

**Provincial Commodity Investment Plan** (With Climate Change Adaptation PAPs)

# HIGHLAND VEGETABLES





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Photo Documentation

# List of Abbreviations & Acronyms

ACFTAnnual per Capita Food ThresholdACPTAnnual per Capita Poverty ThresholdAESAgro-Edaphic SuitabilityAIPAnnual Investment PlanADPAnnual Development PlanARMMAutonomous Region in Muslim MindanaoBALABohol Livestock AideBEMOBohol Environment Management OfficeBFARBureau of Fisheries and Aquatic ResourcesBOIBoard of InvestmentsBONACGABohol Provincial Seaweed Farmers Producers CooperativeCCAClimate Change AdaptationCDACooperative Development AuthorityCLUPComprehensive Land Use PlanCPTComprehensive Land Use PlanCPTDepartment of AgricultureDENRDepartment of AgricultureDENRDepartment of Environment and Natural ResourcesDOLEDepartment of Environment and Natural ResourcesDOLEDepartment of Environment and Natural ResourcesDOLEDepartment of Science and TechnologyDRRMDisaster Risk Reduction and ManagementDTIDepartment of Trade and IndustryELAExecutive Legislative AgendaEOExecutive CorderE-VSAExpanded Vulnerability and Suitability AssessmentEAExpanded Vulnerability and Suitability Assessment
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E-VSA Expanded Vulnerability and Suitability Assessment
EA Earmors' Association
FMR Farm-to-Market Road
GAP Good Agriculture Practices
GEF Global Environmental Facility
I-BUILD Intensified Building-Up of Infrastructure and Logistics for Development
IEC Information Education Campaign
IP 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
NMIS National Meat Inspection Service
NOL No Objection Letter

NPCO	National Project Coordination Office
NSCB	National Statistical Coordination Board
OPA	Office of Provincial Agriculturist
OPV	Office of Provincial Veterinarian
РСА	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
PDPFP	Provincial Development Physical Framework Plan
PGBh	Provincial Government of Bohol
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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# INTRODUCTION

Bohol is one of the selected recipient provinces of the Philippine Rural Development Project (PRDP). PRDP 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 platform that aims to improve the incomes and food security of the rural poor. 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 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.

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 PCIP of Bohol is a 3-year strategic plan (2017-2019) that highlights the identified priority commodities of the province for an inclusive, value-chain based and climate smart agriculture that will contribute to the vision towards a strong and balanced agri-industrial province.

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.*<sup>1</sup>

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. 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 are: coconut, dairy, native chicken, swine, highland vegetables, cassava, inland fishery, mariculture (seaweed), cacao and coffee. These identified commodities that are of great importance to the agricultural development of Bohol will undergo the value chain analysis. As soon as the value chain report will be approved it will start the preparation and integration of the commodity into the PCIP.

The PCIP will serve as a basis of all interventions relative to the commodities identified. Funding for I-BUILD and I-REAP sub-projects will be incorporated in the plan for the selection of eligible interventions. Infrastructure projects and commodity enterprises within this plan shall be the priority projects of the Provincial Government in agriculture, livestock and fisheries.

<sup>&</sup>lt;sup>1</sup>J. Hellin and M Meijer. Guidelines for Value Chain Analysis, (FAO) November 2006, p. 4.

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**

There is an apparent necessity to address certain issues that have been hindering the full development of agricultural land in Bohol. Foremost, there are still large areas of idle lands in the province, unutilized or underutilized for agriculture. Only half of the total agricultural area of the province is planted to major crops. With this level of land utilization, there is still a substantial potential for the province to enhance its agricultural productivity and harness other crops suitable for its soil and weather conditions.

Technologies to maximize the upland areas have not yet been fully accepted and practiced by farmers. There is low level of adoption and application of location specific agri-aqua technologies. Many of the rural poor are landless, or have limited farm lands, which may not be appropriate to achieve viable financial returns. Insufficient farm equipment, support infrastructure and production and postharvest facilities also is a challenge in the sector that needs improvement of existing farm equipment and the provision of additional farm machineries and support facilities. Development of agricultural lands has also been impeded by lack of accessibility and poor road networks that link farms to production support facilities and markets. Bohol's development challenges can be summarized as pertaining to underutilization of agricultural lands and small, limited landholdings with an average farm size of only 0.6 hectare; poor farm to market road system; and low production due to inefficient and insufficient modern farm or agricultural technologies.

The agricultural development of the province is a collaborative effort among stakeholders. The Philippine Rural Development Project (PRDP), thru the Department of Agriculture (DA) and funded by the World Bank is extending different projects with the objective of alleviating the poverty situation of the Boholano farmers. The Provincial Commodity Investment Plan (PCIP) is one of the requirements needed for project implementation. The PCIP is a strategic plan that substantiates the interventions within the various segments of the value chain of the commodity, which shall become the basis for PRDP's I-BUILD and I-REAP in selecting subprojects for funding.

The Bohol PCIP undertakes a series of consultation with various stakeholders. The issuance of No Objection Letter (NOL) by the National Project Coordination Office (NPCO) and the presentation of the VCA results to the Provincial Governor and the PCPT indicates the integration of the approved commodity to the PCIP. The highland vegetables is the third priority commodity of the province that is with a PCIP, along with native chicken and seaweeds.

The approved Highland Vegetables VCA with NOL was presented by RPCO to the Provincial Development Council last January 30, 2017. Being participatory, the planning process includes technical review and stakeholders' consultation with various actors along the chain from the input supplier, producer, processor and traders. The Highland Vegetables Stakeholders' Consultation was conducted last May 18, 2017. The activity was attended by both private and public players in the industry, with a strong participation from the Indigenous Peoples' (IP), the Eskaya. The IPs was represented by its Provincial IP Chieftain being a grower of highland vegetables. The PCIP was presented and approved by the Provincial Development Council last June 14, 2017. The PLGU may also use the PCIP to mobilize resources from other fund sources other than PRDP, such as other National Government Agencies (NGAs) and the private sector.

## 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 Slope<sup>2</sup>

#### **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- 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 Range<sup>3</sup>

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), vlcanic extrusive and magmatic rocks (Ubay Volcanics and Jagna Andesite). *Map 2* and *Table 1* show the slope categories and the corresponding area covered in hectares.



<sup>2</sup> Bureau of Soils and Water Management, DA, Region 7, Cebu City

<sup>3</sup> Philippine Land and Soil Management Atlas for Central Visayas

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

#### Soil Types<sup>4</sup>

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).





<sup>4</sup> Bureau of Soils and Water Management, Department of Agriculture 1992, Region 7, Cebu City

#### • Existing Land Use and Vegetative Cover<sup>5</sup>

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%.<sup>6</sup>



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 is bounded by Mabini and Candijay towns and covers an area of 2,200 hectares<sup>7</sup>. The most popular man-made mangrove forest in Bohol is around Banacon Island in Getafe town comprising an area of 1,750 hectares.

<sup>&</sup>lt;sup>5</sup> Bohol Ecological Profile of DENR, 1992

<sup>&</sup>lt;sup>6</sup> Bohol Ecological Profile, DENR 1992

<sup>&</sup>lt;sup>7</sup> Bohol Coastal Environment Profile of 2002



## • Land Classification<sup>8</sup>

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.

<sup>&</sup>lt;sup>8</sup> Department of Environment and Natural Resources (DENR), 2000





#### • 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 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, 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.



Map 6. Protected Areas Map, Bohol Province

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.

In terms of biodiversity assets, 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.

The Province has the biggest mangrove forest in Southeast Asia 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-renown 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.

#### • Risk Profile<sup>9</sup>

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 4<sup>th</sup> 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).

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.





Source: PPDO Bohol

<sup>&</sup>lt;sup>9</sup> Bohol Provincial Disaster Risk Reduction and Management Plan 2023-2025

#### • 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, Alburguergue, 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.

#### • Rain-Induced Landslide

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 Map 9. Rain-Induced Landslide Susceptibility Map, Bohol Province



Source: PPDO Bohol

addition to these, the municipalities of 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 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

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 Map 13. Liquefaction Hazard Map, Bohol Province



Source: PPDO Bohol

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.





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

Source: PPDO Bohol

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.

#### Map 15. Tsunami Hazard Map, Bohol Province



Source: PPDO Bohol

#### • Infrastructure <sup>10</sup>

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, which account for 61%. The Provincial 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)



Map 16. Road Network Map, Bohol Province

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. Moreover, the preference for motorcycles stayed on top because of its affordability and lower maintenance cost compared to four-wheeled vehicles.

## 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**

Population: 1.255 Million (2010) 1.313 Million (2015) 1.394 Million (2020) Income Class: 1<sup>st</sup> Class Province Land Area: 411,726 hectares (411.726 Km<sup>2</sup>) Population Growth Rate: 1.06% (2010-2020) No. of Household: 322,022 (2020) Ave. HH Size: 4.3 (2020) Pop. Density: 292 persons/km<sup>2</sup> (2020) Administrative Units: 1 City, 47 Municipalities 1,109 Barangays **3** Congressional Districts Coastline: 654 Km. of coastline Municipal Waters: 6,245 Km<sup>2</sup> Coastal Barangays: 304 Brgys.



Source: OpenSTAT, PSA

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

every 100 females. Among the municipalities, Buenavista had the highest sex ratio of 108 while Tagbilaran City had the lowest sex ratio of 98.

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 province include Tagbilaran the City (2,876/km<sup>2</sup>), Dauis (1,211/km<sup>2</sup>), Bien Unido  $(974/km^{2}),$ Panglao  $(834/km^2),$ Cortes (671/km<sup>2</sup>), Baclayon (652/km<sup>2</sup>), Tubigon (585/km<sup>2</sup>), Talibon (507/km<sup>2</sup>), Maribojoc  $(449/km^2)$ , and Calape  $(439/km^2)$ . On the other hand, the least densely populated areas include Sevilla (97/km<sup>2</sup>), Dimiao





(110/km<sup>2</sup>), Danao (124/km<sup>2</sup>), Antequera (126/km<sup>2</sup>), Sierra Bullones (131/km<sup>2</sup>), Bilar (143/km<sup>2</sup>), Balilihan (147/km<sup>2</sup>), San Isidro (165/km<sup>2</sup>), Trinidad (180/km<sup>2</sup>) and Sikatuna (181/km<sup>2</sup>).

#### **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.

#### • Poverty Situation

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 Incidence<sup>11</sup> 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.<sup>11</sup> 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

/	Annual Per Capita Poverty Threshold							erty Inci/ Famil	dence am ies (%)	nong	Magnitude of Poor Families					
Province	(in Pesos)							Estima	ates (%)		Estimate ('000)					
	2015	20	18	2021	20	23	2015	2018	2021	2023	2015	2018	2	2021	2023	
PHILIPPINES	21,753	25,8	14	28,794	33,2	96	16.5	12.1	13.2	10.9	3,747	3,005	5 3	,482	2,992	
Region VII	21,914	25,9	68	32,423	34,5	53	23.6	12.2	22	12.3	394	181	3	54	207	
Bohol	20,437	26,1	08	26,853	30,9	81	21.7	15.5	19.1	14.8	60	47	6	51	49	
Cebu	21,740	25,9	14	33,657	35,6	605	17.9	11.3	22.8	11.7	179	134	2	.93	157	
Region/	An	nual Per	Capi	ta Food T	hreshold	ł	Subsi	stence In Famil	cidence a ies (%)	among	Magnitude of Subsistence Poor Families					
Province	(in Pesos)						Estimates (%)				Estimate ('000)					
	2015	20	18	2021	20	23	2015	2018	2021	2023	2015	20	18	2021	2023	
PHILIPPINES	15,18	<b>39</b> 18,1	26	20,046	22,9	94	5.7	3.4	3.9	2.7	1,303.55	5 839.5	64 1	.,032.63	741.73	
Region VII	15,35	<b>57</b> 18,0	33	22,679	24,0	)49	9.8	2.6	8.1	3.2	164.50 38.24		1	.30.18	53.42	
Bohol <sup>b/</sup>	14,24	18,2	45	18,743	21,6	536	7.2	2.9	6.2	4	20.14	8.90	1	.9.94	13.33	
Cebu	15,13	39 17,9	59	23,400	24,7	/98	6.8	2.5	8.6	3	68.35	29.34	l 1	.10.25	40.09	
/	Income Gap							Pove	rty Gap	Severity of Poverty						
Region/Provinc	ce	2015		2018	2021		2023	2015	2018	2021	2023	2015	2018	2021	2023	
PHILIPPINE	5															
Region VII		27.9	1	L9.2	25.8	20	).53	6.6	2.34	5.69	2.52	2.6	0.72	2.15	0.81	
Bohol		25.7	1	L8.11	23.92	21	L.53	5.6	2.8	4.57	3.19	2.1	0.79	1.58	1.05	
Cebu		26.3	1	L9.58	26.19	20	).21	4.7	2.22	5.97	2.36	1.8	0.7	2.29	0.75	

<sup>11</sup> Families with income below the food threshold; subsistence incidence is often referred to as the proportion of Boholanos in extreme or subsistence poverty

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)

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%).



Source: OpenStat, Philippine Statistics Authority



Source: OpenStat, Philippine Statistics Authority

#### **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 midway 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.

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.





Source: Department of Agriculture Region VII

Source: OpenStat, Philippine Statistics Authority



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 and poultry industry is a major contributor to the region's total In terms of **livestock** production. **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



Source: OpenStat, Philippine Statistics Authority

Comparing the production and consumption of major food commodities in the year 2023, the province of Bohol has surplus production for corn, carabeef, beef, pork, chevon, chicken and eggs. Food commodities where the province have recorded deficit in terms of production include rice, vegetables, fruits, rootcrops, fish and marine products.

### 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 21. Visitor Arrivals, Bohol: 2019-2023

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

Table 4. 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%						
**	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: DOT 7 and 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 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 billion 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.

Table 5. Micro Small Medium Enterprises (MSMEs) Business Name Registration and Employment												
Generated, Province of Bohol												
	BN	I Registratio	ns	Employment Generated			Bui	sness 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		

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 Central 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 share of the major industries to the economy of the province, Figure 26. Annual GDP of Bohol, 2020-2023 Level (in Billion Php) and Growth Rates (in Percent), at Constant 2018 Prices



Source: OpenStat, Philippine Statistics Authority (PSA)

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 Vision and Framework of the Province**

### • 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). Divided into five (5) Core and four (4) Support, each Agendum aims to transition governance with each respective objective:

- 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 Chains 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 6. Priority Commodities, Bohol, 2015

					Prior	ity Commodities		
<b>Commodity Prioritization Worksheet</b>	Woi	aht	COC	CONUT	LIVES	TOCK-DAIRY	NATIVE CHICKEN	
(CRITERIA)	vveignt		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

Critorio			Priority Commodities						
		Woight		HI-HV VEGETABLE		CASSAVA		TILAPIA-HITO -IF	
Citteria	vve	igiit	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			6	1.80	6	1.80	3	0.90	
Total Weighted Score	100			4.68		5.94		3.12	
RANK				4th		5th		6th	

		Weight		Priority Commodities								
Critoria	Woi			Weight		SWINE		ICULTURE	C	ACAO	COFFEE	
Citteria	VVCI	giit	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		
3. 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		

# Commodity Value Chain 3: <u>HIGHLAND VEGETABLES</u>

• Commodity Profile <sup>12</sup>

## a) **Product Description**

The term "vegetable" is from the Medieval Latin word *vegetabilis* (animated) and from *vegetare* (enliven), which is derived from *vegetus* meaning active. The use of the word was first recorded in the 15th Century English and originally applies to any plant. In the 18 th century, the meaning of "vegetable" as "plant grown for food" was established. Thus, any edible plant or part of a plant can be considered vegetable in the broadest sense.

Considering their complex nature, it is very difficult to come up with a single, acceptable, all in compassing definition of vegetables. Classification also proves to be a problem as they can be grouped in a number of ways, such as botanical families, uses, form of propagation, and edible parts.

A popular categorization of vegetables is based on their capacity to adapt to different climates. Tropical vegetables are those that adapt well to temperatures ranging between 18 and 27°C while temperate vegetables thrive in areas where the mean monthly temperatures range between 15 and 18°C. Temperate vegetables also thrive at elevations greater than 800 meters above sea level. This allows mountainous regions in tropical countries such as the Philippines to grow temperate vegetables.

Vegetable production in the country is based on highland and lowland cropping in the wet and dry season. Most vegetables planted in highland areas are temperate types. These are cabbages, carrots, potatoes, Kentucky beans and lettuce. Farmers in the lowland on the other hand prefer to plant tropical types such as eggplant, squash, bitter gourd, string beans and okra as they are more adaptable in these areas.

Under the High Value Crops Development Program (HVCDP) of the Department of Agriculture, vegetables are categorized into four (4) main types – highland, lowland, spices and indigenous. HVCDP has identified twenty (20) different kinds of vegetables that comprises the four types and these are the following: 1) ampalaya, 2) asparagus, 3) broccoli, 4) cabbage, 5) carrots, 6) cauliflower, 7) eggplant, 8) garlic, 9) ginger, 10) gourd, 11) habitchuelas, 12) lettuce, 13) okra, 14) onion, 15) Chinese pechay, 16) native pechay, 17) squash, 18) stringbeans, 19) tomato, and 20) white potato.

In the HVCDP's official online address, highland vegetables are referred as the chopsuey group and lowland vegetables as the pinakbet group. Chopsuey is an American-Chinese origin dish, prominent to the Filipino cuisine and is often served during family gatherings. It mainly consists of meat (often chicken, fish, beef, prawns, or pork) and eggs, cooked quickly with vegetables such as beans, cabbage, broccoli, cauliflower, and carrots and bound in a starch-thickened sauce, thus the reference of highland vegetable variety as the Chopsuey-group vegetables. Pinakbet on the other hand is a recipe comprised of different lowland vegetables such as eggplant (talong), squash (kalabasa), string beans (sitaw), ampalaya (bitter gourd), and okra.

<sup>&</sup>lt;sup>12</sup> Highland Vegetables Value Chain Report, RPCO, 2017

Table 7. Cropping Pattern and Cultivation Time of Selected Vegetables in the Philippines								
CLIMATE PREFERENCE	SEASON OF CULTIVATION	VEGETABLE TYPES						
Highland	Year - Round	cabbage, chinese cabbage, cucumber, shallot, climbing french beans						
	Cooler Months	french beans, tomato						
Upland	Year - Round	bitter gourd, celery, eggplant, shallot, peas, pak choi, squash, yard long beans, bell pepper						
	Cooler Months	garlic, onion, winged beans						
	Warm Months	ginger						
Lowland	Year - Round	cucumber						
	Cooler Months	tomato						

As summarized from the study of Libero and Rola (2000), Table 1 shows the cropping patterns and cultivation time for popular vegetables in the Philippines.

Source: Johnson, G.I., Weinberger, K., Wu, M.H. 2008. The Vegetable Industry in Tropical Asia: An overview of production and trade, with focus on Thailand, Indonesia, the Philippines, Vietnam, and India. Shanhua, Taiwan: AVRDC – The World Vegetable Center.

*Table 7* distinguished highland, upland, and lowland vegetables. However, definite requirements such as temperature, slope, and altitude is not identified. This is understandable considering the wide assortment of vegetables involved. Technical requirements such as these are also not often practiced or followed since farming practices in the localities are based on the farmer's preference and supply and demand.

Several sources however mentioned that upland zones in the Philippines where agriculture is practiced is on areas with altitudes ranging between 500 meters and 1,000 meters above sea level and areas with rolling to steep land, with slopes ranging upwards from 18%. On the other hand, highland refers to areas with elevation above 1000 m, with the Cordillera Mountain Range as the most prominent example, while lowland is composed mainly of grassland, pasturelands, and landlocked provinces with an altitude of below 500 meters.

Highland vegetables are considered one of the important high value food crops in the Philippines. It directly employs farmers who are otherwise not into the traditional crops like rice, corn, coconut, sugar and other crops. This special sector in the agriculture industry plays a vital role in the economy considering it supplies the food needs of rapidly-urbanizing areas of the country while it supplies the nutrient requirements of the ever-increasing population.

## Product Forms and Uses

Vegetables can be consumed and used in many forms. They can be eaten directly or they can also undergo processing to produce a wide variety of products like oils, sauces, and pastes. There are also preservation processes like freezing, canning, pickling and drying. Dried vegetables however, are mainly used as ingredient to animal feed. Locally, excess or rejects which are considered vegetable wastes are also fed to poultry and livestock or used for producing organic fertilizers.

The United States Department of Agriculture (USDA) reported that people who eat more

vegetables as part of an overall healthy diet are less likely on risk of most chronic diseases. Vegetables provide the nutrients and other vitamins important to the proper maintenance of the human body. Considering its nutritional and medicinal properties, vegetables are also present in the pharmaceutical and cosmetic industry. A wide range of beauty products are today infused with vegetable extracts to increase skin whitening. Pharma companies also recognizing the need for vegetable-provided vitamins and minerals, produce vegetable capsules and dietary oils which are usually sourced from organic farms.

*Table 8* provides description, production requirements, product forms, and uses of each of the identified vegetables.

#### Table 8. Highland Vegetables Description, Uses and Product Formats



Cabbage is one of several vegetables in the species *Brassica oleracea*, which also includes broccoli and cauliflower.

It is leafy, green or purple biennial plant with heads generally ranging from 0.5 to 4 kilograms (1 to 9 lb.), and can be green, purple and white.

Smooth-leafed firm-headed green cabbages are the most common, with smooth-leafed red and crinkle-leafed savoy cabbages of both colors seen more rarely.

Cabbage requires an optimum day requirement of 15 to 20°C but good heads can still, be obtained at temperature up to 28°C. Loamy sand is the type of soil suited to cabbage, provide there is adequate irrigation. But cabbage also adapted to a wide range of soil texture. Cabbage does not very well in a

- Generally grown for its densely leaved heads which is prepared and consumed in many ways.
- Can be eaten raw or by steaming, though many cuisines pickle, stew, sauté or braise cabbage. Pickling is one of the most popular ways of preserving cabbage, creating dishes such as sauerkraut
- In addition to its usual purpose as an edible vegetable, cabbage has been used as a medicinal herb for a variety of purported health benefits such as treatment for constipation, stomach ulcers, headaches, obesity, skin disorders, eczema, jaundice, scurvy, rheumatism, arthritis, gout, eye disorders, and heart diseases.



The carrot is a biennial plant in the umbellifer family *Apiaceae*. During the first season of its growth, it forms a rosette of finely divided leaves and stores a surplus of food in its root, which thus becomes large and fleshy. Firstseason carrots are harvested for food. If left in the ground for a second season, a terminal bud in the center lengthens into a bristly branched stem 91 to 152 cm (36 to 60 in) high. This stem bears a nest-like umbel of white or pinkish flowers, the central flower of each umbelet, often being purple. The fruit consists of two one-seeded nutlets, each of which has four rows of radiating spine.

Carrot grows best in high elevation areas 1,000 m above sea level. Roots attain optimal color when air temperature is 15-21 °C. Carrots grows best in deep sandy loam soil rich in organic matter with pH ranging from 5.5 to 6.8.

- The roots can be chopped and boiled, fried or steamed, and cooked in soups and stews, as well as baby and pet foods.
- Large-rooted late types are used for stock feeding and are relished by farm animals.
- Grated carrots are used in carrot cakes, as well as carrot puddings and breads.
- Can also be used alone or blended with fruits in jams and preserves.
- Carrot juice is also widely marketed, especially as a health drink, either stand-alone or blended with juices extracted from fruits and other vegetables.
- Rich in Beta-carotene a powerful antioxidant which enhances the regeneration, renewal and expansion of skin cells. Because of this property, carrot juice, puree, or seed essential







Lettuce, common name for members of an herbaceous genus of the composite family, particularly the garden lettuce.

The four common horticultural varieties are head lettuce, leaf lettuce, romaine lettuce, and asparagus lettuce.

Head lettuce forms a cabbage like head which are crisp and juicy and accounts for the bulk of commercially grown lettuce.

Leaf lettuce has free-growing leaves that do not form a head, some varieties of which form purple leaves.

Romaine or cos lettuce produces long, erect heads. They contain more nutrients than iceberg, but is grown less often commercially because its long, tender leaves damage easily.

Asparagus lettuce has a thick, edible stem and unpalatable leaves.

- Most lettuces is used in salads, either alone or with other greens, vegetables, meats and cheeses. Romaine lettuce is often used for Caesar salads, with a dressing that includes anchovies and eggs. Lettuce leaves can also be found in soups, sandwiches and wraps,
- The "woju", or asparagus or stem lettuce, is grown for its stems or seed stalk, which are eaten either raw or cooked, usually in Asian Chinese Cuisines
- Oilseed type is grown for its seeds, which are pressed to extract an oil mainly used for cooking and as an herbal oil. It has few leaves, bolts quickly and produces seeds around 50 percent larger than other types of lettuce.

 Some herbal cigarettes or tobacco-free cigarettes are made out of wild lettuce leaves. Wild lettuce is known for having mild sedative and pain relieving

### b) Production Trends

### • Global Production

According to a study by Texas A&M University- Commerce based on the data from Food and Agriculture Organization (FAO), there are variety of factors that affect the ability and drives of countries to produce, import, export and consume vegetables. Among the factors that affects trend in production include "prices of inputs, technology, and exogenous factors such as climate change, government policies, pests and diseases and number of producers".

The Food and Agriculture Organization (FAO) of United Nations reported that vegetables cover only about 1.1 % of the world's total agricultural area. Despite this, the production of fresh vegetables is continuously experiencing extreme and significant growth globally especially in terms of per capita which increased 60% over the last 20 years.

Aggregate data for global production of highland vegetables is not available so production data on the identified vegetables are carefully extracted from FAO database to give a bird's eye view on the highland vegetable production status globally from 2009-2013.

Presented in Figure 29 is the summary of global vegetable production based on the seven vegetables identified for this study.



Based on the Figure, cabbage and other brassicas has the largest global production among these four highland vegetable groups. Production trend of each vegetable is increasing from 2009-2013 which can be attributed to the growing demand for these vegetables globally.

To present a summary of the status of Philippines with regards to the global production of the identified vegetables, kindly refer to Table 8 below.

Table 9. Summary of Philippines' Status in Global Vegetable Production								
Global			Philip	pines				
Vegetable	2013 Production (MT)	2013 Yield (HG/HA)	2013 Production (MT)	% Share Global Production	Ranking	2013 Yield (HG/HA)		
Cabbage	71,434,080	292,307	127,450	0.18	42	151, 079		
Carrots and Turnips	37,209,469	310,063	68,102	0.18	51	141,320		
Broccoli & Cauliflower	22,278,055	178,088	11,779	0.05	49	106,694		
Lettuce and Chicory	24,896,115	216,798	4.040	0.02	67	74,128		

Source: Computation based on FAO data

It can be seen in this table that Philippines has low production of the identified vegetables compared to other producing countries. The country has than less than 1% share in global production of the selected vegetables and highest ranking is only at 42nd place.

In terms of yield, average yield of the Philippines is relatively lower than global yield but the most noticeable is the yield per hectare of lettuce of 74,128 hg/ha as compared with the posted 216,798 hg/ha or only 34.19% of global production.

The above figures imply that Philippines in general has an insignificant role in the global production of the identified vegetables. It is worth noting though that the Philippines is the fifth largest producer of fresh vegetables both in volume (5,000,000 MT) and value (US\$ 942,205,000) in 2013. This disparity can be explained by the difference in the general preference for the type of vegetables grown in the specific area. For example, Chinese cabbage is the major vegetable produced in China, Japan, and Korea, while eggplant ranks high in Southeast Asian countries such as the Philippines.

Some difference can also be attributed to the physical characteristics and climate environment of the countries. For example, East Asia is mainly temperate and subtemperate, while Southeast Asia lies mainly in the tropics. The selected vegetables for this VCA are more difficult to grow in hot and humid conditions; therefore, their productivity is expected to be low in tropical nations.

Aside from the stated factors, the country's competiveness is affected by a number of social and economic issues. A book published by AVDRC summarized the constraints faced by the vegetable industry using published literature. These are : 1)high input cost or low output price; 2)losses to pests and diseases (\*fungal diseases are more serious); 3)lack of seeds or planting materials; 4)institutional constraints, including lack of capital, inputs, or information, poor extension, research, roads, sub-optimal use of inputs, etc.; 5)lack of postharvest and storage facilities; 6)inadequate marketing systems, resulting in low product prices, price instability, high margins, etc.; 7)biological constraints, including poor plant growth and poor fruit setting; 8)poor cultural practices; 9)excessive rains, flooding or bad weather; 10)lack of appropriate variety; and 11)policy constraints, including size of land holding, subsidies, and taxes.

The lower production in the country compared with other countries and being lagged behind more than 40 countries is a factor why Philippines has low to no volume of export of these vegetables.

### • Domestic Production

The vegetables produced and traded in the Philippines can be classified into two groups: highland and lowland vegetables.

The succeeding tables display the production of the selected highland vegetables produced in the country. Philippine Statistics Authority's data on Snap beans or Baguio beans is not available. Some regions do not have production data on the identified vegetables so these were not included in the table.

The available figures however aim to provide adequate synthesis on the status of domestic production of highland vegetables and the region's position vis-a-vis total Philippine production.



As a summary, Figure 30 shows the production trend of the six vegetables: broccoli, cabbage, cauliflower, lettuce, carrots and Chinese cabbage. Among these vegetables, cabbage has the highest production followed by carrots, Chinese cabbage, cauliflower, lettuce and broccoli.

There is also an erratic trend in production displayed by these vegetables during the past five years (2011-2015).

To explain the reasons and factors that contributed to these production trends, analysis in the production of each vegetable follows.

## > Broccoli

Broccoli is mostly consumed in the Philippines due to its health benefits. This grows in selected regions in the country mostly in the upland areas. Production volume and trend in production is shown below.

Table 10. Volume of Broccoli Production in the Philippines for 2011-2015, per Region (in MT)								
Pagions		Average						
Regions	2011	2012	2013	2014	2015	Growth in %		
PHILIPPINES	2,880.86	2,993.98	3,026.41	3,064.28	2,911.18	0.32 %		
CAR	1,863.96	1,919.30	1,948.35	1,984.13	1,890.09	0.39 %		
Northern Mindanao	780.00	786.00	820.55	872.00	812.00	1.14 %		
Central Visayas	204.30	245.90	222.01	167.08	169.33	-3.19 %		
Cagayan Valley	15.64	24.38	17.19	16.07	16.06	4.95 %		
Davao Region	7.88	7.64	8.06	9.69	9.71	5.72 %		
CALABARZON	1.00	1.40	1.15	6.75	0.46	103.98 %		
Western Visayas	6.61	7.55	7.50	6.75	11.50	18.48 %		
SOCCSKSARGEN	1.47	1.81	1.60	1.81	1.93	7.82 %		

Source: Bureau of Agricultural Statistics (BAS), 2016

In the last five-years, broccoli production in the country posted upward and downward trend but had an average growth rate of 0.32%. The regions of CAR, Northern Mindanao and Central Visayas posted the highest production volume for broccoli. However, it was observed that there was a negative growth rate of 3.19% in Central Visayas for the past five years.

It is noticeable in this data that CALABARZON had the largest average growth share for broccoli production among the regions with 103.98% increase.

The top three broccoli-producing regions for 2015 are CAR, Northern Mindanao, and Central Visayas as shown in Figure 31 above. The landlocked area of Cordillera Administrative Region dominates with almost 65% share.



# > Cabbage

Among the vegetables being studied, cabbage has the highest production due to its adaptability to a wide range of climatic conditions and soil types, ease of production and storage, and its food value. In relation to this, high market demand has prompted the success of commercial cultivation of this plant. The production trend for cabbage is presented in the table below.

Table 11. Volume of Cabbage Production in the Philippines for 2011-2015, per Region (in MT)								
			Year			Average		
Regions	2011	2012	2013	2014	2015	Growth in %		
PHILIPPINES	125,309.48	126,380.50	127,463.46	127,986.48	128,587.96	0.65 %		
CAR	98,942.82	99,361.72	99,957.60	99,520.12	97,306.77	-0.41 %		
Central Visayas	7,947.48	8,198.93	8,518.61	8,687.92	8,500.18	1.72 %		
Northern Mindanao	5,751.50	6,090.80	6,296.84	6,709.74	6,672.40	3.82 %		
Davao Region	4,211.81	4,215.49	4,144.19	4,246.66	4,265.94	0.33 %		
Ilocos Region	3,012.45	3,044.04	3,159.70	3,215.06	3,257.06	1.98 %		
SOCCSKSARGEN	1,564.06	1,640.51	1,531.91	1,563.68	4,265.94	43.29 %		
Cagayan Valley	1,273.94	1,227.92	1,183.82	1,188.67	1,537.23	5.63 %		
CALABARZON	847.70	853.19	797.44	828.29	760.50	-2.55 %		
Zamboanga Peninsula	317.04	325.69	534.25	773.03	792.68	28.50 %		
ARMM	465.37	449.90	459.46	459.73	459.22	-0.31 %		
Western Visayas	484.22	487.96	451.26	440.67	483.97	0.18 %		
Bicol Region	264.72	255.82	239.07	186.76	112.42	-17.90 %		
Eastern Visayas	181.03	179.61	149.44	132.75	138.11	-6.18 %		
MIMAROPA	27.60	27.90	28.64	29.65	32.56	4.27 %		
CARAGA	17.75	21.03	11.24	3.76	2.98	-28.84 %		

Source: Bureau of Agricultural Statistics (BAS), 2016

Based on this table, the top three cabbage-producing regions are CAR, Central Visayas and Northern Mindanao. Overall, Philippines has an average growth rate of 0.65% in the past five years.

The increase in production in 2015 is triggered by the following: favorable weather condition during the head formation in Benguet, increase in production areas in Ilocos Region and Cagayan Valley and lesser incidence pest infestation (cabbage worms in Davao City and borers and head rot in Laguna), and increase in number of farmers due to high demand.

Meanwhile, the decrease in production is due to the occurrence of the following: adverse effect of Habagat, typhoons "Egay" and "Ineng" in CAR, crop shifting to eggplant and ginger

in Cebu and incidence of cutworms in CALABARZON, smaller heads harvested in Cagayan Valley, Western Visayas, and Central Visayas, and due to abrupt climate change and lesser planting areas in SOCCSKSARGEN.

*Figure 32* illustrates percentage share of regions in cabbage production 2015. CAR, the leading highland vegetable-producing region contributes more than 75% to domestic production.



Northern Mindanao and Central Mindanao contributes little more than 11% while the rest of the regions produced about 13% of the total production.

### > Carrots

Carrots are among the most popular vegetable in this group and even worldwide due to its nutritional content and ability to grow even for the novice. In the Philippines, this is most commonly used as an ingredient for cooking chopsuey dish. The production trend in the past five years is displayed in the below table.

Table 12. Volume of Carrots Production in the Philippines for 2011-2015, per Region (in MT)								
		Average						
Regions	2011	2012	2013	2014	2015	growth in %		
PHILIPPINES	67,161.65	68,453.92	68,110.79	68,342.09	67,036.96	-0.04%		
CAR	58,766.14	60,126.13	60,038.42	60,507.33	59,526.75	0.33%		
Central Visayas	4,165.25	4,168.85	3,908.73	3,632.28	3,351.38	-5.24%		
Davao Region	1,419.46	1,422.50	1,389.99	1,308.84	1,279.49	-2.54%		
Northern Mindanao	1,260.71	1,296.25	1,244.45	1,263.80	1,231.80	-0.54%		
Cagayan Valley	712.5	609.20	601.80	584.58	594.94	-4.20%		
SOCCSKSARGEN	465.66	478.97	488.61	514.10	535.16	3.55%		
Zamboanga Peninsula	134.16	137.71	227.22	314.93	309.83	26.16%		
Western Visayas	149.2	135.64	139.09	143.73	139.53	-1.53%		
CALABARZON	46.43	43.87	33.38	33.26	31.12	-9.05%		
Bicol Region	20	20.8	21.5	22.00	22.25	2.71%		
Eastern Visayas	12.3	12.16	11.92	11.86	11.91	-0.80%		
MIMAROPA			3	2.95	2.5			
Ilocos Region	1.3	1.31	1.3	1.19	0.3	-20.81%		
CARAGA	4.9		1.38	1.25				
CENTRAL LUZON	3.64	0.53						

Source: Bureau of Agricultural Statistics (BAS), 2016

Based on this table, the regions of CAR, Central Visayas and Davao Region were the leading carrot producers in the country in the past five years. Overall, Philippines experienced а slight decrease of 0.04%. CAR had a production share of about 88.80% of the entire carrot production. Central Visayas only has 5% share of the production which is a small value compared to the production share of Cordillera.



## > Cauliflower

Table 13 below shows the production volume of cauliflower in the Philippines in the past five years. The country experienced an average growth of 0.61% during this period.

The leading cauliflower producing regions are CAR, Ilocos Region and Northern Mindanao. Based on 2015 production, Central Visayas is at the sixth place.

Table 13. Volume of Cauliflower Production in the Philippines for 2011-2015, per Region (in MT)								
			Year			Average		
Regions	2011	2012	2013	2014	2015	Growth in %		
PHILIPPINES	11,582.83	11,636.30	11,781.69	11,738.75	11,864.83	0.61 %		
CAR	5,290.32	5,302.22	5,206.66	5,144.13	5,178.74	-0.53 %		
Ilocos Region	4,681.56	4,641.79	4,812.07	4,803.11	4,911.34	1.22 %		
Northern Mindanao	901.50	946.00	1,022.04	1,051.00	1,032.20	3.50 %		
Cagayan Valley	308.34	275.28	239.52	236.29	232.44	-6.67 %		
SOCCSKSARGEN	131.32	135.37	154.55	166.69	174.56	7.46 %		
Central Visayas	84.29	115.64	133.61	134.78	127.65	12.08 %		
Western Visayas	46.50	70.25	72.55	64.30	87.00	19.57 %		
Davao Region	105.07	116.35	102.79	90.03	86.24	-4.39 %		
Central Luzon	27.32	25.35	25.00	24.65	24.00	-3.16 %		
Zamboanga	2 00	1 10	E 20	6.09	<b>مر د</b>	17 22 %		
Peninsula	5.90	4.40	5.50	0.98	7.20	17.52 %		
MIMAROPA			3.00	3.10	2.73			
CALABARZON	2.70	2.95	2.80	13.50	0.45	72.41 %		
CARAGA		0.69	1.80	0.20	0.20			

Source: Bureau of Agricultural Statistics (BAS), 2016

cauliflower The top two producing regions of CAR and Ilocos Region have a combined total of 85.04% share of the total production which describes the dominance of Luzon in terms of producing these vegetables. The rest of the regions are sharing the 15% of the balance in the production.



## Lettuce

Lettuce is usually used as an ingredient for salad in most restaurants and resorts and to some extent, in local households. Among the regions, Northern Mindanao, CAR and Central Visayas are the leading producers.



Table 14. Volume of Lettuce Production in the Philippines for 2011-2015, per Region (in MT)								
			Year			Average		
Regions	2011	2012	2013	2014	2015	growth in %		
PHILIPPINES	3,518.75	3,647.00	4,040.54	4,060.68	4,074.93	3.82%		
Northern Mindanao	1,816.12	1,821.34	1,817.85	1,759.42	1,593.20	-3.14%		
CAR	1,233.18	1,269.73	1,283.40	1,290.91	1,203.61	-0.53%		
Central Visayas	266.60	317.29	604.54	611.69	551.64	25.23%		
CALABARZON	108.70	137.41	218.56	274.30	314.47	31.40%		
SOCCSKSARGEN	39.760	40.52	44.76	49.16	314.47	140.47%		
Western Visayas	28.13	32.74	35.15	35.18	55.13	20.14%		
Zamboanga								
Peninsula	20.35	21.27	22.83	24.32	24.06	4.33%		
MIMAROPA			5.50	5.52	7.33			
Davao Region	4.83	5.00	5.25	6.18	6.44	7.61%		
Cagayan Valley	0.10	0.94	2.07	3.45	4.03	260.92%		
Eastern Visayas	0.68	0.72	0.63	0.50	0.55	-4.31%		
CARAGA	0.30	0.03		0.05				

Source: Bureau of Agricultural Statistics (BAS), 2016

Northern Mindanao has a 39.10% share in production, CAR with 29.54% and Central Visayas with 13.54%. As compared with the production of other previously mentioned vegetables, the distribution of lettuce production is almost widely dispersed. This means that growing lettuce is possible in different areas of the country.

	I	BROCCOLI			CABBAGE			CARROTS	
REGION	AVE PRO- DUCTION (MT)	AVE AREA PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)	AVE PRO- DUCTION (MT)	AVE AREA PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)	AVE PRO- DUCTION (MT)	AVE AREA PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)
PHILIPPINES	2,975.34	298.62	9.96	127,145.58	8, 396.76	15.14	67,821.08	4,824.50	14.06
NCR				0.00	0.00	0.00	0.00	0.00	0.00
CAR	1,921.17	163.60	11.74	99,017.81	5,375.24	18.42	59,792.95	3,327.72	17.97
ILOCOS REGION				3,137.66	370.39	8.47	1.08	0.51	2.13
CAGAYAN VALLEY	17.87	6.02	2.97	1,282.32	193.10	6.64	620.60	94.95	6.54
CENTRAL LUZON				0.00	0.00	0.00	2.09	1.45	1.44
CALABARZON	2.15	0.66	3.26	817.42	129.40	6.32	37.61	7.04	5.34
MIMAROPA				29.27	21.30	1.37	2.82	0.90	3.13
BICOL REGION				211.76	21.64	9.79	21.31	5.00	4.26
WESTERN VISAYAS	7.98	1.28	6.24	469.62	66.70	7.04	141.44	24.24	5.84
CENTRAL VISAYAS	201.72	15.81	12.76	8,370.62	703.52	11.90	3,845.30	632.75	6.08
EASTERN VISAYAS				156.19	33.36	4.68	12.03	3.71	3.24
ZAMBOANGA PENINSULA				548.54	100.60	5.45	224.77	87.23	2.58
NORTHERN	814.11	107.38	7.58	6,304.26	502.34	12.55	1,259.40	131.60	9.57
DAVAO REGION	8.60	2.00	4.30	4,216.82	586.83	7.19	1,364.06	357.60	3.81
SOCCSKSARGEN	1.72	1.87	0.92	1.546.11	218.23	7.08	496.50	150.03	3.31
CARAGA			0.72	11.35	4.30	2.64	2.51	1.67	1.51
ARMM		+		458.74	69.80	6.57	/ · · · · · · · · · · · · · · · · · · ·	+	
Annes		LETTUCE			AULIFLOWE	R	CHI	NESE PECHA	v
REGION		AVEAREA			AVEAREA			AVEAREA	
REGION	DUCTION (MT)	PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)	AVE PRO- DUCTION (MT)	PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)	DUCTION (MT)	PLANTED/ HARVESTED (HA)	AVE YIELD (MT/HA)
PHILIPPINES	3,868.38	504.26	7.67	11,720.88	1,035.38	11.32	51,535.15	3, 719.81	13.85
CAR	1,256.17	163.20	7.70	5,224.41	334.68	15.61	44,887.80	2,785.00	16.12
ILOCOS REGION				4,769.97	432.48	11.03	1.89	0.30	6.26
CAGAYAN VALLEY	2.12	2.38	0.89	258.37	95.56	2.70	160.22	26.46	6.06
CENTRAL LUZON			·	25.26	2.89	8.74	「 <u> </u>	<u> </u>	
CALABARZON	210.69	19.36	10.88	4.48	0.87	5.15	161.66	32.90	4.91
MIMAROPA	6.12	2.05	2.98	2.94	2.02	1.46			
BICOL REGION		<u> </u>	-		<u> </u>	<u> </u>	<u> </u>		
WESTERN VISAYAS	37.27	7.05	5.28	68.12	9.94	6.85	<u> </u>	<u> </u>	
CENTRAL VISAYAS	470.35	117.64	4.00	119.19	28.27	4.22	3,465.25	436.85	7.93
EASTERN VISAYAS	0.62	2.19	0.28			<b>-</b> /	1.69	1.83	0.93
ZAMBOANGA PENINSULA	22.57	4.95	4.56	5.57	3.40	1.64	83.06	11.35	7.32
NORTHERN	1.761.59	160.75	10.96	990.55	121.47	8.15	2.024.51	263.02	7.70
DAVAO REGION	5.54	4.35	1.27	100.10	24.40	4.10	392.13	97.85	4.01
SOCCSKSARGEN	44.73	21.12	2.12	152.50	29.94	5.09	356.91	64.25	5.55
CARAGA	0.13	0.06	2.11	0.72	0.34	2.16			
	· ,	· · · · · · · · · · · · · · · · · · ·	1 5		1	(P	<b></b> `	L	(

Table 15. Area Planted and Production Yield for Sele	ected Vegetables, Philippines, 201
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Source: Computation based on BAS data

The average yield for each vegetable is computed based from average production for each vegetable over the area planted/harvested. Among the vegetables under study, the vegetable with the highest yield is cabbage which has an average yield of 15.14 metric tons. This is followed by carrots, Chinese pechay, cauliflower, broccoli and lastly, lettuce. Cabbage has the largest production and planting area among these vegetables due to its ability to be grown in all regions of the country.

Following the large production of cabbage are carrots with an average yield of 14.06 MT/ha despite the almost half of the production volume of cabbage. Accordingly, the average planting area for carrots are almost half of the production area for cabbage.

As compared with broccoli, lettuce has the lower average yield of 7.67 MT/Ha compared with the 9.96 MT/Ha yield of broccoli despite the lower production and planted area for broccoli. This

means that the broccoli farmers are able to maximize their planting area and harvest more than the lettuce farmers do.

Among the regions, it is consistently CAR, Northern Mindanao and Central Visayas which have the largest yield of production which means that these regions are consistent in utilizing their large planting area by producing sufficient volume of production.

### • Regional Production Performance

Vegetables are priority commodities in Central Visayas. During the past five years, the region belongs to the top ten regions of the identified vegetables' production. The region posted positive production growth for cabbage, cauliflower, lettuce and Chinese pechay while the production for carrots and broccoli has posted negative growth.

In order to present how the provinces in Region 7 perform in terms of production, *Table 15* below lists the production volume from 2011-2015 and the average growth share per area. It is noticeable in this table that Bohol and Siquijor has little to no data on production of the identified vegetables.

These two provinces have little to no production of the identified vegetables because Bohol is more focused in growing lowland vegetables while Siquijor is more into livestock growing.

Table 16. Domestic Production of Identified Highland Vegetables in Region 7										
	C.VISAYAS	N. ORIENTAL	CEBU	BOHOL	SIQUIJOR					
A. BROCCOLI		-								
2011	204.30	204.05	0.25	-	-					
2012	245.90	245.90	-	-	-					
2013	222.01	222.01	-	-	-					
2014	167.08	167.08	-	-	-					
2015	169.33	169.33	-	-	-					
Ave. Growth Share	-3.19%	-3.15%	N/A	-	-					
B. CABBAGE										
2011	7,947.48	1,956.70	5,990.78	-	-					
2012	8,189.93	2,278.39	5,920.74	-	-					
2013	8,518.61	2,303.45	6,214.54	-	-					
2014	8,687.92	2,270.03	6,417.54	-	-					
2015	8,500.18	2,374.38	6,124.48	-	-					
Ave. Growth Share	1.72%	5.17%	0.62%	-	-					
C. CARROTS		-								
2011	4,165.25	2,424.26	1,740.99	-	-					
2012	4,168.85	2,488.40	1,680.45	-	-					
2013	3,908.73	2,374.11	1,534.29	-	-					
2014	3,632.28	2,095.89	1,536.39	-	-					
2015	3,351.38	1,898.60	1,452.78	-	-					
Ave. Growth Share	-5.24%	-5.77%	-4.37%	-	-					
D. CAULIFLOWER										
2011	84.29	6.94	77.35	-	-					
2012	115.64	9.01	106.63	-	-					
2013	133.61	20.27	113.34	-	-					

2014	134.78	17.71	117.07	-	-
2015	127.65	14.68	112.94	0.03	-
Ave. Growth Share	12.08%	31.27%	10.98%	-	-
E. LETTUCE					
2011	266.60	189.14	74.63	2.83	-
2012	317.29	212.89	96.88	7.40	0.12
2013	604.54	493.69	100.41	10.18	0.26
2014	611.69	489.00	115.21	6.12	1.36
2015	551.64	433.78	112.26	5.37	0.23
Ave. Growth Share	25.23%	33.05%	11.41%	36.73%	152.22%
F. CHINESE PECHAY					
2011	3,256.46	181.60	3,061.61	13.26	-
2012	3,339.22	198.57	3,130.33	10.32	-
2013	3,570.02	147.27	3,414.07	8.68	-
2014	3,689.39	123.01	3,564.78	1.56	0.04
2015	3,471.18	92.46	3,376.59	1.23	0.90
Ave. Growth Share	1.72%	-14.45%	2.61%	-35.31%	

Source: Bureau of Agricultural Statistics (BAS), 2016

For cabbage production, Central Visayas got no problem indeed with the demand as seen with its annual average growth of 1.72% during the period 2011-2015. However, there is a sudden decline in production in 2015 and even lower than the production in 2013 when Cebu's production dropped considerably. While Negros Oriental experienced a positive annual growth rate of 5.17%, Cebu was just having a growth rate of 1.44%. This year alone, Cebu's traders have imported more than 90% of their cabbage from other regions.

With regards to carrots production, Central Visayas, though second in production, posted a negative 5.24% growth rate. Both Cebu and Negros Oriental posted a negative growth rate. Cebu traders alone have imported from other regions more than 90% of their 312,000 kilograms carrots sold from March-June just to be able to supply its local demand.

Though Central Visayas has posted a positive growth of 12.08% in the production of cauliflower, still the small volume of production could not suffice the local demand. In fact, according to Cebu traders, from March- June 2016, of the 180,000 kilograms of cauliflower traded in the province, more than 90% came from Baguio.

Central Visayas posted a positive annual growth rate of 25.22% in lettuce production during the period 2011-2015. However, there was also a remarkable decrease in production in 2015. A difference of 60 metric tons is already a big loss to the industry. If Cebu traders have imported more than 90% of 89,600 kilograms of lettuce they have sold during the period March-June, 2016, bigger volume would be imported in a year.

Table 17. Top 10 vegetable-Producing wunicipalities for Cebu and Bonol									
MUNICIPALITY	PRODUCTION (MT)	AREA (Ha)	NO. OF FARMERS						
	CEBU								
Dalaguete	7,686.00	679.00	5,764						
Cebu City	2,718.74	273.55	630						
Boljoon	355.50	60.00	60						
Alcoy	241.50	15.50	426						
Ginatilan	100.40	9.50	98						
Badian	85.60	40.00	80						
Oslob	63.00	2.00	115						
Malabuyoc	57.90	5.00	370						
Argao	42.30	18.00	320						
Toledo City	25.34	8.00	40						
	BOHOL								
Balilihan	1,776.35	91	521						
Cortes	1,628.91	0.5938	154						
Calape	1,274.48	147.4	418						
Carmen	801.90	77.99	1608						
Valencia	363.59	19.611	675						
Albuquerque	289.25	18.5	121						
Duero	281.54	151.37	615						
Dimiao	265.61	12.81	160						
Jagna	212.24	84.89							
Mabini	175.25	15	118						

able 17.	Top 10 Veg	etable-Producin	ng Municipalities for Cebu and Bohol

Source: PLGU of Cebu and Bohol

*Table 16* above presents the top ten municipalities in Cebu and Bohol in terms of production of selected vegetables. The province of Cebu was able to provide data on highland vegetables specifically Cabbage, Cauliflower, and Carrots. Data above shows aggregate volume of production, area harvested or planted and number of farmers. Dalaguete is the top producer and is considered the salad bowl of Cebu. The barangay of Mantalongon wherein highland vegetable production is the major source of income, is also considered the summer capital of Cebu and provides the best condition for upland vegetable growing with its low temperature and average humidity. Cebu city is the second with its 33 upland barangays producing lettuce and cabbages that are easily carried to trading areas in downtown. Neighboring municipalities of Boljoon, Alcoy, Argao, and Oslob were also included in the top ten.

The province of Negros Oriental, another major source of highland vegetable production in the Visayan area was not able to provide data on its production per municipality. It was well established during the KIIs conducted that highland vegetable producing areas are Canlaon City, Valencia, and Siaton. Some upland barangays in Dumaguete City also produce minimal quantity of the highland vegetable variety.

The Province of Bohol on the other hand provided data on production of Ampalaya, Pechay, Squash, String Beans and Eggplant. Since Bohol only has little production of highland vegetables, most of their areas and monitoring are focused on lowland vegetables or the pinakbet variety. Balilihan, which is a panorama of verdant hills, rugged mountains and green fields- ideal for vegetable farming, is the number one producer. The neighboring towns of Cortes and Calape came in second and third respectively.

### • Bohol Highland Vegetable Production

Cabbage, cauliflower, broccoli and lettuce are the identified highland vegetables that grow in the province, more specifically in the elevated areas of Pilar, Duero, Sierra Bullones, Guindulman and Jagna. Duero has the biggest area with an aggregate total of 85 hectares planted with highland vegetables, particularly in the highland barangays of Taytay, Imelda, Bangwalog, Angila, Anibongan, Payao and Danao. The Eskaya Tribe, an Indigenous People that settled in the province has a communal farm planted with lettuce, cabbage and cauliflower in the hinterlands of Taytay, Duero. The municipality of Jagna comes second with a total area planted with highland vegetables totaling 80 hectares, followed by Sierra Bullones – 72 hectares, Pilar – 71 hectares and Guindulman with 70 hectares.

### **Commodity Map**



Map 17. Commodity Map: Highland Vegetables Industry Players

### c) Value Chain Mapping

The flow of commodity within and outside the region is illustrated in the figure below. This shows the flow of either the highland vegetables group identified in this study or the aggregate group of vegetable since some data do not classify the vegetables into groups.



In Central Visayas, majority of the highland vegetables are produced in the municipalities of Canlaon, Negros Oriental and Dalaguete, Cebu. The provinces of Siquijor and Bohol while also produces some highland vegetables, production is of limited quantity because they are focused in either producing other crops or in growing livestocks.

Based on interviews from farmers and traders in Negros Oriental, 70-80% of vegetable production goes to Region 6, mostly for Bacolod and Iloilo City. The remaining 10-15% are divided among the province's local markets and the 5-10% goes to Cebu. The production of the rest of Negros Oriental vegetable producing areas is just for local consumption.

Meanwhile in Cebu, which is a center of trade for vegetables in the region, the local production does not suffice for the local consumption and overall demand for highland vegetables. The province is getting additional supplies of vegetables such as carrots, broccoli, and cauliflower to supplement the deficit from other provinces such as Cagayan, Bukidnon, Baguio, and Canlaon. These consolidated volumes of vegetables are distributed to nearby provinces of Bohol, Siquijor and sometimes in Eastern Visayas. Majority of it though are bought by local traders to be sold to the institutional buyers (hotels, restaurants, resorts) within the province while the rest are being consumed by local households.

Bohol and Siquijor on the other hand are acting mainly as a market for the vegetables produced and traded in Cebu. According to traders during the KII, they have noticed that from an estimated 15% of their sales attributed to Bohol buyers, it is now almost 20%. However, this includes other items like spices and herbs especially garlic and onions.

The value chain map for the highland vegetables in Central Visayas is shown below in *Figure 37*. In this map, there are five main segments namely: farm input provision, production, trading, wholesaling, and retailing.



As described in *Figure 37*, needed farm inputs for growing of highland vegetables include planting materials, fertilizers and chemicals, and farm equipment. These are usually bought from locally established agrivet stores in the province. Production are usually performed by farmers growing either highland vegetables in particular or vegetables in general. Buying of farm produce from farmers are done by local small or big traders. These are then sold to either the wholesalers or retailers who distribute the highland vegetables to the domestic households or institutional buyers.

### d) Competitiveness Vision

Based on the data gathered and consultation with the players of the industry, the following competitiveness vision was developed for the next 3-5 years.

Figure 38. Competitiveness Vision for Highland Vegetables in Central Visayas									
	OUTCON	1E/IMPACT							
	FARMERS	INDUSTRY							
Increase highland vegetable production Sufficient water supply to all vegetable farms Easy access to good quality inputs Provision of additional farm tools, equipment and machineries Improved physical linkages and infrastructure Conduct of skills training in farming, marketing and trading	High yield/farm productivity High quality of produce Build good relationship with traders and buyers Lower financial and environmental costs/ improved efficiency Stable market	Increased and stable supply of good quality highland vegetables Competitive prices Compliance to social and environmental standards Mutually beneficial relationships Stable markets							
Self-sufficiency on vegetable supply Improved communication, coordination and collaboration among players	Increased income/profitability Reduced vulnerability to price fluctuation	Increase in domestic and sales Improved profitability of players							

The needed industry changes include link to available good inputs, provision of farm materials, easier transportation of produce through FMRs, water source to far-flung farms and improvement on the skills and knowledge of the players by means of training. Through these specific objectives, it is expected that the industry performance as well as the welfare of the players would improve. With regards to the changes on the side of the highland vegetable industry, it involves stable supply to the buyers, having competitive prices, improvement on sales in the domestic and building mutually beneficial relationships among players.

### Investment Plan

The Provincial Government of Bohol recognizes the development of the highland vegetable value chain as a strategy to help farmer growers not only raise their income but also their productivity and market competitiveness. The strategy would thus reduce the incidence of poverty and maintain food security in the rural areas in particular, and sustain agricultural development of the province and country, in general.

There is a growing interest of the provincial local government in strengthening the highland vegetable industry since the province is among the number one tourist's destination of the country and there is an increasing demand of highland vegetables especially in hotels and restaurants.

Since these kinds of vegetables are grown at a higher elevation it contributed to the limitation in its production. The farmers are determined to make use of the land despite the difficulty in tilling and so many more constraints that need to be addressed. The ever-changing weather condition is a critical factor which we cannot do away. The limited supply of water in the first place should be addressed so as to sustain production. The intervention to enhance their water system is a very welcome idea for the farmers.

On the other hand, to increase production is to capacitate the farmers on new technology on highland vegetable production and provision of high-quality planting materials. There is a need for adaptation trials for the farmers to observe and benchmarking for highland vegetable producing areas that excels in this industry. Farm machineries are also among the top priorities in the provision of farmer assistance.

Being situated on a higher elevation is not easy, making accessibility during production and marketing a problem. Farm-to-market roads are the best intervention. Transporting produce from higher places especially perishable goods must be looked into. Refrigerated van maybe could answer the problem but they need to produce more to justify the need. The growers must be organized and registered so that group selling is achieved. There must be constant supply to sustain the demand from the buyers

Marketing system of highland vegetables in a manner similar to other agricultural products. Producers either sell directly to retailers or dealers, to institutional buyers (hotels, restaurants, wet markets) or brought directly to markets and trading centers. One program intervention is the provision of technical assistance through trainings to improve the knowledge and skills of the growers and developing the sanitary skills.

The project envisions to attracting more growers and investors who will embark on highland vegetable production in commercial scale. This will contribute to the generation of employment and livelihood opportunities in the agricultural sector thus contribute to the overall economic growth of the province.

## Summary and Rank of Constraints

Table 17 shows the constraints of the highland vegetable value chain. The constraints are ranked according to their priorities in the value chain. Most of the constraints have similar ranking. This is because constraints can be addressed simultaneously, and addressing the constraints may be performed not just by one value chain player. More importantly, the parity in 'ranking' means that when one constraint is not addressed simultaneous with other constraints, the proposed intervention for one constraint may be undermined or weakened if other constraints are not simultaneously addressed.

Table 18. Summarv and Rank of Highland Vegetables Value Chain Constraints							
Constraints	Rank						
Poor- or low-quality planting materials	1st						
High cost of farm inputs	2nd						
Inadequate farm equipment	2nd						
Inadequate skills and knowledge to proper farming practices	1st						
Improper handling resulting to poor quality of produce and production losses	3rd						
Low adoption of farmers to modern technology	3rd						
Production losses due to pest infestation and weather disturbances	3rd						
Inadequate water supply in some production areas	1st						
Establishment of trading and bagsakan centers need rehabilitation	2nd						
Improper product handling results to losses	2nd						
Inadequate post-harvest facilities	2nd						
Improper and faulty packaging, grading and weighing facilities	2nd						
Difficulty in transporting products from farm areas to trading centers	1st						
Lack of transportation hastens spoilage and results in low buying price	1st						
Inadequate storage facilities results in wastage	2nd						
Limited or lack of technical support and personnel	2nd						
Farmers lack access of current price trends and other information in modern	3rd						
technology							
Weak industry leadership from input supply to trading	3rd						
Limited number of cooperatives specific to highland vegetables	3rd						

Table 19. Summary of Opportunities								
Opportunities	Rank							
Farm waste can be used as fertilizers or feeds for livestock and poultry	2nd							
Many agri-vet stores are located near farm areas	3rd							
Organic farming can reduce production costs	2nd							
GAP training are available for vegetable farmers	2nd							
High demand for highland vegetables in the local market	1st							
Health awareness offers new opportunity to increase vegetable consumption	1st							
Value-adding products can increase production value	2nd							
Information drive or advertisement like trade fairs create more interest to the	3rd							
industry								
Some training programs sponsored by LGU's and NGO's provide technical	3rd							
know-how to farmers								
Established relationship among players which enable them to bargain for	2nd							
better price and payment terms								

### Expanded-Vulnerability and Suitability Assessment (E-VSA)

Only 4 parameters were used in the assessment and selection of priority sites using the EVSA as a tool, namely: poverty incidence; area in hectares; production in metric tons; and the number of farmer growers by municipality. The data on area planted, production in metric tons and number of farmer growers are sourced from the Municipal Agricultural Offices.

For poverty incidence, the weight of 0.001 was assigned based on the premise that highland vegetable production can be done only in municipality with higher elevation no matter it is the poorest or not, thus the suitability matters most. The area in hectare parameter was assigned a weight of 0.159, production parameter in metric tons 0.14 and finally the number of growers was assigned a weight of 0.2 based on the idea that no matter how suitable the area is, if there are no growers the industry cannot continue.

The system-generated results in Table 19 show the ranking of the 5 municipalities that are into highland vegetable production, namely: Pilar, Duero, Sierra Bullones, Guindulman and Jagna. The table below shows the ranking and composite index of municipalities with competitive advantage in highland vegetable production based on the parameters identified.

Table 20. Ranking and Prioritization of Municipalities										
MUNICIPALITY	POVERTY INCIDENCE	AREA (in has.)	PRODUCTION (in M. T.)	FARMERS/ GROWERS	NEW COMPOSITE INDEX	NEW RANK				
PILAR	38.8	71.0	12.5	577	0.6968	1				
DUERO	29.6	85.0	16.0	650	0.6809	2				
SIERRA - BULLONES	35.1	72.0	13.0	575	0.6404	3				
GUINDULMAN	30.3	70.5	12.5	580	0.6298	4				
JAGNA	19.6	80.0	13.0	560	0.6112	5				
DAGOHOY	40.7	0.0	0.0	0	0.2790	6				
DAUIS	17.0	0.0	0.0	0	0.2663	7				
PANGLAO	16.4	0.0	0.0	0	0.2663	7				
TAGBILARAN										
CITY	7.9	0.0	0.0	0	0.2651	8				
CORTES	15.9	0.0	0.0	0	0.2644	9				
BATUAN	32.3	0	0	0	0.2629	10				



Map 18. Expanded Vulnerability and Suitability Assessment Analysis (EVSA) Map

### **Investment Priorities**

The over-all estimated investment cost of the proposed interventions for the Highland Vegetable Production PCIP will amount to P445.03 Million. The biggest bulk is for the water system development which amounts to P360.69 Million. Infrastructure support such as farm-to-market roads must also be provided to link production to the market. Selected road sections have been identified to and from the highland vegetable production areas (Annex).

The Value Chain Analysis identified the gaps and constraints that needs to be addressed for the development of the highland vegetable industry in the province. The potential interventions in the Investment Plan are based from the identified constraints in the VCA per industry segment. Series of consultations were conducted to validate the constraints and gain consensus on possible interventions that are prioritized in the PCIP based on the urgency of the needs to address the gaps. The interventions are with corresponding target areas that are included as priority areas in the EVSA ranking.

The table below shows the investment priorities for the development of highland vegetable industry in Bohol.

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Tab	Ie 21. Investment Plan Summary				
		Esti	mated Cos	t (P000, 00	0, 000)
	Proposed Interventions	Year 1	Year 2	Year 3	Total
1	Provision of good quality and high yielding planting materials	1.50	1.50	1.50	4.50
2	Establishment of research laboratory and adaptation sites				
-	- 1 Research Laboratory	5.00			
	- 3 Adaptation Sites	0.30	0.30	0.30	0.90
3	Organize certified vegetables seed growers (BPI)	0.30	0.30	0.30	0.90
4	Promote use of alternative inputs such as utilization of farm and				
	trading wastes				0.00
	- 6 Trainings on Waste Utilization	0.60			0.60
5	Conduct adaptability trials (Efficacy Test)	0.06	0.09		0.15
6	Encourage farmers to practice organic farming				0.00
	- 6 Trainings on Organic Farming	0.60			0.60
	- Production of IEC materials including radio plugging	0.50	0.50	0.50	4.50
	(10,000 leaflets @ P50 each, hrs radio plugging per day)	0.50	0.50	0.50	1.50
7	Provision of equipment for organic inputs production				0.00
	- 1 Shredder		0.30		0.30
	- 1 Pelletizer		0.30		0.30
	- 1 Mixer		0.30		0.30
	- 1 Tank		0.10		0.10
	- 5 Shredder	1.50			1.50
8	Provision of building for the production of organic inputs				0.00
	- 1 Production Building	2.00			2.00
	- 1 Multipurpose Drying Pavement	1.00			1.00
9	Provision of vehicle for the transport of organic inputs produced	2.00			2.00
10	Provision of machineries and facilities				0.00
	- 15 Greenhouses (3 per site)		4.50		4.50
	- 5 Tractors (45HP)		5.00		5.00
	- 20 Cultivators (4 per site)		5.00		5.00
	- Horses for hauling	0.25	0.26	0.28	0.79
	- Carabao as draft animal	0.30			0.30
11	Provision of vehicle for the transport of vegetables				0.00
	- 5 Vehicles		5.00		5.00
	- 1 Refrigerated Van		3.00		3.00
12	Establish a program for an improved and sustainable adoption to				
	Good Agricultural Practices (GAP) through information				0.00
	dissemination and technical trainings				
	<ul> <li>10 Technical Trainings</li> </ul>	1.00			1.00
	<ul> <li>1 Bench Marking (Dalaguete, Cebu or Bukidnon)</li> </ul>		0.30		0.30
13	Sustainable Land Care/ Soil preservation				0.00
	<ul> <li>10 Technical Trainings</li> </ul>	1.00			1.00
	<ul> <li>Contour farming planting materials, fruit trees; cacao;</li> </ul>	1 00		1 00	2.00
	coffee; pineapple etc.	1.00		1.00	
	- Plastic mulch	0.50		0.50	1.00
	- UV Treated fine net and structure	3.00			3.00
14	Provision of water system to high land areas that are existing and				0.00
	potential for high land vegetable cultivation	1.25			4.35
┝───	- 25 Small Farm Reservoir	1.25			1.25
	- 1 Water Scanner	2.30			2.30
	- 1 Water Drilling Kig	2.50			2.50
	- 5 Level 2 Water System	250.00			250.00
	- SUU IUIIS ITUPE PIPES	2.50			2.50
1	- 5 Sular Puwereu Pump	5.00	1	1	5.00

# Provincial Commodity Investment Plan (PCIP) for Highland Vegetables, Bohol | 2024

	Droposed Interventions	Esti	mated Cos	t (P000, 00	0, 000)
	Proposed interventions	Year 1	Year 2	Year 3	Total
	- 2 Rain Shelter	2.00			2.00
	<ul> <li>4 Solar Powered Submersible Pump</li> </ul>	4.00			4.00
	- 4 Water Reservoir	6.00			6.00
	- 400 rolls HDPE Pipes (Pilar)	2.00			2.00
	- 32 Spring developed /constructed (Guindulman -7; Jagna -7;	22.00			22.00
	Sierra Bullones -5; Duero -7; Pilar -6)	32.00			32.00
	- 1 Drip Irrigation	1.00			1.00
	- 10,000 m. Hose	0.10			0.10
	- 50 Drums	0.03			0.03
	- 100 Sprinklers	0.01			0.01
	- 5 Communal Irrigation System (CIS)	50.00			50.00
15	Rehabilitation and protection of micro watersheds, water sources				
	and non-water shed areas through agroforestry and planting of		2.50		2.50
	indigenous trees				
16	Intensive promotion on the conservation and management of	0.50			0.50
	water sources	0.50			0.50
17	Establishment of Trading and Bagsakan Center				0.00
	- 5 Trading Centers		10.00		10.00
	- 1 Bagsakan Center		2.00		2.00
18	Review guidelines on Trading and Bagsakan Centers operation	0.10			0.10
19	Conduct briefings/ orientations	0.10			0.10
20	Provision of post-harvest facilities				0.00
	- 1 Cold Storage		2.00		2.00
	- 1 Warehouse		5.00		5.00
	- 1 Transport Facilities		2.00		2.00
21	Capacity enhancement		0.10		0.10
22	Product development and enhancement		0.10		0.10
23	Development of training program	0.10			0.10
24	Information drive thru tri-media	0.30	0.30	0.30	0.90
25	Strengthening linkage and networking among players				0.00
	- 3 Market Matching	0.30	0.30	0.30	0.90
	- 3 Market Clinic	0.30	0.30	0.30	0.90
	- 3 Trade Fairs	0.30	0.30	0.30	0.90
	- 3 Market Symposium	0.30	0.30	0.30	0.90
	- 3 Vegetable Congress	0.30	0.30	0.30	0.90
26	Organize coops of growers and strengthening of existing grower	0.40	0.50		0.00
	groups	0.40	0.50		0.90
	Sub-Total	386.10	52.75	6.18	445.03
27	Farm-to-Market Roads Rehabilitation and Upgrading (345.29 kms)	2036.36	2036.36	2036.36	6,109.08
	GRAND TOTAL	2422.46	2089.11	2042.54	6,554.11

# • PCIP Matrix for Highland Vegetables

Key Gap/ Constraint in VC Devt.	Brief Description of Potential	Target Result/	Targe	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
ve bevi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	orrailus	
SEGMENT: IN	PUT PROVISION	J												
Poor- or low- quality planting materials	Provision of good quality and high yielding planting materials	Good quality and high yielding planting materials dispersed	Duero Jagna S-Bullones Guindulma n Pilar	Duero Jagna S-Bullones Guindulman Pilar	Duero Jagna S- Bullones Guindulm an Pilar	Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman La Nina Pest and Diseases	Sloping agricultural land technology (SALT) and 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 to act as water breaks during storm surges.	OPA DA MLGU	1.50	1.50	1.50	4.50	OPA MLGU DA HVCDP regular funds	1st
Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions)	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
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ve Devi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	orrunus	
							Establish an efficient information and feedbacking mechanism for fast reporting of pest and diseases in the field.							
	Establish research laboratory & adaptation sites	1 research laboratory	Duero					OPA DA MLGU	5.00			5.00	OPA DA MLGU	
		3 adaptation sites established	Duero	Jagna	S-Bullones	Erosion: Duero Landslide (Rain Induced: Duero, Jagna, S- Bullones	Sloping agricultural land technology (SALT) and contour farming techniques to mitigate erosion and landslide risks.	OPA DA MLGU	0.30	0.30	0.30	0.90	OPA DA MLGU	
	Organize certified vegetables seed growers (BPI)	1 certified vegetables seed grower (BPI) organized	Sierra Bullones	Sierra Bullones	Sierra Bullones			OPA DA MLGU	0.30	0.30	0.30	0.90	OPA DA MLGU	
High cost of farm inputs	Promote use of alternative inputs such as utilization of farm and trading wastes	6 trainings in using wastes conducted	HVCC Tech. Duero Jagna S-Bullones Guindulma n Pilar					OPA MLGU DA	0.60			0.60	OPA MLGU DA	2nd

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions)	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
ve bevi.	Intervention	Outcome	¥1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	orrunus	
		3 alternative inputs identified	1 alternative inputs	2 alternative inputs				OPA MLGU DA				0.00	OPA MLGU DA	
	Conduct adaptability trials (Efficacy Test)	5 Adaptabilit y trials conducted	Duero Jagna	Guindulman S-Bullones Pilar				OPA MLGU DA	0.06	0.09		0.15	OPA MLGU DA	
	Encourage farmers to practice organic farming	6 Trainings on organic farming conducted	HVCC Tech. Duero Jagna S-Bullones Guindulma n Pilar					OPA MLGU DA	0.60			0.60	OPA MLGU DA	
		Production of IEC materials including radio plugging (10,000 leaflets @ P50 each, hrs radio plugging per day)	Provincewi de	Provincewide	Provincew ide			OPA MLGU DA	0.50	0.50	0.50	1.50	OPA MLGU DA	
	Certification of 3rd level organic inputs	3rd level organic inputs producers certified (2 organic fertilizer and 2 bio pesticide)		S-Bullones Duero	Jagna Guindulm an			OPA MLGU DA				0.00	OPA MLGU DA	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
VC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
	Organize PO for organic inputs production	5 POs and 1 Federation for organic inputs production organized Earm	Only 1	S-Bullones Duero	Jagna Pilar Guindulm an Pilar	Flood	Sloping	OPA MLGU DA				0.00	OPA MLGU DA	
	Provision of equipment for organic inputs production	Farm equipment provided:	Only 1 municipalit y/ PO that could qualify the criteria formulated (Duero, Jagna, S-Bullones, Guindulma n, Pilar)			Flood: Guindulman, Pilar Erosion: Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced): Duero, Jagna, S- Bullones Landslide (Earthquake Induced): Guindulman, Jagna, Pilar, S- Bullones Drought: Pilar Storm Surge: Guindulman	Sloping agricultural land technology (SALT) and 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 to act as water breaks during storm surges.	OPA MLGU DA/ PhilMech		0.20		0.00	OPA MLGU DA/ PhilMech	
		1 shredder		*						0.30		0.30		

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions)	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
		1 pelletizer		*						0.30		0.30		
		1 mixer		*						0.30		0.30		
		1 tank		*						0.10		0.10		
		5 shredders	Duero Jagna S-Bullones, Guindulma n Pilar					OPA MLGU DA/ PhilMech	1.50			1.50	OPA MLGU DA/ PhilMech	
	Provision of building for the production of organic inputs	1 Production building provided	Only 1 municipalit y/PO that could qualify the criteria formulated (Duero, Jagna, S-Bullones, Guindulma n, Pilar)			Flood: Guindulman, Pilar Erosion: Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced): Duero, Jagna, S- Bullones Landslide (Earthquake Induced) :Guindulman, Jagna, Pilar, S- Bullones Drought : Pilar Storm Surge: Guindulman	Climate resilient building. Sloping agricultural land technology (SALT) and 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	OPA MLGU DA	2.00			2.00	OPA MLGU DA	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
		1	Only 1			Flood	species to act as water breaks during storm surges.	000	1.00			1.00		
		1 Multipurpo se Drying Pavement	Only 1 municipalit y/PO that could qualify the criteria formulated (Duero, Jagna, S-Bullones, Guindulma n, Pilar)			Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman	Climate resilient building. Sloping agricultural land technology (SALT) and 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 to act as water breaks during storm surges.	OPA MLGU DA	1.00			1.00	OPA MLGU DA/ PhilMech	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vc Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
	Provision of vehicle for the transport of organic inputs produced	1 Vehicle provided	Only 1 municipalit y/PO that could qualify the criteria formulated (Duero, Jagna, S-Bullones, Guindulma n, Pilar)					OPA MLGU DA	2.00			2.00	OPA MLGU DA	
SEGMENT: PR	ODUCTION													
Inadequate farm equipment	Provision of machineries and facilities	Farm equipment/ machinerie s and facilities provided like:										0.00		2nd
		15 greenhouse s (3 per site)		Duero Jagna S-Bullones Guindulman Pilar		Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) -	Construction of Smart Greenhouses. Sloping agricultural land technology (SALT) and contour farming techniques to mitigate erosion and landslide risks. Construct small farm reservoirs and other rain	OPA MLGU DA/ PhilMech		4.50		4.50	OPA MLGU DA/ PhilMech	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Targe	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
						Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman	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 to act as water breaks during storm surges.							
		5 tractors (45HP)		Duero Jagna S-Bullones Guindulman Pilar				OPA MLGU DA/ PhilMech		5.00		5.00	OPA MLGU DA/ PhilMech	
		20 cultivators (4 per site)		Duero Jagna S-Bullones Guindulman Pilar				OPA MLGU DA/ PhilMech		5.00		5.00	OPA MLGU DA/ PhilMech	
		Horses for hauling	Duero	Duero	Duero	Diseases Very High - Erosion High - Landslide (Rain Induced)	PCIC insurance Animal Health Care Management	OPA MLGU DA	0.25	0.26	0.28	0.79	OPA MLGU DA	
		Carabao as draft animal	Duero			Diseases Very High - Erosion High - Landslide (Rain Induced)	PCIC insurance Animal Health Care Management	OPA MLGU DA	0.30			0.30	OPA MLGU DA	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions)	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
vc Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
	Provision of vehicle for the transport of vegetables	5 Vehicles provided		Duero Jagna S-Bullones Guindulman Pilar				OPA MLGU DA		5.00		5.00	OPA MLGU DA	
		1 Ref Van						OPA MLGU DA		3.00		3.00	OPA MLGU DA	
Inadequate skills and knowledge to proper farming practices	Establish a program for an improved and sustainable adoption to good agricultural practices (GAP) through information dissemination and technical trainings	* 50 Accredited Farms/ site	Provincewi de					OPA MLGU DA				0.00	OPA MLGU DA	1st
		* 10 Technical trainings conducted	Duero Jagna S-Bullones Guindulma n Pilar					OPA MLGU DA	1.00			1.00	OPA MLGU DA	
		* 1 bench marking conducted (Dalaguete, Cebu or Bukidnon) 30pax	1 bench marking					OPA MLGUs DA		0.30		0.30	OPA MLGU DA	
		*1 Team technical experts as mentor provided	1 Team of Technical Expert					OPA MLGU DA				0.00	OPA MLGU DA	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
ve Devi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	or Funds	
	Sustainable Land Care/ Soil preservation	* 10 Technical trainings conducted	Duero Jagna S-Bullones Guindulma n Pilar					OPA MLGU DA	1.00			1.00	OPA MLGU DA	
		Contour farming planting materials, fruit trees; cacao; coffee; pineapple etc.	Pilar		Pilar			OPA MLGU DA DENR	1.00		1.00	2.00	OPA MLGU DA DENR	
		plastic mulch	Pilar		Pilar			OPA MLGU DA	0.50		0.50	1.00	OPA MLGU DA (HVCCDP regular fund)	
		UV treated fine net and structure	Pilar					OPA MLGU DA	3.00			3.00	OPA MLGU DA (HVCCDP regular fund)	
Inadequate water supply in some production areas	Provision of water system to high land areas that are existing and potential for highland vegetable cultivation	water system for high land areas for vegetable cultivation provided:						OPA MLGU DA				0.00	OPA MLGU DA DPWH PEO BSWM	1st
		25 small farm reservoir	S-Bullones			Sierra Bullones: - Erosion - Landslide (Rain	Sloping agricultural land technology (SALT)	OPA MLGU DA	1.25			1.25	OPA MLGU DA	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
VC Devt.	Intervention	Outcome	¥1	¥2	Y3			Players	¥1	Y2	Y3	Millions )	of Funds	
						Induced) - Landslide (Earthquake Induced)	and contour farming techniques to mitigate erosion and landslide risks.						DPWH PEO BSWM	
		1 water scanner	Pilar					OPA MLGU DA	2.30			2.30	OPA MLGU DA	
		1 water drilling rig						OPA MLGU DA	2.50			2.50	OPA MLGU DA	
		5 Level 2 water system	Duero Jagna S-Bullones Guindulma n Pilar			Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman	Obtain insurance for entire water system Sloping agricultural land technology (SALT) and 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	OPA MLGU DA	250.00			250.00	OPA MLGU DA DPWH PEO BSWM	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
		500 rolls HDPE Pipes	Duero Jagna S-Bullones Guindulma n Pilar			Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman	during droughts. Mangrove Reforestation using appropriate species to act as water breaks during storm surges. Obtain insurance for entire water system Sloping agricultural land technology (SALT) and 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.	OPA MLGU DA	2.50			2.50	OPA MLGU DA	
							Mangrove						1	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
							Reforestation using appropriate species to act as water breaks during storm surges.							
		5 Solar powered pump	Duero Jagna S-Bullones Guindulma n Pilar					OPA MLGU DA	5.00			5.00	OPA MLGU DA	
		2 Rain shelter	Duero Pilar					OPA MLGU DA	2.00			2.00	OPA MLGU DA DPWH PEO BSWM	
		4 Solar powered submersibl e pump	Pilar (La Suerte, Ilaud, San Carlos, Lundag)					OPA MLGU DA	4.00			4.00	OPA MLGU DA	
		4 water reservoir	Pilar (La Suerte, Ilaud, San Carlos, Lundag)					OPA MLGU DA	6.00			6.00	OPA MLGU DA DPWH PEO BSWM	
		400 rolls HDPE Pipes	Pilar (La Suerte, Ilaud, San Carlos, Lundag)					OPA MLGU DA	2.00			2.00	OPA MLGU DA (HVCCDP regular fund)	
		32 spring developed / constructe	Duero Jagna S-Bullones			Flood: Guindulman, Pilar	Develop climate and geologic resilient structure	OPA MLGU DA	32.00			32.00	OPA MLGU DA DPWH	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vc Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
		d (Guindulma n-7; Jagna- 7; Sierra Bullones-5; Duero-7; Pilar-6)	Guindulma n Pilar			Erosion: Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced): Duero, Jagna, S- Bullones Landslide (Earthquake Induced): Guindulman, Jagna, Pilar, S- Bullones Drought: Pilar Storm Surge: Guindulman							PEO BSWM	
		1 drip irrigation	S-bullones			Sierra Bullones: - Erosion - Landslide (Rain Induced) - Landslide (Earthquake Induced)	Develop climate and geologic resilient structure Sloping agricultural land technology (SALT) and contour farming techniques to mitigate erosion and landslide risks.	OPA MLGU DA	0.10			0.10	OPA MLGU DA DPWH PEO BSWM	
		hose	(5 brgys)					MLGU DA	0.10			0.10	MLGU DA (HVCDP	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
													regular fund)	
		50 drums	S-Bullones (5 brgys)					OPA MLGU DA	0.03			0.03	OPA MLGU DA (HVCDP regular fund)	
		100 sprinklers	S-Bullones (5 brgys)					OPA MLGU DA	0.01			0.01	OPA MLGU DA (HVCDP regular fund)	
		5 Communal Irrigation system (CIS) constructe d (1 in every Municipalit y)	Duero Jagna S-Bullones Guindulma n Pilar			Flood: Guindulman, Pilar Erosion : Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced): Duero, Jagna, S- Bullones Landslide (Earthquake Induced) : Guindulman, Jagna, Pilar, S- Bullones Drought : Pilar	Develop climate and geologic resilient structure Sloping agricultural land technology (SALT) and 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	OPA MLGU DA	50.00			50.00	OPA MLGU DA DPWH PEO BSWM	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
VC Devt.	Intervention	Outcome	Y1	Y2	Y3	-		Players	Y1	Y2	Y3	Millions )	of Funds	
	Conduct Hydro- geological studies and	* Inventory of potential water		Duero Jagna S-Bullones Guindulman		Storm Surge: Guindulman	and address the need for water during droughts. Mangrove Reforestation using appropriate species to act as water breaks during storm surges.	OPA/ PLGU DENR DPWH				0.00	OPA/ PLGU DENR DPWH	
	inventory of potential water sources	sources and mini watersheds conducted		Pilar										
	Rehabilitation and Protection of micro watersheds, water sources and non-water shed areas through agroforestry and planting of indigenous trees	Agroforestr y areas developed (20 has/ sites for arabica coffee) 500 trees/ ha		Duero Jagna Guindulman S-Bullones Pilar		Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S-	Establish Early Warning System Sloping agricultural land technology (SALT) and contour farming techniques to mitigate erosion and landslide risks. Construct small farm reservoirs and other rain collection techniques to harness and	OPA/ PLGU LGUS DENR- MGB NIA PEO DENR- FMB BEMO		2.50		2.50	OPA/ PLGU LGUS DENR- MGB NIA PEO DENR- FMB BEMO	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	¥1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
	Intensive	5 trainings	Duero			Bullones Drought - Pilar Storm Surge- Guindulman	maximize water from tropical cyclones, mitigate effects of flood and address the need for water during droughts. Mangrove Reforestation using appropriate species to act as water breaks during storm surges.	OPA/	0.50			0.50	OPA/	
	promotion on the conservation and management of water sources	to Institutiona lize awareness on the protection, conservatio n and manageme nt of water sources	Jagna S-Bullones Guindulma n Pilar					PLGU MLGU DENR					PLGU MLGU DENR	
SEGMENT: TR	ADING/ WHOL	ESALING	1		1				1	10.00	1	10.00		
Construction/ Establishment of Trading & Bagsakan Center	Establishment of Trading and Bagsakan Center	5 Irading Centers and		Duero Jagna S-Bullones Guindulman Pilar		Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S- Bullones	Establish Climate Resilient Structure Slope protection	DA OPA MLGUs		10.00		10.00	DA OPA MLGUs	2nd

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
VC Devt.	Intervention	Outcome	Y1	¥2	Y3			Players	Y1	Y2	Y3	, Millions )	of Funds	
		1 Bagsakan Center established		Tagbilaran		Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman Sink Holes	Conduct Ground Penetrating Radar Survey prior to construction Establish Climate Resilient Structure with complete facilities Change Name to KADIWA Retail Post Updating of Hazard Map of Tagb. City	DA OPA MLGUS		2.00		2.00	DA OPA MLGUs	
	Review guidelines on trading	1 Guidelines reviewed,	Duero Jagna S-Bullones					DA OPA MLGUs	0.10			0.10	DA OPA MLGUs	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
ve Devi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	orrunas	
	bagsakan centers operation	enhanced and adopted	Guindulma n Pilar											
	Conduct briefings/ orientations	Briefing/ orientation on operational guidelines conducted	Duero Jagna S-Bullones Guindulma n Pilar					DA- HVCDP OPA MLGUs	0.10			0.10	DA- HVCDP OPA MLGUs	
Inadequate post-harvest facilities	Provision of post-harvest facilities	post- harvest facilities provided such as:		Tagbilaran				OPA /PLGU MLGU DA/PhilM ech DPWH				0.00	OPA/ PLGU MLGU DA/ PhilMech DPWH	2nd
		1 cold storage		Tagbilaran		Sink Holes	Conduct Ground Penetrating Radar Survey prior to construction Establish Climate Resilient Structure Updating of Hazard Map of Tagb. City	do		2.00		2.00		
		1 warehouse		Tagbilaran		Sink Holes	Conduct Ground Penetrating Radar Survey prior to construction Establish Climate Resilient Structure Updating of Hazard Map of Tagb. City	do		5.00		5.00		

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Targe	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
VC Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
		1 transport facilities		Tagbilaran				do		2.00		2.00		
Improper product handling results to losses	Capacity enhancement	* 1 ToT Refresher on Product Handling		Tagbilaran				DA- HVCDP OPA MLGUs		0.10		0.10	DA- HVCDP OPA MLGUs	2nd
	product development and enhancement	1 Training on value adding		Tagbilaran				DA- HVCDP OPA MLGUs		0.10		0.10	DA- HVCDP OPA MLGUs	
	Provision of post-harvest facilities	Working areas provided		Tagbilaran S-Bullones Jagna		Sinkholes - Tagbilaran Erosion - Jagna, S-Bullones Landslide (Rain Induced) - Jagna, S- Bullones Landslide (Earthquake Induced) - Jagna, S- Bullones	Slope protection for erosion. Conduct Ground Penetrating Radar Survey prior to construction to determine sinkholes within the area. Establish Climate Resilient Structure Updating of Hazard Map of Tagb. City	DA- HVCDP OPA MLGUs				0.00	DA- HVCDP OPA MLGUs	
Difficulty in transporting products from farm areas to trading centers	Provision of infra support facilities	*FMRs provided 345.29 kms. of FMR rehabilitate		Duero Jagna Guindulman S-Bullones Pilar		Flood- Guindulman, Pilar Erosion - Duero, Guindulman, Jagna, S-	Slope Stabilization Improve Drainage System Installation of Seawalls and Barriers	DA/PhilM ech OPA MLGUs PEO				345.29	DA/ PhilMech OPA MLGUs PEO	1st

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Targe	t Access to be cov	ered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
ve Devi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	orrunus	
		d and upgraded				Bullones Landslide (Rain Induced) - Duero, Jagna, S- Bullones Landslide (Earthquake Induced) - Guindulman, Jagna, Pilar, S- Bullones Drought - Pilar Storm Surge- Guindulman	Resilient Road Materials Conduct of Risk Assessment Maintenance and monitoring Surface Protection (Paving and Surfacing; vegetative cover) Reforestration Use of bioengineering for slope stability Sediment control Elevation & Structural Design (Bridges & causeways; Reinforced structures; elevated roads) Environmental Measures such as natural Buffers							
SEGMENT : RE	TAILING			1										
Lack of transportation hastens spoilage & results in low buying price	Provision of credit financing to coop as soft loan	5 POs provided with Credit financing		Duero Jagna Guindulman S-Bullones Pilar				DA OPA MLGUs Banks MFIs				0.00	DA OPA MLGUs	1st
SEGMENT : SU	JPPORT SERVIC	ES												

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Targe	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Projec Millions)	t Cost )	TOTAL Project Cost (in	Proposed Sources	Rank
vC Devt.	Intervention	Outcome	Y1	¥2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
Limited technical support and lack of personnel	Development of training program	1 Training Program * Big Brother Small Brother Model adopted	1 training program					DA OPA MLGUs	0.10			0.10	DA OPA MLGUs	2nd
	Policy development and adoption (support services)	1 Policy on water concession permits developed and adopted per municipalit y		Duero Jagna S-Bullones Guindulman Pilar				OPA/ PLGU MLGU DENR NWRB				0.00	OPA/ PLGU MLGU DENR NWRB	
Farmers lack access of current price trends and other market information	Information drive thru tri- media	* 3 Information bulletin (Electronic monitor)	Tagbilaran	Jagna	S-Bullones			DA OPA/ PGBh MLGUs NGOs	0.30	0.30	0.30	0.90	DA OPA/ PGBh MLGUs NGOs	3rd
SEGMENT : IN	TERFIRM RELA	TIONSHIP		1		1					1			
Weak industry leadership from input supply to trading	Strengthening linkage and networking among players	*3 market matching	Tagbilaran	Jagna	S-Bullones			DA OPA/ PGBh MLGUs NGOs	0.30	0.30	0.30	0.90	DA OPA/ PGBh MLGUs NGOs	3rd
		*3 market clinic	Jagna	S-Bullones	Tagbilaran			DA OPA/	0.30	0.30	0.30	0.90	DA OPA/	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Target	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimate (in	ed Project Millions)	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
ve Devt.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	of Funds	
								PGBh MLGUs NGO					PGBh MLGUs NGO	
		*3 trade fairs	S-Bullones	Jagna	Tagbilaran			DA OPA/ PGBh MLGUs NGO	0.30	0.30	0.30	0.90	DA OPA/ PGBh MLGUs NGO	
		*3 market symposium	Tagbilaran	S-Bullones	Jagna			DA OPA/ PGBh MLGUs NGO	0.30	0.30	0.30	0.90	DA OPA/ PGBh MLGUs NGO	
		*3 Vegetable Congress	S-Bullones	Jagna	Tagbilaran			DA OPA/ PGBh MLGUs NGO	0.30	0.30	0.30	0.90	DA OPA/ PGBh MLGUs NGO	
		*6 Organize producers & buyers group	2 organized group	2 organized group	2 organized group			DA OPA/ PGBh MLGUs				0.00	DA OPA/ PGBh MLGUs	
		* 2 contract signed		2 contract signed				DA OPA/ PGBh MLGUs				0.00	DA OPA/ PGBh MLGUs	
		* 1 policy support from governm ent		1 policy support								0.00		
	Database management and profiling of high land vegetable growers and traders	<ul> <li>* 1 Registry and profile of high land vegetable growers and</li> </ul>	1 registry and profile					MLGUS POs/ COOPS PLGUs				0.00	MLGUs POs/ COOPS PLGUs	

Key Gap/ Constraint in	Brief Description of Potential	Target Result/	Targe	t Access to be cov	vered	Major Risks	Risk Adaptation Measures/ PPAs	Proposed Lead & Other	Estimato (in	ed Projec Millions	t Cost	TOTAL Project Cost (in	Proposed Sources	Rank
ve Devi.	Intervention	Outcome	Y1	Y2	Y3			Players	Y1	Y2	Y3	Millions )	or Fullus	
		traders establishe d												
Limited number of cooperative specific to highland vegetables	Organize coops of growers and strengthening of existing grower groups	* 9 Orientati on seminars	Duero Jagna Guindulma n S-Bullones	Pilar Bilar Corella Balilihan Baclayon				DA OPA/ PGBh MLGUs NGOs	0.40	0.50		0.90	DA OPA/ PGBh MLGUs NGOs	3rd

# **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 subunits 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.



## • Monitoring and Evaluation

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;
- 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 Highland Vegetables PCIP**



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 JUNE 14, 2017 AT GOVERNOR'S MANSION, TAGBILARAN CITY, BOHOL, PHILIPPINES

In Attendance:

Gov. Edgar M. Chatto......Chairman, Presiding Officer and Majority of the Members of the PDC Executive Committee

#### PDC EXECOM RESOLUTION NO. 51-2017

A RESOLUTION APPROVING THE PROVINCIAL COMMODITY INVESTMENT PLAN (PCIP) FOR HIGHLAND VEGETABLES OF THE PROVINCE OF BOHOL AND FAVORABLY ENDORSING THE SAME TO THE CENTRAL VISAYAS REGIONAL DEVELOPMENT COUNCIL (RDC-VII) FOR INCLUSION IN THE REGIONAL DEVELOPMENT INVESTMENT PROGRAM (RDIP) AND THE DEPARTMENT OF AGRICULTURE (DA) AND OTHER RELEVANT AGENCIES FOR SUPPORT AND FUNDING ASSISTANCE

WHEREAS, the Province of Bohol has identified highland vegetables as one of the 10 priority commodities that will be accorded attention under the Philippine Rural Development Project (PRDP) of the Department of Agriculture (DA);

WHEREAS, being one of the identified commodities that is important to the agricultural development of the province, a value chain analysis and a Provincial Commodity Investment Plan (PCIP) for highland vegetables have been undertaken and prepared as part of the necessary requisites to ensure effective interventions;

WHEREAS, the PCIP for highland vegetables is a strategic plan that rationalizes the interventions within the various segments of the value chain of the commodity, which shall become the basis for PRDPs I-BUILD and I-REAP in selecting eligible sub-projects for funding and eventual implementation in the Province of Bohol;

WHEREAS, the PCIP for highland vegetables is a 3-year rolling consensus plan between the DA and Provincial Government of Bohol based on the value chain analysis, which was conducted with strong participation of the various stakeholders in the chain; WHEREAS, the Provincial Core Planning Team (PCPT) presented the PCIP to this Body, giving emphasis on relevant information, gaps and constraints, and needed interventions, which has been identified through a technical review and a stakeholders' consultation involving input suppliers, growers, traders, municipal agriculturists, and other key players in the highland vegetable industry;

WHEREAS, the PCIP for highland vegetables, after review and deliberation, has been found by this Body to be relevant, well-grounded, responsive, and aligned with the provincial goals and priorities, and foreseen to 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 Provincial Commodity Investment Plan (PCIP) for Highland Vegetables of the Province of Bohol and favorably endorsing the same to the Regional Development Council (RDC) for inclusion in the Regional Development Investment Program (RDIP) and to the Department of Agriculture (DA) and other relevant agencies for support and funding assistance

**RESOLVED FURTHER,** to provide copies of this resolution to the DA, and other proper government agencies for support and subsequent endorsement and funding assistance.

#### UNANIMOUSLY ADOPTED.

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I hereby certify to the correctness of the foregoing Resolution.

JOHN TITUS J. VISTAL PPDC-Bohol Head, PDC Secretariat

APPROVED:

FDGARDO M. Governor Chairman, PDC-Bohol

• 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. Baja .....Chairman, 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

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# **ANNEXES**

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

- Annex B. List of Highland Vegetables Industry Players
- Annex C. Summary of Risk Profile of Municipalities
- Annex D. Risk Profile of Commodity per Municipality
- **Annex E. Directory of Players**
- Annex F. Provincial Core Planning Team Composition

	Farm-to-Market Roads	Road Length	Estimated Cost
	Farm-to-Warket Roads	(in kms.)	Pesos)
Due	ero		,
1	Itum - Duay - Payao Farm to Road	8.500	153.00
2	Guinsularan - Lobogon Farm to Road	6.700	120.60
3	Mawi - Cansuhay Farm to Road	7.000	126.00
4	Alejawan - Mambool Farm to Road	5.000	90.00
5	Danao - Imelda - Taytay - Bangwalog - Angilan - Anibongan - Payao Farm to Road	17.000	306.00
6	Barangay Itum-Ilaya FMR	10.43	187.74
7	Barangay Itum-Duay-Payao-Mayana FMR	10.5	189.00
Jag	na		
1	Jagna - Cabungaan - Lonov Road	9.000	162.00
2	Can-ipol - Odiong Road	8.000	144.00
3	Malbog - Calabacita Roa	9.500	171.00
4	Bunga Mar - Kinagbaan - Laka Road	7.700	138.60
5	Mayana-Balili-Calabacita-Buyog-Odiong-Lonoy-Boctol Road	6.900	124.20
6	Purok 7 to Tugbongon Balili FMR	1.500	27.00
7	From National Highway Boctol to Sitio Danao	1.400	25.20
8	Buyog road to Sitio Catino FMR	1.000	18.00
9	Calabacita Road to Capahan	3.250	58.50
10	Teofilo Nayga St., Lonoy FMR	1.100	19.80
11	Purok 10-Sitio Balikbayan- Purok 3, Mayana FMR	1.500	27.00
12	East Lumbay to Kabulihan to Ilaya, Odiong FMR	4.500	81.00
13	Rehabilitation of Mayana FMR	3.500	63.00
Gui	ndulman		
1	Jct. (TER) Guindulman-Catungawan-Mayuga-Lombog Road	21.000	378.00
2	Cabantian - Cansiwang Road	9.000	162.00
3	Cabantian - Pansol Road	8.800	158.40
4	Catungawan - Sudlon Road	7.300	131.40
5	Pob Casbu Circumferential Road	5.000	90.00
6	Biabas - Lombog - Bayong FMR	14.000	252.00
7	Mayuga - Caniwang - Tabunok FMR	9.200	165.60
8	Guinacot FMR	4.000	72.00
Sier	rra Bullones		
1	Pob Bugsok FMR	10.000	180.00
2	Jct. (Sierra Bullones - Jagna) Abachanan Road	4.000	72.00
3	Magsaysay - Danicop Road	6.000	108.00
4	Lataban - Cantaub - Cahayag - Nan-od - Matin-ao Road	15.000	270.00
Pila	r		
1	Bagumbayan - Estaca FMR	10.000	180.00
2	Pilar - Inaghuban FMR	12.000	216.00
3	Pilar - Bayong FMR	8.000	144.00
4	Pilar - Bagacay - Lundag FMR	11.000	198.00
5	llaud - Lundag - San Isidro- Rizal -Estaca - Buenasuerte EMR	15.000	270.00

## Annex A. Farm-to-Market Roads (FMR) for Highland Vegetables PCIP, Province of Bohol

	Farm-to-Market Roads	<b>Road Length</b> (in kms.)	Estimated Cost (In Million Pesos)	
6	Del Pilar-Catagdaan-Bagumbayan-Inaghuban-Cagawasan- San Carlos-San vicente-Cansungay-Bagacay-La Suerte FMR	17.000	306.00	
Oth	er LGUs			
1	Campagao-Dagohoy-Bonifacio-Cabacnitan, Bilar, FMR	10.970	132.42	
2	Desamparados (Calape)-Tabuan (Antequera), FMR	12.820	252.47	
3	Dagnawan-Dagohoy, Inabanga, FMR	6.480	74.97	
4	Pondol-Candaigan, Loon, FMR	4.740	64.19	
	TOTAL	345.290	6,109.09	

# Annex B. List of Highland Vegetables Industry Players

Name	Location
Pilar, Bohol	
1. La Suerte Organic Vegetable Growers Association	Brgy. La Suerte, Pilar, Bohol
2. Ilaud Vegetable Growers Association	Brgy. Ilaud, Pilar, Bohol
3. Escaya Tribe Vegetable Growers Association	Brgy. Lundag, Pilar, Bohol
Sierra Bullones, Bohol	
1. Matin-ao Vegetable Growers Asso.	Brgy. Matin-ao, Sierra Bullones, Bohol
2. Nan-od Vegetable Growers Asso.	Brgy. Nan-od, Sierra Bullones, Bohol
3. Sta. Cruz Palayamanan Asso.	Brgy. Sta. Cruz, Sierra Bullones, Bohol
4. Cantaub Coop Farmers Asso.	Brgy Cantaub, Sierra Bullones. Bohol
5. Libertad Farmers Asso.	Purok Libertad, Brgy. Bugsok, Sierra
	Bullones, Bohol
6. Cahayag Vegetable Growers Asso.	Brgy. Cahayag, Sierra Bullones, Bohol
Guindulman, Bohol	
1. Visayan Eskaya Multi-purpse Coop	Brgy. Biabas, Guindulman, Bohol
2. Eskaya Youth Asso.	Brgy. Biabas, Guindulman, Bohol
3. Bayong Farmers Asso.	Brgy. Bayong, Guindulman, Bohol
4. Caahan Tinabangay sa Panguma	Sitio Carahan, Lombog, Guindulman,
	Bohol
5. Basak-Cabaocan Vegetable Growers Asso.	Brgy. Mayuga, Guindulman, Bohol
6. Guinacot Farmers Asso.	Brgy. Guinacot, Guindulman, Bohol
7. Cansiwang Farmers Asso.	Brgy. Cansiwang, Guindulman, Bohol
8. Tabunoc Farmers Asso.	Brgy. Tabunoc, Guindulman, Bohol
Jagna, Bohol	
1. Confraternity of Mayana Small Farmers Asso.	Bgy Mayana, Jagna, Bohol
2. Mayana Cutflower and Vegetable Growers Asso.	Bgy Mayana, Jagna, Bohol
3. Mayana Tilapia Growers Asso.	Bgy Mayana, Jagna, Bohol
4. Odiong Skilled Vegetable and Agricultural	Brgy, Odiong, Jagna, Bohol
Workers Asso.	
5. Balili Siling Irrigators Asso.	Brgy. Balili, Jagna. Bohol
6. Buyog United Farmers Asso.	Brgy. Buyog, Jagna, Bohol
7. Calabacita Upland Farmers Asso.	Brgy. Calabacita, Jagna, Bohol
8. Calabacita Irrigators Asso.	Brgy. Calabacita, jagna, Bohol
9. Lonoy Irrigators Asso.	Brgy. Lonoy, Jagna, Bohol
10. Boctol Vegetable Growers Asso.	Brgy. Boctol, Jagna. Bohol
Duero, Bohol	
1. Danao Rice Farmers Association	Brgy. Danao, Duero, Bohol
2. Imelda Women's Association	Brgy. Imelda, Duero, Bohol
3. LUMAD MPC	Brgy. Taytay, Duero, Bohol
4. BANWA Coop	Brgy. Bangwalog, Duero, Bohol
5. SEA-K	Brgy. Angilan, Duero, Bohol
6. Anibongan Women's Association	Brgy. Anibongan, Duero, Bohol
7. Payao Women's Association	Brgy. Payao, Duero, Bohol

# 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
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

	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 *
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
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

Annex D. R	lisk Profile o	f Commodity	per Municipality
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Municipality	Production Area (in ha)	Key Hazards	Adaptive Capacity (AC)
Pilar	71	<b>High</b> - Flood, Landslide (Earthquake Induced), Drought	Very Low - Economic, Human Low - Institutional Moderate - Physical High - Social, Anticipatory Very High - Natural
Duero	85	Very High - Erosion High - Landslide (Rain Induced)	Very Low- Economic Low - Human, Anticipatory Moderate - Social, Institutional High - Natural Very High - Physical
Sierra Bullones	72	<b>High -</b> Erosion, Landslide (Rain Induced), Landslide (Earthquake Induced)	Very Low - Economic, Human Low - Anticipatory Moderate - Natural, Social, Institutional, Physical
Guindulman	70.5	<b>High -</b> Flood, Erosion, Landslide (Earthquake Induced), Storm surge	Very Low - Economic, Natural Low - Human Moderate - Anticipatory High - Institutional, Physical Very High - Social
Jagna	80	Very High - Erosion High - Landslide (Rain Induced), Landslide (Earthquake Induced)	Very Low - Human Low - Economic, Natural Moderate - Institutional, Anticipatory High - Social, Physical
Dagohoy		High - Erosion	Very Low - Economic, Human High - Natural, Social, Institutional, Anticipatory Very High - Physical
Dauis		Very High - Salt water Intrusion	Low - Economic, Natural, Social, Human Moderate - Anticipatory High - Institutional, Physical
Panglao		<b>Very High</b> - Salt Water Intrusion <b>High -</b> Storm Surge	Low - Economic, Natural, Social, Human Moderate - Physical High - Institutional, Anticipatory
Tagbilaran City		High - Sinkhole	Low - Social, Physical Moderate - Natural High - Anticipatory Very High - Economic, Human, Institutional
Cortes			Low - Economic, Human Moderate - Natural, Institutional, Anticipatory High - Social, Physical

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

\*\* Source: Bohol LDRRM Plan

\*\*\* Based on location of Major Dams
#### Annex E. Directory of Players

PROVINCE	MUNICIPALITY	NAME	PRODUCT	VOLUME/ HARVEST	CONTACT NUMBER
Farmers					
Bohol	Jagna	Amancio Sapa	Upland		
Bohol	Jagna	Conchita Galve	Upland		

PROVINCE	NAME	CONTACT NUMBER	COMMODITY	CLASSIFICATION
BOHOL	Fresh Market Alturas Group of Companies	501-6828	Vegetables	Concessionaire
BOHOL	Pepe Reposposa		Vegetables	Retailer
BOHOL	Hilaria Bag-o		Vegetables	Retailer
BOHOL	Alvie & Dolores Fresh Vegetable		Vegetables	Retailer
BOHOL	Luisita Maghinay		Vegetables	Retailer
BOHOL	Nenita Cenabre		Vegetables	Retailer
BOHOL	Olga Calimbayan		Vegetables	Retailer
BOHOL	Caridad Balli		Vegetables	Retailer
BOHOL	Felixverto Buhion		Vegetables	Retailer
BOHOL	Rosario Naraga		Vegetables	Retailer
BOHOL	Silveria Ihalas		Vegetables	Retailer
BOHOL	Rosalina Maestrado		Vegetables	Retailer
BOHOL	Emma Durang		Vegetables	Retailer
BOHOL	Poncia Bangalao		Vegetables	Retailer
BOHOL	JJ Ramulta		Vegetables	Retailer
BOHOL	Procesa Reserva		Vegetables	Retailer
BOHOL	Sylvia Torrepalma		Vegetables	Retailer
BOHOL	Nestoria Fuentes		Vegetables	Retailer
BOHOL	Lourdes Rulida		Vegetables	Retailer
BOHOL	Joanne Mediano		Vegetables	Retailer
BOHOL	Enriquita Gahum		Vegetables	Retailer
BOHOL	Sol Balbin		Vegetables	Retailer
BOHOL	Perla Lauren		Vegetables	Retailer
BOHOL	Rosalia Yocyoc		Vegetables	Retailer
BOHOL	Jose Nelson Flores		Vegetables	Retailer
BOHOL	Anacleto Salces		Vegetables	Trader
BOHOL	Meliton Malubay		Vegetables	Trader
BOHOL	Marivic Libron		Vegetables	Trader
BOHOL	Socrates Cuario		Vegetables	Trader

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PROVINCE	NAME	CONTACT NUMBER	COMMODITY	CLASSIFICATION
BOHOL	Manuel Concha		Vegetables	Trader
BOHOL	Delia Bassadre		Vegetables	Wholesaler
BOHOL	Rufino Camilo Jr.		Vegetables	Wholesaler
BOHOL	Boy-Flora Fresh Vegetables		Vegetables	Wholesaler/ Retailer
BOHOL	Boy Lorie Fresh Vegetables		Vegetables	Wholesaler/ Retailer
BOHOL	Ellen Mahinay		Vegetables	Wholesaler/ Retailer
BOHOL	Jun Corpuz		Vegetables	Wholesaler/ Retailer
BOHOL	Nene Sumipo		Vegetables	Wholesaler/ Retailer
BOHOL	Rudy Sumaylo		Vegetables	Wholesaler/ Retailer

### Annex F. Provincial Core Planning Team Composition

Provincial Core Planning Team					
Component Commodity		Agency/Office	Name		
I-PLAN Subproject Cor	nponent				
Component Head		Office of the Provincial Agriculturist (OPA)	OPA/ Dr. Larry M. Pamugas, PhD.		
	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		
commodity Experts	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 Component / Engineering		Provincial Engineer's Office (PEO)	Engr. Camilo Gasatan Engr. Evelyn Ayuban		
I-REAP Subproject Component		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 Natural Resources			EnP. Jovencia Ganub		
Social Welfare and Development/GAD			Ms. Carmelita Tecson		
Disaster Management			Dr. Anthony Damalerio		
Enterprise			Ms. Gertrudes Fuentes		
PAFC Representative			Mr. Apolonio Manatad		

# PHOTO DOCUMENTATION

## Presentation of Highland Vegetables VCA Results to PDC and PCPT by RPCO-7 | January 30, 2017



#### PCPT Meeting for Discussion of Draft PCIP Matrix | March 15, 2017



### Technical Review of Draft PCIP | April 18, 2017



Stakeholders' Consultation for the Highland Vegetables PCIP | May 18, 2017



#### PDC Presentation of Highland Vegetables PCIP June 14, 2017



#### PDC ExeCom Presentation of the Updated PCIP Matrices July 19, 2024

