	26.4		10	390		2.637	0	2.5	78	0	83.14	12
Panglao	16.4	20	20	180		1.636	5	5	36	0	47.64	13
Anda	30.9	25				3.094	6.25	0	0	0	9.34	14
Tagbilaran City	7.9	30				0.785	7.5	0	0	0	8.29	15
Valencia	28.5	20				2.851	5	0	0	0	7.85	16
Maribojoc	17.3	15				1.73	3.75	0	0	0	5.48	17
San Isidro	44.9					4.489	0	0	0	0	4.49	18
Danao	42.7					4.274	0	0	0	0	4.27	19
San Miguel	42.7					4.271	0	0	0	0	4.27	20
Dagohoy	40.7					4.067	0	0	0	0	4.07	21
Trinidad	39.7					3.969	0	0	0	0	3.97	22
Pilar	38.8					3.881	0	0	0	0	3.88	23
Carmen	38.4					3.838	0	0	0	0	3.84	24
Catigbian	37.0					3.698	0	0	0	0	3.70	25
Sierra Bullones	35.1					3.505	0	0	0	0	3.51	26
Alicia	33.9					3.393	0	0	0	0	3.39	27
Batuan	32.3					3.229	0	0	0	0	3.23	28
Sevilla	31.7					3.172	0	0	0	0	3.17	29
Balilihan	31.3					3.13	0	0	0	0	3.13	30
Dimiao	30.6					3.06	0	0	0	0	3.06	31
Guindulman	30.3					3.026	0	0	0	0	3.03	32
Duero	29.6					2.961	0	0	0	0	2.96	33
Sikatuna	29.0					2.898	0	0	0	0	2.90	34
G-Hernadez	28.0					2.801	0	0	0	0	2.80	35
Sagbayan	24.0					2.401	0	0	0	0	2.40	36
Bilar	22.6					2.255	0	0	0	0	2.26	37
Loon	22.0					2.198	0	0	0	0	2.20	38
Loboc	21.5					2.152	0	0	0	0	2.15	39
Jagna	19.6					1.963	0	0	0	0	1.96	40
Lila	19.6					1.962	0	0	0	0	1.96	41
Loay	19.3					1.93	0	0	0	0	1.93	42
Antequera	18.5					1.845	0	0	0	0	1.85	43
Corella	17.9					1.788	0	0	0	0	1.79	44
Dauis	17.0					1.701	0	0	0	0	1.70	45
Alburquerque	15.9					1.594	0	0	0	0	1.59	46

Table 19. Ranking of Municipalities for Priority Intervention Implementation Using Customized Criteria for Seaweeds													
Municipalities	Poverty Incidence	No. of Seaweed Farmer's	Area Planted	Potential for Expansion	GEF Site	Poverty Incidence (10%)	No. of Seaweed farmer's (25%)	Area Planted (25%)	Potential for Expansion (20%)	GEF Site (20%)	TOTAL	Rank	
Cortes	15.9					1.588	0	0	0	0	1.59	47	
Baclayon	15.1					1.508	0	0	0	0	1.51	48	
TOTAL	30.1	4,544	4,142	13,973	5								





The top priority areas for seaweeds in the province of Bohol are: Bien Unido, Talibon, Getafe, Inabanga, Pres. Carlos P. Garcia, Candijay, Tubigon, Mabini, Buenavista and Ubay. All five Global Environment Facility (GEF) sites, namely: Buenavista, Talibon, Bien-Unido, Ubay and Pres. Carlos P. Garcia are all included and are shown as priority areas in the ranking. The GEF focuses on natural resource management in globally significant biodiversity areas, seascapes and landscapes, and in priority degraded coastal areas. The GEF support is concentrated in Marine Protected Areas (MPAs) within the Danajon Reef, a PRDP priority area with a globally significant biodiversity value, where demand for an improved and effective resource management is high.

The potential interventions in the Investment Plan are based from the identified constraints in the VCA per industry segment. Each intervention is with corresponding target areas that are included as priority areas in the ranking. The locations of the support facilities (research and

training center, nurseries, drying platforms and storage facilities) and production expansion areas are all under the top priority areas. However, three inland municipalities of San Isidro, Danao and San Miguel are included in the top 20 ranking due to the consideration on high poverty incidence of the 3 municipalities. Even if the said municipalities are without seaweed production but still, attention must be given using the principle of ridge-to-reef consideration in environmental protection and conservation. Moreover, interventions like agri-support facilities may be established in the areas, as these are proximate to the seaweed production areas of Talibon, Bien Unido, and Ubay.



INVESTMENT PLAN

A leading seaweed processor – exporter aptly puts it, "If you solve the seaweed supply problem, you will solve 80% of the industry's problems."

The seaweed value chain in Bohol, especially in the production segment has a vital contribution to the economic development of the region in general, and the province's agricultural development in particular.

Seaweed processors are located in Cebu while seaweed production is concentrated in Bohol. RDS from Bohol are bought and shipped by traders to processor/exporters in Cebu. Increasing seaweed production in Bohol will help resolve the low capacity utilization of seaweed in Cebu. Additionally, the value added captured by seaweed growers is also very high. Fifty-five per cent (55%) of total value added captured for the production of Semi-Refined Carrageenan go to seaweed farmers or growers. This would imply that developing the local seaweed industry can most likely lead to inclusive growth and notable reduction of the poverty level in Bohol's coastal areas.

The biggest market for carrageenan is the dairy industry, accounting for 30% of the total market. The dairy production of Ubay Stock Farm can benefit considerably from the value chain of seaweeds in the province.

However, the Philippines has a big supply deficit and low capacity utilization of seaweed processors. It fills in the supply gap by buying RDS from Indonesia even if Indonesia's RDS quality is lower than the Philippines.

The Province of Bohol will invest in the seaweed value chain by increasing the efficiency and productivity of its seaweed farms to improve the competitiveness of Philippine RDS in the export market. The investment plan will also lessen the dependence of the local seaweed processors on Indonesian RDS and reduces the risks associated with imported raw materials.

A final note worth considering: During the presentation of the PCIP draft to the Stakeholders, a point raised was the absence of the processing function in Bohol. All processors are in Cebu, yet the bulk of production is in Bohol. It was then suggested that Bohol sets up its own seaweed processing plant and seek funding from PRDP and the group of manufacturers in Bohol and other funding institutions.

The suggestions are apt not only for fast-tracking the economic development of Bohol, but for its competitiveness in the international carrageenan market. As the value of seaweed far exceeds the value of other aquaculture products, venturing into seaweed processing is guaranteed to make Bohol a game changer in the seaweed industry.

Competitiveness Vision

The Seaweed Industry in the Visayas collectively envisioned the cluster to be the: "Leading Seaweed and Carrageenan Supplier in the Local and Global Market"

The competitiveness direction of the Visayas Seaweed Industry for 2018 – 2023, of which the province of Bohol is part of the Visayas cluster is characterized by the following objectives:

- To increase and ensure stable seaweed supply in order to accommodate processors' requirement through improved access and availability of good quality planting materials.
- To improve over-all farm productivity through adoption of good aquaculture practices, mapping and zoning of farm areas, and climate-adaptive and resilient farming technologies.
- To improve and remain as one of the country's best RDS supplier by improving postharvest and logistic facilities.
- Diversify to other seaweed species to take advantage of their market potential with the help of R&D and IEC activities on commercial farming and harvesting practices.
- Contribute to the development of rural and coastal communities with inclusive growth while also taking responsibility for environmental concerns.

Each of the producing provinces will have a different role to take in realizing this collective vision considering the difference in the present industry status and capacity. Central Visayas, on the other hand, can initiate in the diversification of the industry by developing the product and market for other seaweed species while still remaining as a preferred supplier of carrageenan in the global market.

Bohol, being the main supplier of seaweeds in Central Visayas, will invest in the seaweeds value chain by aggressively pursuing increased production while aiming to be environmentally sustainable. As a province with high potential for expansion and a very strong competitive advantage, the challenge is to continue to increase seaweeds production while ensuring economic, social, and environmental sustainability.

To achieve the competitiveness vision, major interventions in the province should be pursued such as the following:

- Expansion of production areas.
- Upgrading of current seedling production system to increase supply and access to good quality seedlings.
- Development and adoption of a climate-smart production system complemented with the use of ridge-to-reef management approach and mapping and site assessment technologies.
- Development of capacity of farmers and sustained adoption of good aquaculture practices that encompass over-all seaweed production system including site selection, seedling management, harvesting, and drying.
- Establishment of common service facilities to upgrade post-harvest practices and serve as buying stations.

Summary and Rank of Constraints and Opportunities

The constraints indicated in the value chain of seaweeds are herein ranked according to priorities. It can be noted that top priority is given to constraints that affect mostly the production of seaweeds due to its declining supply and productivity. However, those that follow are inter-related having one constraint affected and or connected to the next constraints. These also show that proposed interventions are not "stand alone"; it will be simultaneously responded with convergence of resources by a number of players in the value chain.

Table 20. Summary of Constraints										
CONSTRAINTS	RANKING									
INPUT SUPPLY SEGMENT	3									
 Inadequate supply of good quality seedlings 										
- Limited production capacity of multiplier farms of good quality seedlings										
PRODUCTION	1									
 Declining seaweed production and productivity due to: 										
- Lack of climate resiliency measures of seaweeds which are vulnerable to										
changes in water temperature, salinity, strength of waves, etc.										
 Intensive crop farming bringing chemicals to tributaries of run-off waters 										

- Poor farm management practices and low adoption of good aquaculture	
practices	
- High siltation	
- High production cost	
FIELD PROCESSING/ DRYING / POSTHARVEST	2
Limited drying and storage facilities	
 Lack of technical capacities for quality control at farm level 	
 Contaminated dried seaweeds with dirt, sand, and other foreign objects 	
affecting quality	
TRADING	4
 Inconsistent quality of traded RDS in some areas 	
 Limited access to market and price information 	
 Fluctuating and unstable prices of RDS 	
 High transport cost from farm to trade areas and processors 	
(Poor road network)	
No collective marketing	
 Low volume of supply of Raw Dried Seaweeds 	
Limited Access to Capital	
Lack of Mobility Logistics	
SUPPORT SERVICES	5
 Lack of info on Good Aquaculture Practices (GAqP) 	
 Lack of providers on GAqP for seaweed farming 	
ENABLING ENVIRONMENT	5
Lack of clear delineation of farm boundaries	
Lots of idle seaweed farms	

Table 21. Summary of Opportunities
OPPORTUNITIES
INPUT SUPPLY SEGMENT
 Availability of technology (e.g. branch and spore cultures and micropropagation techniques)
that can grow high-yielding and rapidly growing seed stocks
Availability of planting materials at the farm level after each cropping cycle
PRODUCTION
Large potential expansion areas
 Seaweeds farms need only permits based on declared farm size
 Low start-up costs of seaweed farming
 Low maintenance requirements of seaweeds farms
FIELD PROCESSING/ DRYING / POSTHARVEST
 Farmers base dryness of seaweeds for sale on physical observation
Improvised drying platforms
TRADING
 Huge demand for RDS by local processors and in the export market
 Price incentives for good quality raw dried seaweed
 Huge market potential for other species and other applications of Kappaphycus
 Manufacturing, process technology – capability to extract carrageenan and tailor to specific applications
 Advanced processing technology and facilities

High demand for carrageenan in the export market

- Established cooperatives and associations that can facilitate technology transfer
- Production credit at limited amounts from traders and kin

ENABLING ENVIRONMENT

 Seaweed culture is a low- impact, environment-friendly income-generating activity for coastal areas that has potential for eco-development and tourism projects

Proposed Interventions

The interventions are ranked according to priority. The reason is to identify the interventions that are urgently needed for a particular value chain segment or function. Prioritization is used so as to create a bigger impact to a particular value chain function even if it is the first to be implemented among all other interventions.

The Core Planning Team formulated customized criteria for ranking the segment where the intervention will be applied. The table showing the ranking is presented below.

Table 22. Ranking of Interventions of the Value Chain Segments													
Value Chain Segment/ Interventions	Impact to Value Chain/ Industry	Sustains Competive ness	Builds Capacities	Improves Economies of Scale	TOTAL	RANK							
Input Supply	15	15	25	10	65	3							
1) Establishment of On-farm Nursery													
Seaweed Growing	25	15	25	25	90	1							
1) Expansion of Production Areas													
2) MPA Strenghtening/ Demo Farms													
3) OD (GAqP, MPA)													
Field Processing	20	25	10	20	75	2							
1) Support Facilities													
Trading	10	10	10	10	40	4							
1) Ogranizational Devt. (OD)													
2) Farm-to-Market Roads (FMR)													
3) Delivery Vehicles													

Using the value chain segment ranking, all the proposed interventions and the corresponding costs of each proposed interventions are presented in Table 23 below.

Table 23. Rank	ing of I	nterventions and Estimated Proiect Cost	
Segment/ Function	Rank	Proposed Interventions	Estimated Cost (in Pesos)
Input Supply	3	Upgrading of Seedling Production System	5,500,000.00
		Transfer of Technology on Cultivar Production (GEF sites)	1,200,000.00
		Establishment of On-farm Seaweed Nurseries (Non-GEF sites)	5,000,000.00
		On-farm Seaweeds Nursery (GEF site)	16,900,000.00
		Integrated Natural and Coastal Resources Devt. and Mgt.	7,600,000.00
		Organizational Development	5,150,000.00
Production	1	Development and Adaption of Climate-Smart Production System	
		- 4,130 hectares (Expansion to Potential Seaweed Areas)	743,400,000.00
		- 9,300 hectares (Expansion to Potential Deep-Sea Farms)	1,674,000,000.00
		Mangrove Planting in Heavily Silted Areas	400,000.00
		Provision and Distribution of Floaters, Lines, etc.	3,200,000.00
		Trainings on Good Aquaculture Practices (GAqP)	500,000.00
		MPA Strengthening	40,000,000.00
		Development of Farm Tourism Activities in MPA	1,000,000.00
		Techno Demo	1,000,000.00
Field Processing	2	Construction of Support Facilities	
Drying/		- 14 Communal Drying Platforms with Storage Facilities	140,000,000.00
Postharvest		- 5 Permanent Working Areas and Farm House	37,500,000.00
		- 5 Docking Facilities	25,000,000.00
		 Provision of Weighing Scales and Motor Bancas 	1,850,000.00
		Capability development on Proper Drying, Storage and Postharvest Handling	10,000,000.00
Trading/	4	Rehabilitation and Upgrading of Access Roads	
Marketing		 - 37 FMRs (204.36 kms. =Total Road Length) 	4,474,000,000.00
		Provision of Working Capital	1,000,000.00
		Provision of Delivery Vehicles	2,970,000.00
		TOTAL	7,197,170,000.00

Investment Priorities

The over-all estimated investment cost for seaweeds is **P7.2 Billion** where the biggest bulk of the interventions which represents 62% of the total estimated cost is for the rehabilitation and upgrading of access roads. Farm to market road infrastructures play a significant role in providing access and link from production sites to the market. While, the development of the seaweeds industry amounts to P2.8 Billion, of which the largest share, about 89% is for the development and expansion of seaweed production areas.

The proposed interventions identified in the 3-year Investment Plan are based on the gaps and constraints indicated by segments in the Value Chain Analysis conducted for the industry. The formulation of the PCIP has been subjected to series of consultations, arriving at a consensus

2024

2024

on the prioritized interventions. Results from the EVSA ranking are used as reference in identifying locations of proposed projects.

Table 24. Investment Plan Summary											
	Proposed Interventions	Estimated Project Cost (in Pesos)									
1	Upgrading of Seedling Production System	5,500,000.00									
2	Transfer of Technology on Cultivar Production (GEF sites)	1,200,000.00									
3	Establishment of On-farm Seaweed Nurseries (Non-GEF sites)	5,000,000.00									
4	On-farm Seaweeds Nursery (GEF site)	16,900,000.00									
5	Integrated Natural and Coastal Resources Devt. and Mgt.	7,600,000.00									
6	Organizational Development	5,150,000.00									
7	Development and Adaption of Climate-Smart Production System										
	 4,130 hectares (Expansion to Potential Seaweed Areas) 	743,400,000.00									
	 9,300 hectares (Expansion to Potential Deep-Sea Farms) 	1,674,000,000.00									
8	Mangrove Planting in Heavily Silted Areas	400,000.00									
9	Provision and Distribution of Floaters, Lines, etc.	3,200,000.00									
10	Trainings on Good Aquaculture Practices (GAqP)	500,000.00									
11	MPA Strengthening	40,000,000.00									
12	Development of Farm Tourism Activities in MPA	1,000,000.00									
13	Techno Demo	1,000,000.00									
14	Construction of Support Facilities										
	 14 Communal Drying Platforms with Storage Facilities 	140,000,000.00									
	 5 Permanent Working Areas and Farm House 	37,500,000.00									
	- 5 Docking Facilities	25,000,000.00									
	 Provision of Weighing Scales and Motor Bancas 	1,850,000.00									
15	Capability development on Proper Drying, Storage and Postharvest	10,000,000.00									
	Handling										
16	Rehabilitation and Upgrading of Access Roads										
	 37 FMRs (Total Road Length = 204.36 kms.) 	4,474,000,000.00									
17	Provision of Working Capital	1,000,000.00									
18	Provision of Delivery Vehicles	2,970,000.00									
	TOTAL	7,197,170,000.00									

• PCIP Matrix for Seaweeds

Key Gap/ Constraints	Brief Description of Potential Intervention	Target Result/ Outcome	MFO/ Sub-	Target A	reas to be c	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Ph	ted Projec ip '000 in I	t Cost VI)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Subproject Implementation	Y1	Y2	Y3				
Segmer	t: Input Sup	ply														
1. Inadequa te supply of good quality seedlings	 Upgrading of current seedling production system to increase supply and access to various cultivar of good quality seedlings Upgrading of gene bank where different cultivars can be stored R and D on identifying strains that are resilient to changes in temperature and salinity 	1 gene bank upgraded Various strains developed that are CC resistant Availability of new disease- resistant seedling varieties		Sinandigan, Ubay -do- -do-	- do- -do- -do-	-do- -do- -do-	Tropical Cyclone Storm Surge Drought	Mapping of storm surge zones to establish facilities away from possible storm surges Use of climate resilient technologies and facilities Provision of Insurance by PCIC	Lead: BFAR, DOST- PCAARD, P/MLGU, SEAFDEC, BISU, SUC's Public-Private Partnership – SIAP, NGO'S, Cooperative Association BISU-Candijay, SEAFDEC BFAR (Sorsogon)- Research SUPPORT: SIAP-Upgrading of facilities/ Accreditation	1.0	2.0	1. 0	BFAR OPA	PLGU will provide salary of 1 personnel as counterpart		 Sustainability Accreditation of Research Center Registration or patenting of disease- resistant varieties Creation of Certifying Body for seedlings Accreditation of Nursery Operators Monitoring and Evaluation of Research Center and Nurseries Formulation and adaption of Operations and Policy
	 Implementation of the latest micro propagation techniques and tissue culture technologies to 	Availability of the latest technology on micro propagation (tissue culture		-do-	-do-	-do-			BFAR, SUC, SEAFDEC	0.5	0.5	0. 5	BFAR			Manual for Research Center - Augmentation of staff from BFAR and continuing

Key Gap/ Constraints	Brief Description of Potential	n Target Result/ Outcome	MFO/ Sub-	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Ph	ted Projec ip '000 in l	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention		MFO	Y1	Y2	Y3			Subproject Implementation	Y1	Y2	Y3	1			
	develop and mass produced															 capability building Adaptability of new seedlings and methods Availability of adequate certified seedlings every cropping season Adaption of new seedling varieties & farming methods Adaptability of cultured seedlings from the lab to wild environment More field testing, documentation and further research Adaptability trials Water quality monitoring Consciousnes s on proper banding

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be (covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Ph	ted Projec ip '000 in I	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	intervention	Outcome		Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
	Transfer of Technology on Cultivar production (Planting materials)	4 GEF On- site demo established	MFO 2	GEF Sites Buenavista -1 Talibon- 2 BienUnido- 2 Ubay- 1 CPG 2			Disease (Ice- ice) Pollution Tropical Cyclone-Bien Unido, Buenavista, CPG, Talibon, Ubay Flood - Bien Unido, Buenavista, CPG, Talibon, Ubay Drought - CPG, Talibon Sealevel rise - CPG, Talibon Storm Surge - Bien Unido, Talibon, Ubay	Adoption of pest and disease resilient seedling varieties Adoption of new climate resilient farming methods Provision of insurance by PCIC Water quality monitoring Mangrove Reforestation using appropriate species to act as water breaks during storm surges Mapping of storm surge zones to establish facilities away from possible storm surges	BFAR, OPA, DA- PRDP-GEF	0.800	0.2	0. 2	NPCO BFAR PLGU FARMLG U			 Lack of funds Tap coops, NGOs, private persons or other agencies Calamities Crop Insurance (PCIC) ACPC
- Limited production capacity of multiplier farms of good quality seedlings	Set up On-Farm sea-based nurseries at identified seaweeds communities to serve as grow out system	6 Non-GEF sites on farm sea-based nurseries 8 GEF pilot sites sea- based nurseries		Calape-1 Buenavista-1 Getafe-1 Candijay-1 Talibon-2 BUnido-2 CPG-2 Uba-1 Buenavista- 1	Getafe 2 Talibon 2 Bien Unido 2 Mabini 1	Talibon 2 Bien Unido 2 Getafe 2	Disease (Ice- ice) Pollution Tropical Cyclone - Bien Unido, Buenavista, Candijay, Getafe,	Adoption of pest and disease resilient seedling varieties Adoption of new climate resilient farming methods Utilization of reusable planting materials	OPA, BFAR, DA- PRDP SIAP	1.0 8.7	2.0 1.6 5.0	2. 0 1. 6	BFAR PLGU DA- PRDP- GEF PG's roll over	0.5 ha seaweed nursery Per area GEF sites has 1.0 hectare per area		 Lack of funds Tap coops, NGOs, private persons or other agencies Calamities Crop Insurance (PCIC)

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estima (Ph	ted Projec p '000 in l	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	IVIFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
							Mabini, Talibon Flood- Buenavista, Candijay, Mabini Drought - Mabini, Talibon Sea Level Rise - Getafe, Talibon Storm Surge - Bien Unido, Getafe, Mabini, Candijay Saltwater Intrusion - Bien Unido	Enactment of Mariculture Zone/Park Ordinance of MLGUs Provision of insurance by PCIP Water quality monitoring Conduct of Solid Waste Management trainings Mangrove Reforestation using appropriate species to act as water breaks during storm surges Mapping of storm surge zones to establish facilities away from possible storm surges Construction of climate resilient sea wall for areas affected by rising sea levels					DA PRDP I-REAP	4.0 Has. Seaweed nursery for AFFAS etc.		- ACPC
										(based on busine ss plan for total product ion						High mortality during transport

Key Gap/ Constraints	Brief Description of Potential Intervention	Target Result/ Outcome	MFO/ Sub- MFO	Target A	areas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estima (Pł	ted Projec np '000 in I	et Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
										cost includin g nursery at 1.0 hectare per pilot area)						 Provision of sea transport Implementatio n of Good Aquaculture Practices (GAqP) Use of styro box or appropriate transport box Mobility support Sustainability Formulation and adaption of Operations and Policy Manual for Nurseries and BPSFPC Use of climate resilient technologies/f acilities (Climate resilien cultivars/ materials)
	 Integrated Natural and Coastal Resources Development and Management 			Province wide					OPA, BFAR, BEMO, MLGU	2.800	2.80	2.	BFAR, PGBh, MLGU, CLEC Clusters	With existing regular functions of PENRO, MENRO and BEMO from existing NRMP of		 Lack of budget of LGUs Strengthen Convergence initiatives Low priority of LGUs

Key Gap/ Constraints	Key Gap/ Constraints Brief Description of Potential Intervention Intervention 0	Target Result/	MFO/ Sub-	Target A	Areas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Pł	ted Projec np '000 in I	t Cost ⁄/)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Subproject Implementation	Y1	Y2	Y3	Ĩ			
	 Implementation of GAqP Coastal law enforcement Integrated coastal resource management Strengthening of Barangay Enforcement Team (BET) Solid Waste Management Strengthening of CLEC Cluster and CLEC PTWG Strengthening of Convergence on Bohol Coastal Resource Mgt. Task Force and Task Group Kalikasan/ Kadagatan Strengthening on PTWG on CRM Certification 													MLGUs		- Strengtnen advocacy

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	Areas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Pł	ted Projec np '000 in	ct Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Subproject Implementation	Y1	Y2	Y3				
	 Organizational Development of BPSFPC and I- REAP Proponent Groups Organizational and Financial Management Training on Nursery Operations and Management Quality control and monitoring of seedling growers 	12 Accredited Nurseries 3 trainings 15 Monitoring 1 Monitoring Team functional 1 Monitoring vehicle		14 Nursery sites 1 training	2 trainings	2 trainings			BPSFPC BFAR OPA CDA DTI SIAP NGOs Monitoring Team	.050	5.0 M .050	.050	BFAR, PLGU, MLGU OPA, MLGU			Mismanagement of funds - Financial literacy - Records keeping - Hire professional management team in the coop (RPC model) Culture, attitude and aptitude - Organizational development
Segmer	nt: Seaweed	Growing (Produ	ction)												
Declining seaweed production and productivity - Lack of climate resiliency measures of seaweeds which is	1. Development and adoption of a climate smart production system complemented with the use of ridge-to-reef management approach and mapping and site assessment technologies	3,830 hectares of existing farmers who will expand to potential shallow seaweed areas mapped and databased 9,300 hectares of		Bien-Unido - 2000 has. Talibon- 1,300 has. Inabanga - 20 has. Getafe- 400 has. CPG-150 has. Ubay-15 has Mabini- 90 has.	-do- -do- -do- -do- -do- -do- -do-	-do- -do- -do- -do- -do- -do- -do-	Tropical Cyclone - Anda, Bien Unido, Buenavista, Candijay, CPG, Getafe, Mabini, Talibon, Ubay Flood - Buenavista, Candijay, Mabini, Ubay	Use of Climate- Resilient Varieties and disease- resistant seaweed varieties to withstand adverse climatic conditions; Planting of windbreaks Planting of mangroves	Lead Player: Bohol Provincial Seaweed Farmers Producers Coop (BPSFPC) Alumar Farmers and Fishers Association (AFFAS) and other 2 PG's recipient of PRDP IREAP	841.140 Expansi on Cost (4,673 has. @180,0 00/ has.)		1.674 B For Deep -sea Farm 9,300 has. @18 0,000 /ha.)	PRDP PLGU MLGU BFAR			Boundary dispute between Bohol, Cebu, Leyte and Southern Leyte - Activation of CeLeBoSoLe - Co- management among 4 provinces Carrying

Pest and Diseases

Disease Surveillance

Existing and

Potential

Seaweed

Growers

Management/

PCIC Insurance

-do-

-do-

-do-

90 has.

50 has.

Candijay-

Buenavista-

-do-

-do-

-do-

Drought -

Talibon

CPG, Mabini,

seaweed farms

• Set up new

expansion

areas in

potential

deep-sea

farms

changes

in water

to

vulnerable

Carrying Capacity of the area

- Zoning

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Ph	ted Project p '000 in N	t Cost ∕I)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Subproject Implementation	Y1	Y2	Y3	1			
temperatu re, salinity, strength of waves, etc. - Intensive crop farming bringing chemicals to tributaries of run-off waters	in highly suitable areas and in potential deep- sea farms Develop mangrove farms in areas with observed heavy siltation to reduce impact of upland and lowland run-off to marine environment	5 mangrove farms established at 1.0 hectare per farm		Calape-10 has. Anda-5 has. TOTAL – 4,130 has. 2.0 has. in Ubay	-do -	-do- 3.0 has. at Calape, Anda, Inabanga	Sea Level Rise - CPG, Getafe, Talibon Storm Surge - Anda, Bien Unido, Getafe, Mabini, Talibon, Ubay Siltation Pollution from non observnce of carrying capacity Pest&Diseases	Water quality and substrate monitoring Training on solid waste management Coastal resources mapping	Support: BFAR, OPA, Processors, MLGUs SIAP DENR, BFAR, MLGU, Fisherfolk Association/ cooperative	.100		.100				 Regulatory mechanism of the LGU thru the permitting system Coastal resource mapping CC mitigating measures Crop insurance (1000 sq.m/ha will be covered by insurance) Water quality and substrate monitoring Enforcement of regulatory measures Sustainability Formulation and adaption of Operations and Policy Manual for farming and production Membership to Bohol coopreneurs

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estima (Ph	ted Projec ip '000 in I	t Cost VI)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	intervention	Outcome		Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
	2. Provision/ Distribution of Floaters, Lines and Other Farm Implements	1 PG from each 11 LGUs		Calape, Mabini, Getafe, Candijay Talibon Bien-Unido Buenavista Pres. Garcia Ubay Inabanga Anda					OPA, BFAR, DA- PRDP	3.200			PRDP, PLGU			
Declining seaweed production and productivity - Poor farming practices	3. Conduct Trainings on Good Aquaculture Practices (GAqP) for Seaweed Farming	11 trainings with 330 beneficiaries		All Seaweed Areas					Lead Player: Bohol Provincial Seaweed Farmers Producers Coop (BPSFPC) (AFFAS)	0.500 Trainin g Cost: (30 trainin gs.050 /						 High siltation, freshwater run off and improper waste management Regular
	 4. MPA Strengthening Mainstream awards and recognition of Best MPAs Strengthening of MPA Technical Working Group Biophysical Monitoring and Underwater Assessment of MPA's Development of Sustainable Mangrove Froesystems 	- Devt. of eco- friendly Boardwalk Mangrove Projects		Asinan Reef Fish Sanctuary (Buenavista Cataban Marine Sanctuary (Talibon) Guindacpan Marine Sanctuary (Talibon) Bilang- bilangan Marine Sanctuary (Bien Unido) Hinogotan West Marine Sanctuary			Tropical Cyclone- Bien Unido, Buenavista, CPG, Talibon, Ubay Flood - Bien Unido, Buenavista, CPG, Talibon, Ubay Erosion - Buenavista Drought - CPG, Talibon Sealevel rise - CPG Talibon	Use of Climate- Resilient Varieties and disease- resistant magrove species to withstand adverse climatic conditions; Planting of windbreaks Pest and Diseases Management/ Disease Surveillance PCIC Insurance water quality and substrate monitoring	Existing and Potential Seaweed Growers Support: BFAR, OPA, Processors, MLGUs, ATI, NGOs	g) 40.0 (5M per MPA – GEF Funds						 monitoring in the implementatio n of Integrated Coastal Resource Mgt. (particularly on coastal law enforcement) Integrated Watershed Mgt. (including Bank Stabilization) Solid Waste Management GAqP

Key Gap/ Constraints	Brief Description of Potential Intervention	Target Result/ Outcome	MFO/ Sub- MFO	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estima (Pł	ted Projec p '000 in l	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Establishment of Sea ranching of endemic fish species within the sanctuary Development of Eco-Tourism Activities within the Sanctuary	(environment al fee, dispersal of mangrove crablets, establishmen t of boardwalk, mangrove nursery) -(sea cucumber/ sand fish, abalone, brown lip, Guardhouse rehabilitated managed by PO and Bantay Dagat Introduction of water activities such as diving and snorkeling Establishment of Market Buoys, signages among others		Y1 (Bien Unido) Sinandigan Marine Sanctuary (Ubay), Aguining Marine Sanctuary (CPG) Sidlakan Marine Sanctuary (CPG)	Y2	Υ3	Storm Surge - Bien Unido, Talibon, Ubay Saltwater Intrusion - Bien Unido Pollution Pest & Diseases	Training on solid waste management Coastal resources mapping	Implementation	1.0	Y2	Y3				Weak MPA management Organizational development trainings Biodiversity Conservation
Declining seaweed production and productivity - High Siltation	Riverbank Stabilization Mangrove Rehabilitation Plantation	Length of riverbanks rehabilitated No. of hectares		Ipil and Carood Watershed			Tropical Cyclone, Flood, Erosion, Landslide, Drought, Sealevel Rise,	Climate resilient infrastructure Climate resilient small-scale irrigation facilities	DENR, BEMO, DA, OPA, BSWM, DA, ATI, KBOOM, Carood Management Council, PAMB	0.2			DENR, PLGU/ MLGU ATI			

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estimat (Ph	ted Projec ip '000 in I	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	WIFU	Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
	Forestry Development Sloping Agricultural Land Technology (SALT) Promotion of Organic Farming	planted/ rehabilitated No. of hectares in forest zone rehabilitated No. of hectares with SALT intervention No. of hectares					Saltwater Intrusion	Contour farming techniques to mitigate erosion and landslide risks. Construct small farm reservoirs and other rain collection techniques to harness and maximize water from tropical cyclones, mitigate effects of flood and address the need for water during droughts. Mangrove Reforestation using appropriate species Solid waste								
	Environmental and Social Safeguards							management training	PGBh DENR, BEMO, BFAR MLGUs Private Sector							 Area in conflict with Land Use Plan Harmonization of CLUPs Coastal resource mapping
Declining seaweed production and productivity - High productio n costs	1. Techno Demo to reduce cost by using Reusable and Biodegradable Materials	No. of Techno Demo Farms		Buenavista Talibon Bien Unido Ubay Pres. C.P. Garcia					LEAD Players: BFAR OPA BPSFPC MLGUs ATI	1.0						Lack of awareness on and willingness to adapt to new technologies - IEC - Waste mgt. (NaOH)

Key Gap/ Constraints	Brief Description of Potential Intervention	Target Result/ Outcome	MFO/ Sub- MFO	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estima (Ph	ted Projec np '000 in I	t Cost M)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
				YI	YZ	Y3			Implementation	YI	¥2	Y3				 Provide incentives No insurance of Seaweed Farms Provision of insurance by PCIC
Segmer	t: Field Pro	cessing/ [Drying	and Pos	t Harve	est										
Lack of drying and storage facilities	 Construction of Drying Platforms and Storage Facilities To be operated and managed by AFFAS Construction of Working Areas (Permanent working area and farmhouse) Construction of Docking Facilities 	14 Communal Drying Platforms with Storage 5 Common Service Storage Facilities and Working Areas 5 Docking Facilities 5 Motor Bancas (K416 Hp Pumpboats 1 Unit Pumpboat		Bien-Unido Talibon Inabanga Getafe CPG Ubay Tubigon Mabini Buenavista Clarin Panglao Candijay Maribojoc Tagbilaran City Talibon (San Francisco, Bansaan, Sag, Mahanay, Sto Nino, Guindacpan) Bien-Unido (Hingutanan East, Pinamgo) Getafe (Jandayan, Alumar, Campao Occ.)			Tropical Cyclone - Bien Unido, Buenavista, Candijay, CPG, Getafe, Mabini, Talibon, Ubay Flood - Buenavista, Candijay. Mabini, Ubay Erosion - Buenavista, Mabini Drought - COG, Mabini, Talibon, Tubigon Sealevel Rise - CPG, Getafe Storm Surge - Bien Unido, Getafe, Mabini, Panglao, Talibon, Ubay	Construction of climate resilient structures Mangrove Reforestation using appropriate species to act as water breaks during storm surges. PCIC Insurance Mapping of storm surge zones to establish facilities away from possible storm surges Construction of climate resilient sea wall for areas affected by rising sea levels	Lead Player: Bohol Provincial Seaweed Farmers Producers Cooperative Processors Traders SIAP	140.0 Drying Platfor m 37.5 Stora ge Facilit ies (Ware house) 25.0 Dockin gPlatfo rm Type Motor Bancas & Weighin g Scale						 Natural Calamities Climate resilient facilities Sustainability Regular maintenanc e M&E on Facilities Regular Monitoring and Audit (Financial, Facilities, Equipment)

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub-	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estimat (Ph	ted Projec p '000 in I	t Cost VI)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	intervention	Outcome		Y1	Y2	Y3			Implementation	Y1	Y2	Y3				1
		2 units weighing scale		Candijay Mabini Calape Calape, Candijay, Mabini, Getafe Calape, Candijay, Mabini, Getafe			Saltwater Intrusion - Bien Unido, Panglao Sinkholes - Tagbilaran City									
Lack of technical capacities for quality control at farm level	2. Conduct Trainings on Proper Drying, Storage and Postharvest Handling	12 Trainings 360 Participants		All Seaweed Areas					BFAR, OPA, SIAP MLGU's Fishery Technician BPSPFC	10.0 M						Willingness to attend and adapt to new technologies Onsite coaching and monitoring of skills
Poor quality of dried seaweeds due to contaminate d dirt, sand, and other foreign objects	3. Quality control measures through moisture content tester	8 moisture content testers procured							BFAR, OPA							
Segmer	nt: Trading/ I	Marketing														
Inconsistent quality of Raw Dried Seaweeds	Consolidation of raw dried seaweeds through establishment of buying station	1 Consolidation Center in Getafe and 12 Buying Stations in Talibon, Buenavista, Mabini, Bien-					Tropical Cyclone - Bien Unido, Buenavista, CPG, Getafe, Mabini, Talibon, Ubay	Construction of climate resilient structures Mangrove Reforestation using appropriate species to act as water breaks during storm surges.								-

Key Gap/ Constraints	Brief Description of Potential	Target Result/	MFO/ Sub- MEO	Target A	reas to be o	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estimat (Ph	ed Projec p '000 in N	t Cost ⁄/)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
Unstable and fluctuating prices of raw dried seaweeds	Intervention Provision of trading capital for RDS consolidation Provision of Compactor Provision of Motor Banca Provision of Pumpboat	Unido, CPG, Ubay 1 compactor 1 motor banca 1 pumpboat 16 HP	MFO	Y1	Y2	Y3	Flood - Buenavista, Mabini, Ubay Erosion - Buenavista, Mabini Drought - CPG, Mabini, Talibon Sealevel Rise - CPG, Getafe, Talibon, Storm Surge - Bien Unido, Getafe, Mabini, Talibon, Ubay Saltwater Intrusion - Bien Unido,	PCIC Insurance Mapping of storm surge zones to establish facilities away from possible storm surges Construction of climate resilient sea wall for areas affected by rising sea levels	Subproject Implementation	Y1 1.0 Platfor m Type: 0.750 K4 16HP Pump boat 0.800 0.300	Y2	Y3				
No collective marketing (Growers are organized but in small groups)	Capacitate Seaweed Farmer Groups to Engage in Collective Marketing • Strengthening of Lead Players (technology and organizational mgt) • Business Planning and Management	65 POs		All Seaweeds Areas					LEAD PLAYER; AFFAS							Uncooperativ e POs Incentives Provision of benefits thru PhilHealth, SSS
High transport cost from farm to trade areas	Rehabilitation and Upgrading of Access Roads	37 FMRs, 204.36 kms. total road length for production					Tropical Cyclone - Bien Unido, Buenavista, Candijay,	Slope Stabilization; Elevation & Structural Design (Bridges & causeways;		4,474.50						Natural calamities - Construct climate resilient

Key Gap/ Constraints	Brief Description of Potential Intervention	Target Result/ Outcome	MFO/ Sub- MFO	Target A	reas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estimated Project Cost (Php '000 in M)			Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management	
and processors - Poor road network	(Upgrading of climate resilient FMRs with positive impact on the Value Chain)	and trading areas			12	13	CPG, Getafe, Mabini, Talibon, Ubay Flood - Buenavista, Candijay, Mabini, Ubay Erosion - Buenavista, Mabini	Reinforced structures; elevated roads) Proper Drainage System Surface Protection (Paving and Surfacing; vegetative cover)	Implementation		12	13				FMRs with positive impact on the Value Chain • Boundary dispute (RROW) • Negotiate with owners • Social Environment al	
	Bien Unido: • Jct. (TER)-Bien Unido Road • Barangay Roads Talibon: • Pob. (Talibon)- San Isidro Road • Pob. (Talibon)-	 9.860 10.000 4.250 6.200 		J J J J	J J J	√ √ √	Drought - CPG, Mabini, Talibon, Tubigon Sealevel Rise - CPG, Getafe, Talibon Storm Surge - Bien Unido, Getafe, Mabini, Talibon, Ubay Saltwater Intrusion - Bien Unido	Measures: Natural barriers, reforestration Use of bioengineering for slope stability/ Resilient Road Materials Sediment control		30.00 100.00 20.00 5.00	100.00 75.00 75.00	100.00 275.00 75.00				Sateguards (SES)	
	San Francisco Road Getafe: Getafe Circumferential Road San Miguel- Tomoc-Getafe Road, Getafe Side	 1.000 6.000		√	J J	~		Getafe, Mabini, Talibon, Ubay Saltwater Intrusion - Bien Unido	e, maoini, pn, Ubay rater ision - Bien b	, Planning Maintenance and monitoring		25.00	25.00 62.50	37.5 0			
	 Inabanga: Dagnawan- Dagohoy, Inabanga, FMR Pob. (Inabanga)- Lawis Road, Causeway Length 	6.4806.2480.335		J J J	V	1				127.00 31.20 8.38	75.00	75.0 0					

Key Gap/ Constraints	Brief Description of Potential	Target MFO/ Result/ Sub- Outcome MEO		Target MFO/ Result/ Sub- Outcome MFO		MFO/ Target Areas to be covered Ma Sub- MFO Y1 Y2 Y3			Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estimated Project Cost (Php '000 in M)			Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3						
	 One Way Traffic, Inabanga Inabanga- Sagbayan via Lapacan- Magtangtang Road 	• 9.340		1	~	V				20.00	125.00	77.5 0						
	Pres. Carlos P. Garcia: • Popoo-Tugas (C.P. Garcia) FMR • Pitogo-Aguining (C.P. Garcia) FMR	9.7583.375		J J	√ √	√ √				37.50 25.00	112.50 25.00	106.45 34.38						
	Candijay: • Road to Candijay Jr. High School • Lungsodaan- Panadhara Baad	 1.500 0.630		√ √						30.00 12.50								
	Panadaran Road Lungsodaan- Panadtaran Road • Lungsodaan (Candijay)- Tambongan (Sierra Bullones)	• 7.010		V	1	~				46.73	46.73	46.73						
	Road Gabayan-Anoling	• 4.730		~	√	~				31.53	31.53	31.53						
	Road • Jct. (TER)-Tugas- Mahangin-	• 2.740		~	✓	√				18.27	18.27	18.27						
	 Jct. (TER)- Guioang-Cogtong 	• 8.140		~						54.23	54.23	54.23						
	Road • Sagumay-Canolin Road	• 1.570		~						10.47	10.47	10.47						
	 Jct. (TER)- Candijay-Cogtong Road 	• 3.570		~						23.80	23.80	23.80						
	 Cogtong (Candijay)- 	• 6.100		√						40.67	40.67	40.6 7						

Key Gap/ Constraints	Brief Description of Potential	n Target MFO/ Result/ Sub- Outcome MEO		Target MFO/ Result/ Sub- Outcome MFO		Target MFO/ Result/ Sub- Outcome MFO		Target MFO/ Result/ Sub- Outcome MFO		Target A	Areas to be	covered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject				Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3										
	Panas- Pangpang- Badiang Road																					
	Tubigon: • Cahayag (Tubigon)- Cabanugan-(San Isidro) FMR	• 10.758		V	~	√				62.50	112.50	106.45										
	Mabini: • Cabulao-Ondol (Mabini)-Union (Libay) Road	• 6.000		√	~	~				25.00	100.00	25.0 0										
	 Kaporsing-Abaca- San Roque Road, Mabini 	• 6.900		√	√	√				22.50	125.00	25.0 0										
	 Jct. (Mabini- Cabulao)-Aguipo 	• 1.100			~						27.50											
	 Jct. (TER)-Ilihan- Cabulao (Mabini) 	• 5.160		√	1					5.00	62.50	60.5										
	Road (Mabini Side) • Jct. (TER)-	• 17.170		1	√	1				5.00	62.50	02.5										
	Mabini-Cabulao- Lungsodaan- Pook Road • Sta. Cruz-Minol- Banlas-Tambo Road	• 6.950		√	~	✓				7.50	62.50	62.5 0										
												62.5 0										
	Buenavista: Pob (Buenavista)- Bonotbonot- Tiguman- Ovorland EMP	• 10.410		1	~	~				68.20	70.00	70.0 0										
	 Mayor Landring Tirol Circum. Road 	• 3.000		✓	~	~				20.00	20.00	20.0 0										
	Ubay: San Miguel- Bayongan-Bulilis-	• 17.400		√	~	~				36.00	150.00	150.00										

Key Gap/ Constraints Brief Description of Potential Intervention Outcom		Target Result/	MFO/ Sub-	Target Areas to be covered			Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estimated Project Cost (Php '000 in M)			Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3	Ĩ			
	Mabuhay (Ubay) Road • Jct. (Soom)- Humay-Humay Road	• 3.310		~	√	√				6.20	37.50	37.50				
	 Road to Ubay Jr. High School 	• 0.400		~						8.00						
	 Gabi Seed Farm, Ubay 	• 1.010		~						25.25	10.00					
	 Road to Ubay Stock Farm 	• 1.600			~						40.00					
	 Jct. (TER)-San Pascual (Ubay)- Mahayag (San Mimus) Decad 	• 2.470		✓						49.40						
	 Jct. (TER)-Ilihan- Cabulao Road 	• 1.900		~						38.00						
Segmer	nt: Trading/	Marketing		<u> </u>	<u> </u>	•							•		<u> </u>	
Low volume of supply of Raw Dried Seaweeds	Facilitate access to capital, roll-over fund for marketing of RDS to organized groups	% increased supply of RDS of Identified MFIs infusing capital		All Seaweed Areas					SIAP, Coops, Landbank, OPA, BFAR							 No buy-in from private sector of capital provision of Inventory Financing Identify sources of capital and financing for the collective marketing of RDS
Limited Access to Capital	Provision of Working Capital	1 Qualified PG/LGU		Calape, Candijay, Mabini, Getafe					PGBh/OPA, BFAR, DA-PRDP (IREAP)	1.0			PGBh, DA, PRDP- IREAP			

Key Gap/ Constraints	Brief Description of Potential	Target Result/ Outcome	MFO/ Sub-	Target Areas to be covered			Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Supproject	Estimated Project Cost (Php '000 in M)			Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	IVIFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
Lack of Mobility Logistics	Provision of Delivery Vehicle & Motorela Tricycle	1-unit Delivery vehicle 1-unit Motorela		Calape, Candijay, Mabini, Getafe			Tropical Cyclone - Candijay, Getafe, Mabini Flood - Candijay, Mabini Erosion - Mabini Drought - Mabini Sealevel Rise - Getafe Storm Surge - Getafe, Mabini	Construction of climate resilient warehpuse Mangrove Reforestation using appropriate species to act as water breaks during storm surges. Mapping of storm surge zones to locate vehicles away from possible storm surges Construction of climate resilient sea wall for areas affected by rising sea levels	PGBh/OPA, BFAR, DA-PRDP (IREAP)	2.8 0.170			PGBh, DA, PRDP- IREAP			
Segmer	nt: Support S	Services														
Lack of info on Good Aquaculture Practices (GAqP) Lack of providers on GAqP for seaweed farming	 Capacitation of Lead Players Organizational Development of BPSFPS Develop Community- based Seaweed and GAqP Experts (Trainor's Training) 	Lead Players and Private Sector Partners No. of trainings conducted No. of participants		All Seaweed Producing Areas					BFAR OPA MLGUS SIAP BPSFPC ATI DOLE				PGBh, BFAR, DA, DOLE, ATI			Trainings will not respond to the needs of the participants Training Needs Analysis (TNA) Develop Training Modules responsiv e to the

Training)

need

Key Gap/ Constraints	Brief Description of Potential	escription Target MFO/ otential Result/ Sub- vention Outcome MEO		-O/ Target Areas to be covered			Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for	Estimated Project Cos or (Php '000 in M)			Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management
	Intervention	Outcome	MFO	Y1	Y2	Y3			Implementation	Y1	Y2	Y3				
	 Training on Agribusiness Devt. and Business Ethics Provision of Marine-based Livelihood Regular Water Quality, Substrate and Seaweed Sampling for Laboratory Analysis 															- Consult Experts - Hire expert Resource Persons
	7. Benchmarking to Model Sites	20 Pax							BFAR DOST BOI PLGU SIAP							 Representatio n of interested non-members Specify names in the invitation as incentive for PCPT and Lead Players
	8. Information Education Campaign (IEC) in School								BFAR, DEPEd, OPA, BEMO, DENR, BISU, BCRMPF				BFAR, EPEd, DENR, PGBh			

Key Gap/ Constraints	Brief Description of Potential Intervention	Target MFO/ Result/ Sub- Outcome MFO	Target A	Target Areas to be covered Y1 Y2		Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other Players for Subproject	Estimated Project Cost (Php '000 in M)		Cost 1)	Proposed Source of Funds	Remarks	Rankin g	Risk & Risk Management	
					Y2	Y3			Implementation	Y1	Y2	Y3				
Segmer	Segment: Enabling Environment															
Lack of clear delineation of farm boundaries Lots of idle seaweed farms	 Passage of seaweed farming zoning Ordinance Passage of an Ordinance for the optimum utilization of underdeveloped fishery resources Support to Provincial Ordinance on the production, development, protection and conservation of all Banyan Trees Species 	Eliminate resource use conflict		All Seaweed Producing Areas					Lead Players: MLGU PGBh M&E TWG BEMO DENR BISU							 Resource use conflict Regulatory Policy/ Ordinance Awards and Incentive Program Policy on water pollution

Chapter IV. Institutional Arrangements

Implementation/ Supervision

The implementation and supervision of the Philippine Rural Development Program (PRDP) will be under the Provincial Governor thru the Provincial Program Management and Implementing Unit (PPMIU) created thru EO. No. 05 Series of 2014, with the Provincial Planning and Development Coordinator as the overall head. The PPMIU will be responsible for implementing all sub-projects, including but not limited to the preparation of pertinent documents as required by the program. The Regional Program Coordinating Office (RPCO) headed by the Regional Executive Director of the Department of Agriculture (DA) shall provide technical assistance in implementing the various projects.

Organization and Management

The organization and management of the program will be handled by the province through the PPMIU, following a structured hierarchy to ensure efficient implementation of the program. Under the leadership of the Governor and the Provincial Administrator, the PPMIU Coordinator oversees key components: I-PLAN, I-BUILD, I-REAP, and I-SUPPORT, each with specialized sub-units catering to planning, infrastructure, enterprise development, and administrative support. Collaboration with national coordinating agencies and PRDP offices ensures alignment with broader development goals. The inclusion of monitoring and evaluation, social and environmental safeguards, and advocacy units highlights the program's commitment to sustainability, transparency, and inclusive growth. The Bohol PRDP- PPMIU organizational structure is shown below.



A monitoring and evaluation system for the I-PLAN will be installed using the PRDP Results-Based Monitoring and Evaluation System (RBMES), to track the implementation of projects indicated in the plan as well as projects being implemented and completed. Based on the PRDP Results-Based Monitoring, the indicators, means of verification of results and means of data collection are to be adopted. The use of geo-tagging tool/system is to be used in the pre-implementation, implementation and post- implementation of the projects funded under the PRDP. The PPMIU M&E Sub-Unit shall have the following functions:

- 1) Oversee monitoring and evaluation of the I-REAP and I-BUILD components in the province;
- 2) Coordinate all M&E activities of the participating LGUs;
- 3) Implement and Maintain Program Monitoring Information System ensuring that system's problems are immediately attended to or reported to RPCO thru the PRMIU;
- 4) Identify problems and issues which impeded program implementation for remedial actions by the PPMIU;
- 5) Generate and submit the prescribed provincial reports based on the LGU's reports to PPMIU for submission to RPCO;
- 6) Ensure that all completed data capture forms and file copies of the provincial consolidation reports are properly kept for ready reference;
- 7) Validate submitted reports by participating LGUs;
- 8) Provide technical assistance to participating LGUs pertaining to M&E system;
- 9) Prepare and submit reports to the RPCO.

Social and Environmental Safeguards

The province will observe safeguard policies set by the World Bank and the Philippine Government as described in the Social and Environmental Safeguards (SES) Framework of the PRDP.

Social safeguards will be governed by the Indigenous People Development Framework, Land/ Right of Way (ROW) Acquisition and Resettlement Policy Framework. Environmental Safeguards will be governed by the Philippine Environment Impact Statement System and will adopt the Environmental Framework and Guidelines set for by the program.

The SES Sub-Unit of the PPMIU shall carry out environmental guidelines, prepare and implement environmental management plan, resettlement action plan and indigenous people development framework in a manner and substance satisfactory to the World Bank.
Chapter V. PDC Resolution Approving the PCIP

• PDC Full Council Res. No. 04-2018 Approving the Enhanced PCIP for Seaweeds



Republic of the Philippines PROVINCE OF BOHOL City of Tagbilaran



PROVINCIAL DEVELOPMENT COUNCIL

EXCERPT FROM THE MINUTES OF THE FULL COUNCIL MEETING OF THE PROVINCIAL DEVELOPMENT COUNCIL HELD ON OCTOBER 24, 2018 AT THE MAGNOLIA PAVILION, REYNA'S HAVEN AND GARDENS, TAGBILARAN CITY, BOHOL, PHILIPPINES

In Attendance:

Gov. Edgar M. Chatto.....Chairman, Presiding Officer and Majority of the Members of the PDC Full Council

PDC FULL COUNCIL RESOLUTION NO. 04-2018

A RESOLUTION APPROVING THE ENHANCED BOHOL PROVINCIAL COMMODITY INVESTMENT PLAN (PCIP) WITH THE UPDATED VERSION FOR THE SEAWEEDS PCIP AND THE NEW VIRGIN COCONUT OIL PCIP AND FAVORABLY ENDORSING THE SAME TO THE CENTRAL VISAYAS REGIONAL DEVELOPMENT COUNCIL (RDC-VII) FOR INCLUSION IN THE REGIONAL DEVELOPMENT AND INVESTMENT PROGRAM (RDIP) AND THE DEPARTMENT OF AGRICULTURE (DA) AND OTHER RELEVANT AGENCIES FOR SUPPORT AND FUNDING ASSISTANCE

WHEREAS, the Enhanced Bohol PCIP is an integration of the six (6) approved priority commodities of the province, namely: seaweeds, native chicken, highland vegetables, buffalo dairy, cassava and virgin coconut oil (VCO) through mainstreaming biodiversity conservation, climate change resiliency and natural resource management;

WHEREAS, the Seaweeds PCIP is an updated version with the previous plan already due for updating and the addition of the Virgin Coconut Oil (VCO) PCIP, another priority commodity of the province, with a newly approved Value Chain Analysis (VCA) undertaken and prepared as part of the necessary requisites to ensure effective interventions with the new PCIP enhanced through integration of environmental protection and conservation measures;

WHEREAS, the PRDP Project Support Office – Visayas Cluster issued a Memorandum dated February 21, 2017 requiring all PCIPs for endorsement to the Regional Development Council (RDC) for inclusion of the PCIP to the Regional Development Plan and in the Regional Development Investment Program (RDIP) for funding support, thus ensure that other NGAs will be aware and cognizant in their role as important source of funds for sub-projects and interventions indicated in the PCIP that are in line with the agency's programs;

WHEREAS, the matrix of interventions in the PCIP significantly consider potential fund sources to facilitate integration of CIPs in the planning and budgeting processes of the DA and LGUs, specifically for identified interventions relevant to the development of the priority commodity but do not qualify to funding support from PRDP, thus the PLGU may use the PCIP to mobilize resources from other sources or utilize other financing scheme;

WHEREAS, the Bohol PCIP was presented to this Body, giving emphasis on biodiversity conservation measures, climate change resiliency and natural resource management, relevant information, gaps and constraints, and needed interventions, which has been identified through a technical review and a stakeholders' consultation involving suppliers, growers, processors, traders, municipal agriculturists, provincial and regional commodity coordinators, and other key players in the industry;

WHEREAS, the Bohol PCIP, after review and deliberation, has been found by this Body to be relevant, well-grounded, responsive, and aligned with the provincial goals and priorities, as well as contribute to the regional and national agriculture goals and for these reasons, worthy of its approval and endorsement to the Regional Development Council, Department of Agriculture and other relevant agencies for support;

WHEREFORE, upon proper motion duly seconded, be it resolved by this Body in a meeting duly convened –

To approve the enhanced Bohol Provincial Commodity Investment Plan (PCIP) with the updated version for the Seaweeds PCIP and the new Virgin Coconut Oil PCIP and favorably endorsing the same to the Central Visayas Regional Development Council (RDC-VII) for inclusion in the Regional Development and Investment Program (RDIP) and to the Department of Agriculture (DA) and other relevant agencies for support and funding assistance

UNANIMOUSLY ADOPTED.

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I hereby certify to the correctness of the foregoing Resolution.

Momm 1-**RONILITA M. BUNADO**

OIC, PPDO-Bohol Head, PDC Secretariat

APPROX

EDGARDO M. CHATTO Governor Chairman, PDC-Bohol

C-105-2017-278

• PDC Execom Res. No. No. 57-2024 Endorsing the Updated Provincial Commodity Investment Plan with Climate Change Adaptation Programs and Projects



Republic of the Philippines PROVINCE OF BOHOL City of Tagbilaran



PROVINCIAL DEVELOPMENT COUNCIL

EXCERPT FROM THE MINUTES OF THE MEETING OF THE PROVINCIAL DEVELOPMENT COUNCIL EXECUTIVE COMMITTEE (EXECOM) HELD ON JULY 19, 2024 AT THE CAMBANGAY CONFERENCE ROOM, PROVINCIAL PLANNING AND DEVELOPMENT OFFICE, PROVINCIAL CAPITOL, LINO CHATTO DRIVE, COGON DISTRICT, TAGBILARAN CITY, BOHOL, PHILIPPINES

In Attendance:

Acting Gov. Tita V. BajaChairman, Presiding Officer and Majority of the Members of the PDC Executive Committee

PDC EXECOM RESOLUTION NO. 57-2024

A RESOLUTION FAVORABLY ENDORSING THE UPDATED PROVINCIAL COMMODITY INVESTMENT PLAN (PCIP) WITH CLIMATE CHANGE ADAPTATION PROGRAMS AND PROJECTS (PAPS) FOR THE DEPARTMENT OF AGRICULTURE - PHILIPPINE RURAL DEVELOPMENT PROJECT (DA PRDP) SCALE-UP FUNDING SUPPORT

WHEREAS, the Department of Agriculture – Philippine Rural Development Project Scale-Up (DA PRDP Scale-Up) is a World Bank-supported project designed to address gaps in value chains, climate resilience, and a more modernized agri-fishery sector;

WHEREAS, the Provincial Commodity Investment Plan (PCIP) is a 3-year rolling consensus plan reflecting agreements between DA and PLGUs with strong participation of the various stakeholders which rationalizes the upgrading strategies and interventions within the various segments of the value chain of commodities prioritized by the province including emergent commodities, and will contribute to the goals of the agriculture and fishery sector;

WHEREAS, the interim approach in updating the PCIP for PRDP Scale-Up implementation focuses on the integration of Climate Risk Vulnerability, particularly the incorporation of Major Climate Risks and Risk Adaptation Measures in the existing PCIP Matrices for the identified priority commodities of Bohol;

WHEREAS, after review and deliberation, the Updated Provincial Commodity Investment Plan (PCIP) with Climate Change Adaptation Programs and Projects (PAPs), has been found by this Body to be aligned with Bohol's strategic change agenda for a climate-smart agriculture and is supportive to the attainment of Bohol's development goals and objectives towards agricultural productivity through improvement of climate change resilient agricultural infrastructure, and is consistent with the Comprehensive Land Use Plans (CLUPs) of all concerned municipalities, and on top of all this, is consistent as well with the Provincial Development and Physical Framework Plan (PDPFP) of the Provincial Government of Bohol; and therefore, worthy of support and endorsement for Department of Agriculture - Philippine Rural Development Project (DA-PRDP) Scale-Up;

WHEREFORE, upon proper motion duly seconded, be it resolved by this Body in a meeting duly convened –

to favorably endorse the Updated Provincial Commodity Investment Plan (PCIP) with Climate Change Adaptation Programs and Projects (PAPs) for the Department of Agriculture -Philippine Rural Development Project (DA-PRDP) Scale-Up funding support.

RESOLVED FURTHER, to furnish a copy of the same Resolution to the Department of Agriculture Regional Office-7, for appropriate action.

UNANIMOUSLY ADOPTED.

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I hereby certify to the correctness of the foregoing Resolution.

MARIA IMELDA R. BORROMEO OIC - PPDO Bohol Head, PDC Secretariat

APPROVED:

TITA V. BAJA Acting-Governor Chairman, PDC-Bohol

2024

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ANNEXES

- Annex A. Farm-to-Market Roads (FMR) for Seaweeds PCIP
- Annex B. Visayas Seaweeds Industry Players Directory
- Annex C. Summary of Risk Profile of Municipalities
- Annex D. Risk Profile of Commodity per Municipality

Annex A. Farm-to-Market Roads (FMR) for Seaweeds PCIP

Province of Bohol

		Road Length	Estin ()	nated Projec Php '000 in I	t Cost
	Project Name	Needed (km.)	Y1	Y2	Y3
1	Bien Unido				
	Jct. (TER)-Bien Unido Road	9.86	30		
	Brgy. Roads	10.0	100	100	100
2	Talibon				
	Pob. (Talibon)-San Isidro Road	4.250	20.00	75.00	275.00
	Pob. (Talibon)-San Francisco Road	6.200	5.00	/5.00	/5.00
_					
3	Getafe	4.000		25.00	
	Getate Circumferential Road	1.000	25.00	25.00	27.50
	San Miguel-Tomoc-Getafe Road, Getafe Side	6.000	25.00	62.50	37.50
	Inchange				
4	Dagnawan Dagohoy Inahanga FMP	C 49	127.00		
	Dagnawan-Dagonoy, Inabanga, FMR	6.48	127.00	75.00	75.00
	Pob. (Inabanga)-Lawis Koad, Causeway Length	0.248	31.20	/5.00	75.00
	Une way Trainc, Indudinga	0.335	8.38 20.00	125.00	77 50
	Inabaliga-Sagbayan via Lapacan-Iviagtangtang Road	9.340	20.00	125.00	77.50
5	Pros. Carlos P. Garcia				
5	Popoo-Tugas (C.P. Garcia) EMP	0.758	27 50	112 50	106.45
	Pitogo-Aguining (C.P. Garcia) FMR	3 3 7 5	25.00	25.00	2/ 28
		3.375	25.00	25.00	54.50
6	Candijay				
	Road to Candijay Ir. High School	1.50	30.00		
	Lungsodaan-Panadtaran Road Lungsodaan-Panadtaran	0.63	12.50		
	Road	0.00			
	Lungsodaan (Candijay)-Tambongan (Sierra Bullones)	7.01	46.73	46.73	46.73
	Road				
	Gabayan-Anoling Road	4.73	31.53	31.53	31.53
	Jct. (TER)-Tugas-Mahangin-Cambane Road	2.74	18.27	18.27	18.27
	Jct. (TER)-Guioang-Cogtong Road	8.14	54.23	54.23	54.23
	Sagumay-Canolin Road	1.57	10.47	10.47	10.47
	Jct. (TER)-Candijay-Cogtong Road	3.57	23.80	23.80	23.80
	Cogtong (Candijay)-Panas-Pangpang-Badiang Road	6.10	40.67	40.67	40.67
7	Tubigon				
	Cahayag (Tubigon)-Cabanugan-(San Isidro) FMR	10.758	62.50	112.50	106.45
8	Mabini				
	Cabulao-Ondol (Mabini)-Union (Ubay) Road	6.000	25.00	100.00	25.00
	Kaporsing-Abaca-San Roque Road, Mabini	6.900	22.50	125.00	25.00
	Jct. (Mabini-Cabulao)-Aguipo Road	1.100		27.50	
	Jct. (TER)-Ilihan-Cabulao (Mabini) Road (Mabini Side)	5.160	5.00	62.50	62.50
	Jct. (TER)-Mabini-Cabulao-Lungsodaan-Pook Road	17.170	5.00	62.50	62.50
	Sta. Cruz-Minol-Banlas-Tambo Road	6.950	7.50	62.50	62.50

	Droject Namo	Road Length	Estin (nated Projec Php '000 in I	ct Cost M)
	Project Name	Needed (km.)	Y1	Y2	Y3
9	Buenavista				
	Pob. (Buenavista)-Bonotbonot-Tiguman-Overland FMR	10.41	68.20	70.00	70.00
	Mayor Landring Tirol Circum. Road	3.00	20.00	20.00	20.00
10	Ubay				
	San Miguel-Bayongan-Bulilis-Mabuhay (Ubay) Road	17.40	36.00	150.00	150.00
	Jct. (Soom)-Humay-Humay Road	3.31	6.20	37.50	37.50
	Road to Ubay Jr. High School	0.40	8.00		
	Gabi Seed Farm, Ubay	1.010	25.25		
	Road to Ubay Stock Farm	1.600		40.00	
	Jct. (TER)-San Pascual (Ubay)-Mahayag (San Miguel)	2.47	49.40		
	Road				
	Jct. (TER)-Ilihan-Cabulao Road	1.90	38.00		
	TOTAL	204.36	1,075.83	1,770.70	1,627.98

Annex B. Visayas Seaweeds Industry Players Directory

FAR	MERS		
BOH	IOL		
1	Leonardo Conzon	Bilangbilangan Island, Tubigon, Bohol	09099390615
2	Charlito Lingo	Aguining, Pres. Carlos P. Garcia, Bohol	09161287700
3	Rubeniano Valmoria	Saguise, Pres. C.P. Garcia, Bohol	
4	Alan D. Casimsiman	Concepcion, Mabini, Bohol	09359161276
5	Romulo A. Pendon, Sr.	Guindacpan, Talibon, Bohol	09322363305
6	Alexander S. Cabando	Cataban, Talibon	09483165619
7	Tarciso S. Padillo	Asinan, Buenavista, Bohol	09105255922
8	Jose Q. Cuyno	Sinandigan, Ubay, Bohol	09771209254
9	Ralph D. Lagura	Ubay, Bohol	09185112361
EAS	TERN SAMAR		
1	Estrella H. Dagsa	Brgy. Ngolos, Guian, E. Samar	09554757732
2	Consolacion N. Daganio	Brgy. Ngolos, Guian, E. Samar	09305056371
3	Ines Arpon	Brgy. Ngolos, Guian, E. Samar	
4	Benedicto Garado	Brgy. Ngolos, Guian, E. Samar	
5	Diego B. Dagsa Jr.	Brgy. Ngolos, Guian, E. Samar	
6	Delia A. Padullon	Brgy. Ngolos, Guian, E. Samar	
7	Eusebio bnemenio	Brgy. Ngolos, Guian, E. Samar	09261415147
8	Romeo Caratay	Brgy. Ngolos, Guian, E. Samar	
9	Ma. Cristina A. Francisco	Brgy. Ngolos, Guian, E. Samar	09493072117
10	Rose Ann V. Plaza	Brgy. Ngolos, Guian, E. Samar	09309527256
11	Sherry Ann A. Gaturian	Brgy. Ngolos, Guian, E. Samar	09487852950
12	Mark Anthony Abneme	Brgy. Ngolos, Guian, E. Samar	
13	Benedicto Garado	Brgy. Ngolos, Guian, E. Samar	
14	Teresita C. Dado-acon	Brgy. Ngolos, Guian, E. Samar	
15	Henry D. Tablon	Brgy. Ngolos, Guian, E. Samar	09155500913
16	Jille G. Navidad	Brgy. Ngolos, Guian, E. Samar	09155500913
17	Edita Garado	Brgy. Ngolos, Guian, E. Samar	
18	Danilo A. Tulang	Brgy. Inapulangan, Guian, E. Samar	
19	Primo Allera	Trinidad, Guian, E. Samar	09503572716
20	Editha Mabini	Sitio Converse, Brgy. Ngolos, Guian, E. Samar	09269609931
21	Jose M. Dagsa	Purok 4, Brgy. Ngolos, Guian, E. Samar	09204627065
22	Cherie Ann Abut	Brgy. Cagaut, Salcedo E. Samar	09483866919
23	Jaime Ecoben	Bagtong, Salcedo, E. Samar	09483471398
24	Joey Duran	Camanga, Salcedo, E. Samar	09959911718
25	Roy B. Dadulla	San Roque, Mercedes, Eastern Samar	09758161754
26	Raymundo B. Pagatpat	Cabunga-an, Mercedes, E. Samar	09301832878
27	Felecisimo Dacuno	Brgy. Bolusao, Lawaan, E. Samar	09776409734

FAR	MERS		
28	Romulo A. Samson	Sto. Nino, Quintapondan, E. Samar	09121603802
29	Christopher Quiza	Brgy. Sta. Margarita, Quintapondan, E. Samar	
ILOI	LO		
1	Jeleyn Arabadon	Estancia, Iloilo	
2	Alejandre Dalida	Brgy. Gogo, Estancia, Iloilo	
3	Maribeth Arabadon	Brgy. Gogo, Estancia, Iloilo	
4	Rellan dela Cruz	Estancia, Iloilo	
LEY	ГЕ		
1	Ruel Inoc	Dawahon Island, Bato, Leyte	09292453160
2	Teresita Kabundukan	Brgy. Vigan, Gen. MacArthur, Leyte	09095826715
TRA	DERS		
1	Maishura Igot	Dawahon, Leyte	09297265019
2	Roberto Ecro		09397924787
3	Rosario Rurca		09292153168
4	Purificacion Benedicto	San Dionisio, Iloilo	
5	Nonong Infante	Sibunan, Guimaras	
6	Maximo Cabanatan	Brgy. Nula-Tula, Tacloban City	
7	Susan Borromeo	Guian, Eastern Samar	
8	Andres Magno	Guian, Eastern Samar	
9	Luz Castillano	Guian, Eastern Samar	
10	Delia Morato	Brgy. Tagpuro, Tacloban City	
11	SPPI	Brgy. Natividad, San Policarpio, E. Samar	
12	Carlito Purca	Brgy. Natividad, San Policarpio, E. Samar	
13	Melevecito Padillo	Brgy. Binogawan, San Policarpio, E. Samar	
14	Alberto tero	Catarman, Northern Samar	
15	Rodulfo Sereno	Brgy. Dawahon, Bato, Leyte	
16	Bonifacio Arong	Brgy. Dawahon, Bato, Leyte	
17	Efren Taneo	Brgy. Dawahon, Bato, Leyte	
18	Denetrio Laroza	Brgy. Dawahon, Bato, Leyte	
19	Job Tapayan	Brgy. Dawahon, Bato, Leyte	
20	Marino Meliang	Brgy. Dawahon, Bato, Leyte	
21	Edgardo Igot	Brgy. Dawahon, Bato, Leyte	
22	Arnulfo Taneo	Brgy. Dawahon, Bato, Leyte	
23	Corazon Tsamoudakis	Brgy. Dawahon, Bato, Leyte	
24	Anita Nanoy	Brgy. Dawahon, Bato, Leyte	
25	Ronillo Pinola	Brgy. Dawahon, Bato, Leyte	
PRC	CESSORS		
1	CP-Kelco	Sibonga, Cebu	
2	Kerry Food Ingredients Phils, Inc.	Mandaue City, Cebu	

FAR	RMERS		
3	FMC Health and Nutrition	Mandaue City, Cebu	
4	Shemberg Marketing Corporation	Mandaue City, Cebu	
5	Shemberg Biotech Corporation	Carmen, Cebu	
6	TBK Manufacturing Corporation	Tacloban City	09237080302
7	MCPI Corporation	Consolacion Cebu	
8	Cebu Carageenan Corp.	Carmen, Cebu	
EXP	ORTERS		
1	Royal Algaculture Corporation	Cebu City	
2	Pzalms Seaweed and Marine Products	Mandaue City, Cebu	
3	Mythic Seaweed Farm	Cebu City	
4	George Alolor Trading	Mandaue City, Cebu	george_alolor@yahoo.com
5	Cebu Maxan Seaweed Corp.	Consolacion, Cebu	(032) 4246218
6	DATINGBAYAN Agro- Industrial Corporation	Consolacion, Cebu	63-32-345-2751
7	FDIII Trading Incorporated	Cebu City	232-6563
8	Shell Haven Fashion International	Lapu-Lapu City, Cebu	(032) 341-4340

Annex C. Summary of Risk Profile of Municipalities

					Indicators	;	Adaptive Capacity									
	Over-All Hazards	Tropical Cyclone	Flood	Erosion	Land Slide	Drought	Sea Level Rise	Storm Surge	Salt Water Intrusion	Econo Mic *	Natural *	Social *	Human *	Instituti- Onal *	Physical *	Anticipa- Tory Capitals *
Albuquerque	Low	Very Low	Low	Very High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Moderate	Very Low	Low	Moderate	Low
Alicia	High	High	Low	High	Low	Low	Very Low	Very Low	Very Low	Very Low	Low	Moderate	Low	High	Very Low	High
Anda	Moderate	High	Very Low	High	High	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	Low	Very Low	Low	Moderate	Moderate
Antiquera	Low	Very Low	Very Low	High	Moderate	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very High	Very Low	Moderate	High	Moderate
Baclayon	Very Low	Very Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Very High	Low	Moderate	Very Low	Very Low
Balilihan	Low	Very Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Very High	Very Low	Moderate	Very High	Moderate
Batuan	Low	Very Low	Very Low	Moderate	High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Low	Moderate	Very Low	Moderate
Bilar	Low	Very Low	Very Low	High	Very High	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low	Very Low	Moderate	Low	High
Buen Unido	Very High	Very High	High	Very Low	Very Low	Ver High	Very Low	Moderate	High	Low	High	Moderate	Very Low	High	Moderate	High
Buenavista	Very High	Very High	Low	Very High	Low	High	Low	Low	Very Low	Very Low	Low	Moderate	Very Low	Moderate	Very Low	Moderate
Calape	Moderate	Very Low	Moderate	Moderate	Moderate	Very Low	Moderate	Moderate	Very Low	Very Low	Moderate	Moderate	Low	High	Low	High
Candijay	Very High	High	Very High	Moderate	Low	Very Low	Moderate	Moderate	Very Low	Very Low	Very High	Low	Low	Low	Moderate	High
Carmen	Low	Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Moderate	Low	Moderate	Low	Moderate
Catigbian	Very Low	Very Low	Very Low	Moderate	Moderate	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very High	Low	Moderate	Moderate	Moderate
Clarin	Very Low	Low	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very High	Low	Very Low
Corella	Very Low	Very Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	High	Low	Moderate	Very High	High
Cortes	Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low	Very Low	Moderate	Low	High
CP Garcia	Very High	Very High	Very High	Low	Very Low	Very High	Very High	Moderate	Very Low	Low	Moderate	High	Low	Moderate	High	Moderate

		Indicators										Adaptive Capacity						
	Over-All Hazards	Tropical Cyclone	Flood	Erosion	Land Slide	Drought	Sea Level Rise	Storm Surge	Salt Water Intrusion	Econo Mic *	Natural *	Social *	Human *	Instituti- Onal *	Physical *	Anticipa- Tory Capitals *		
Dagohoy	High	Moderate	Moderate	High	Low	Low	Very Low	Very Low	Very Low	Very Low	High	High	Very Low	High	Very High	High		
Danao	High	High	Low	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Low	High	Very Low	High	Low	High		
Dauis	Very Low	Very Low	Very Low	Very High	Very Low	Very Low	Very Low	Very Low	Very High	Low	Low	Low	Low	High	High	Moderate		
Dimao	Low	Very Low	Very Low	Very High	Moderae	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low	Low	Low	Moderate		
Duero	Low	Low	Very Low	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	High	Moderate	Low	Moderate	Very High	Low		
Garcia Hernandez	Low	Very Low	Very Low	High	High	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Very High	Low	High	Moderate	Loe		
Getafe	Very High	Very High	Very Low	Moderate	Very Low	High	High	High	Very Low	Very Low	Moderate	Very Low	Very Low	Very Low	Moderate	Moderate		
Guindulman	Moderate	Moderate	Low	High	High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	Low	High	High	Moderate		
Inabanga	High	Moderate	Very High	Low	Very Low	Very Low	Moderate	Moderate	Very Low	Low	Very High	Moderate	Low	High	Very Low	High		
Jagna	Low	Very Low	Very Low	Very High	High	Very Low	Very Low	Very Low	Very Low	Low	Low	High	Very Low	Moderate	High	Moderate		
Lila	Low	Very Low	Low	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	Very High	Very Low	Very High	Very High	High		
Loay	Moderate	Very Low	Very High	Moderate	Moderate	Very High	Very Low	Very Low	Very Low	Very Low	Moderate	Very High	Very Low	High	High	Moderate		
Loboc	Moderate	Very Low	Moderate	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Moderate	Low	Moderate	High	High		
Loon	Low	Very Low	Low	Moderate	Moderate	Very Low	Very Low	Very Low	Very Low	Low	Low	Very High	Low	High	Moderate	High		
Mabini	High	Very High	Moderate	High	Low	Very Low	Low	Low	Very Low	Very Low	Low	High	Low	Moderate	High	High		
Maribojoc	Low	Very Low	Low	Moderate	Moderate	Very Low	Very Low	Very Low	Very Low	Low	Very High	Moderate	Low	High	High	High		
Panglao	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Very High	Low	Low	Low	Low	High	Moderate	High		
Pilar	Low	Moderate	Very Low	Moderate	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	High	Very Low	Low	Moderate	High		
Sagbayan	Low	Low	Very Low	High	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Very Low	Low	Moderate	Moderate		

		Indicators										Adaptive Capacity						
	Over-All Hazards	Tropical Cyclone	Flood	Erosion	Land Slide	Drought	Sea Level Rise	Storm Surge	Salt Water Intrusion	Econo Mic *	Natural *	Social *	Human *	Instituti- Onal *	Physical *	Anticipa- Tory Capitals *		
San Isidro	Low	Very Low	Very Low	Very High	Very High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	Vey Low	Moderate	Low	High		
San Miguel	Moderate	Very High	Moderate	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	High	Moderate	Very Low	Moderate	High	High		
Sevilla	Low	Very Low	Low	High	Moderate	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very High	Low	Moderate	Moderate	Moderate		
Sierra Bullones	Low	Very Low	Very Low	High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Moderate	Very Low	Moderate	Moderate	Low		
Sikatuna	Low	Very Low	Very Low	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Low	High	High	High		
Tagbilaran	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very High	Moderate	Low	Very High	Very High	Low	High		
Talibon	Very High	Very High	Low	Moderate	Very Low	Very Low	Moderate	High	Moderate	Low	High	High	Low	High	Low	Moderate		
Trinindad	Very High	Very High	Very High	Moderate	Very Low	Very Low	Very Low	Very Low	Very High	Very Low	Very Low	Very Low	Low	Moderate	Low	Moderate		
Tubigon	Low	Very Low	Very Low	Moderate	Low	Very Low	Moderate	Low	Very Low	Low	Very High	Very High	Low	Moderate	Moderate	High		
Ubay	Very High	Very High	High	Low	Very Low	Very Low	Very Low	Very High	Moderate	Moderate	Moderate	Moderate	Moderate	High	Very High	Very High		
Valencia	Low	Very Low	Very Low	Very High	High	Very Low	Very Low	Very Low	Very Low	Low	Moderate	Very High	Very Low	Moderate	High	High		

* Source: Bohol, Negros Oriental and Siquijor CRVA Completion Report

** Source: Bohol LDRRM Plan

*** Based on location of Major Dams

Municipality	Area Planted (in ha.)	Key Hazards	Adaptive Capacity (AC)
Bien Unido	570.5	Very High - Tropical cyclone High - Storm Surge, Salt Water Intrusion	Very Low - Social, Human Low - Economic, Natural, Physical Moderate - Institutional High -Anticipatory
Talibon	300	Very High - Tropical Cyclone High - Drought, Sea Level Rise, Storm Surge Moderate - Salt Water Intrusion	Low - Economic, Human, Physical Moderate - Anticipatory High - Natural, Social, Institutional
Getafe	100	Very High - Tropical Cyclone High - Sea level rise, Storm surge	Very Low - Economic, Human, Institutional, Social Moderate - Natural, Physical, Anticipatory
Inabanga	25	Moderate - Sea Level Rise	Very Low - Physical Low - Economic, Human Moderate - Social High - Institutional, Anticipatory Very High - Natural
CPGarcia	12.5	Very High - Tropical Cyclone, Sea Level Rise High - Storm Surge	Very Low - Economic Low - Natural, Human, Physical Moderate - Social, Institutional, Anticipatory
Candijay	2.5	High - Tropical Cyclone, Flood Moderate - Sea Level Rise	Very Low - Ecoomic Low - Social, Human, Institutional Moderate - Physical High - Anticipatory Very High - Natural
Tubigon	7.5	High - Drought	Low - Economic, Human Moderate - Institutional, Physical High - Anticipatory Very High - Natural, Social
Mabini	2.5	Very High - Tropical Cyclone High - Flood, Erosion, Drought, Storm Surge	Very Low - Economic Low - Natural, Human Moderate - Institutional High - Social, Physical, Anticipatory

Annex D. Risk Profile of Commodity per Municipality

Buenavista	2.5	Very High - Tropical Cyclone, Erosion High - Flood	Very Low- Economic, Human, Physical Low - Natural Moderate - Social, Institutional, Anticipatory
Ubay	5	Very High - Tropical Cyclone High - Drought, Storm Surge Moderate - Salt water Intrusion	Moderate - Economic, Natural, Social, Human High - Institutional Very High - Physical, Anticipatory

Annex E.	Provincial	Core	Planning	Team	Composition
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	Provincial Core Planning Team										
Component	Commodity	Agency/Office	Name								
I-PLAN Subproject Co	mponent										
Component Head		Office of the Provincial Agriculturist (OPA)	OPA/ Dr. Larry M. Pamugas, PhD.								
Commodity Experts	Crops	Office of the Provincial Agriculturist (OPA)	Mr. Ramil Rodela								
		Department of Agriculture (DA -PATCO)	Mr. Roman Dabalos								
		Philippine Coconut Authority (PCA)	Mr. Jovencio Felisilda								
	Seaweeds/Fisheries	Office of the Provincial Agriculturist (OPA)	Ms. Queenie Atup								
		Bureau of Fisheries and Aquatic Resources (BFAR)	Mr. Candido Samijon								
	Livestock	Office of the Provincial Veterinarian	Mr. Ian Ray Tejada Ms. Isabelita Alipoyo								
I-BUILD Subproject Co Engineering	omponent /	Provincial Engineer's Office (PEO)	Engr. Camilo Gasatan Engr. Evelyn Ayuban								
I-REAP Subproject Co	mponent	Office of the Provincial Veterinarian	Dr. May Dallyn Paman								
Planning		Provincial Planning and Development Office	EnP. Maria Imelda Borromeo Atty. Maria Contessa Butron-Arcaya								
ON-CALL											
Environment and Nat	ural Resources		EnP. Jovencia Ganub								
Social Welfare and De	evelopment/GAD		Ms. Carmelita Tecson								
Disaster Managemen	t		Dr. Anthony Damalerio								
Enterprise			Ms. Gertrudes Fuentes								
PAFC Representative			Mr. Apolonio Manatad								

PHOTO DOCUMENTATION

1) Bohol PCIP Enhancement Writeshop 8-9 August 2018





2) Enhanced PCIP Writeshop 17-18 September 2018



3) Stakeholders' Consultation 22 October 2018



4) Enhanced Seaweeds PCIP Presentation to the Provincial Development Council (PDC) 24 October 2018



5) PDC ExeCom Presentation of the Updated PCIP Matrices 19 July 2024



