SME Study on Coconut-based Farm Diversification

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ASSESSMENT OF TECHNICAL, SOCIAL AND ECONOMIC OPPORTUNITIES FOR COCONUT INTERCROPPING PRODUCTS VALUE CHAINS

Market and Profitability Assessment for Selected Coconut-based Enterprises

BRIEF

Coconut is a dominant sector in the country's agriculture which covers 26% of the total agricultural lands. Philippine Statistics Authority (PSA) record shows that as of 2017 a total of 3.612 million hectares of country's agricultural land is planted to coconuts. It covers 68 out of 81 provinces or 1,195 municipalities with a total of more than 329.9 million bearing trees.[1]

Coconut plays a vital role in the Philippine economy as the country is one of the largest producer of this commodity in the world with an average annual export earnings of over 1 billion US dollars from 2005-2010. It is one of the priority commodities in the Philippines and it is largely produced in Mindanao.

Mindanao's economy is predominantly agri-based and coconut is a very important sector. The coconut industry plays a vital role in driving Mindanao's economy. Forty two percent (42%) of the country's land area planted with coconut is in Mindanao. It contributes a total of 59% to the country's total coconut production.

Mindanao is considered as one of the Major Supply Grid (MSG) of coconut in the country. In terms of land area, 2017 PSA showed that Mindanao has 1.504 million hectares planted to coconut. All or six regions in Mindanao are growing coconut.

IRDF's pilot project areas of Davao Region and SOCCSKSARGEN are significant coconut growing regions which ranked fourth and tenth respectively in terms of area planted.

Millions of Filipino's depend on coconut for their livelihood. Sadly, just like in many parts of the country, coconut farmers remained to be among the poorest. These despite the fact of the recognized importance of the industry in driving the economy forward through job generation at the production and processing levels of the value chain as well as in marketing and trade.

Considered as a "Tree of Life" due to its many important uses, coconut industry faces lot of challenges which severely affects the most vulnerable among industry stakeholders, the farmers. Low farm income and low farm productivity is an industry-wide problem. Low farm productivity is not only a result of old and senile coconut trees but also of the ageing coconut farmers' population. As a result, many farmers are no longer able to perform important farm activities and succession planning is little to non-existent as younger populations opt for more lucrative careers in the cities or abroad.

In addition, lack of access to important technical and financial support services are very common issues. In many areas, farmers are fragmented and many operate their farm businesses in isolation. This hinders them from accessing important technical support services. Further, they lack the economies of scale to

[1] Philippine Statistics Authority

operate potential value-adding activities at a profit. Often, farmers lack the bargaining power to negotiate for better selling price for their produce and lower buying price for important inputs that they need in the farm.

To address this, select desiccated coconut sub-sector players embarks on an initiative which seeks to improve coconut farmers' livelihood and promote youth engagement while providing industrial users with traceable coconuts.
The collaborative partnership embarks on a 10-year project mobilizing stakeholders of the coconut value chain in Mindanao, Philippines' second largest island: 5,000 motivated smallholder farmers. The Integrated Rural Development Foundation (IRDF), an experienced Filipino NGO implements and manages the project.

Specifically, the project seeks to perform the following activities:

- Leveraging and scale-up existing initiatives to improve farmers' livelihood such as intercropping, development of new activities to valorize coconut's by-products and market-linkage support
- Empower farmers with sustainable practices to better manage their farms and increase their yields
- Replacement of senile coconut trees with high yielding varieties
- Improve harvest and post-harvest practices
- Direct-sourcing scheme through a marketing agreement with Franklin Baker and Mars
- Foster youth and women entrepreneurship by setting-up small-scale transformation units of various coconut-based products and its intercrops

Project activities are now on-going and being rolled-out in the municipalities of Magsaysay in Davao del Sur and in Kidapawan City and municipality of Makilala in North Cotabato.

IRDF has commissioned a service provider to conduct an assessment on technical and social-economic opportunities for coconut intercropping product value chains. Result is already out and the following intercrops were selected by the respondents during the selection process:

- Rubber
- Coffee
- Cacao
- Banana
- Mango

The following are the criteria used during the selection process:

- Social aspect
- Economic aspect
- Agronomic and environmental aspect

The study conducted assessed of the pros and cons to grow different crops under coconut according to farmers' knowledge and appetence, market availability and cost of production (including labor and investment). Cacao, Cardava banana emerged as the priority crops the study result showed. In addition, the Municipality of Magsaysay in Davao del Sur showed a special preference on mango which is commonly grown in the area.

Cacao and cardava banana are the two (2) most preferred choices for the following reasons:

- Known by farmers; GAP will be easier to implement.
- Used for household consumption and selling purposes.
- Have positive and symbiotic effect on coconut trees.
- Costs of production are not prohibitive (especially in a context where labor cost may increase).
- Vegetative phase is short and allow quick harvest (1-3years).
- Organic market is available for both products.

The decision matrix that contained the result of the study showed some of the aspects that influenced the decision of the respondents in choosing their preferred crops. Using the criteria cited herein, information about the production technologies, post-harvest, costs, market, etc. were collected. However, the need to substantiate and collect more useful data to make full use of the study is much needed.

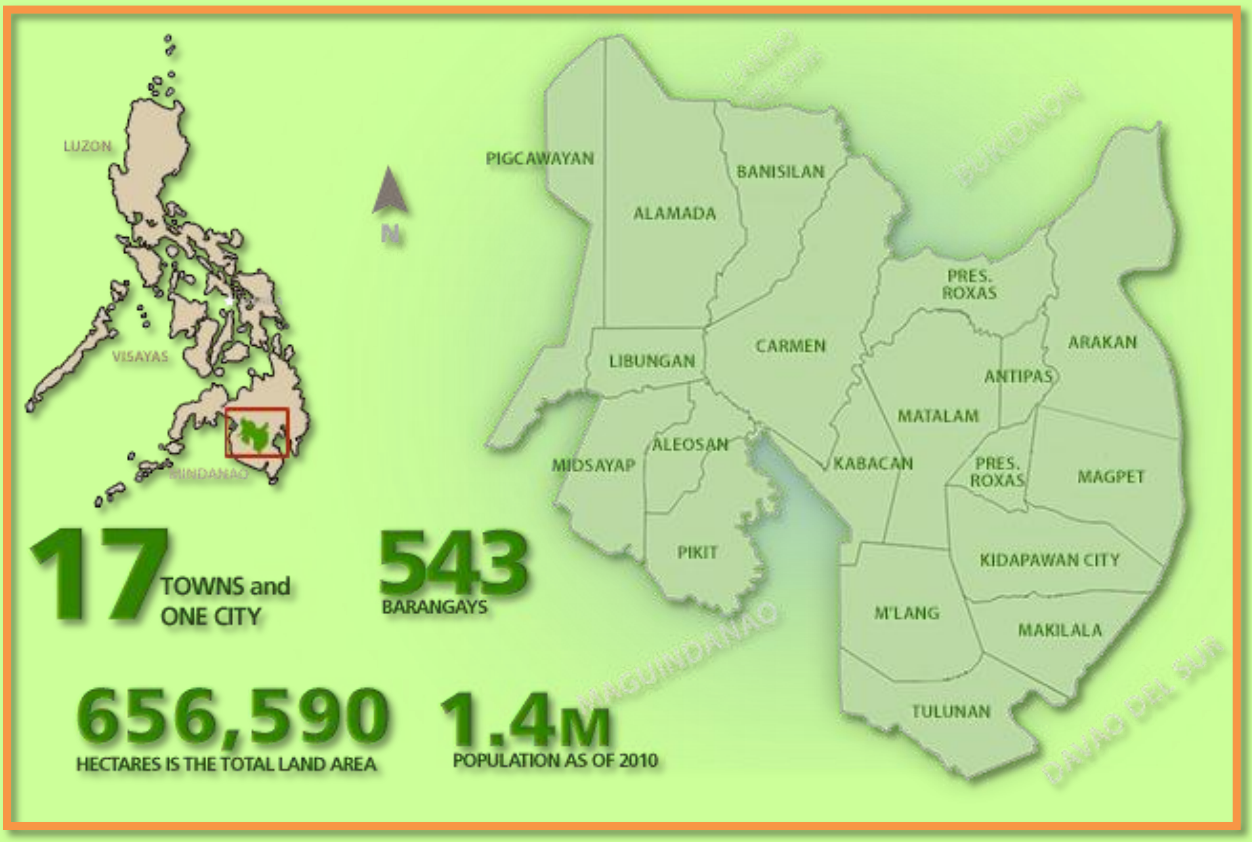
As such, further SME study needs to be conducted to fill-in these gaps. It will be focused on three (3) priority crops which were selected as a result of the study: These are cacao and cardava (saba) banana for Kidapawan City and Municipality of Makilala in North Cotabato and and carabao mango for the municipality of Magsaysay in Davao del Sur.

Specifically, the SME study will look into the following aspects:

- Analyze the different processing options and levels according to their profitability for the farmers:
  - Conduct profit & Loss analysis for each crop in each municipality (with a special attention to mangoes in Magsaysay) at farm level
  - Assess the level of investment needed from production up to selling Assess the different market and their profitability for the different processed crops
  - Assess the job creation potential for each crop throughout the supply chain.
- Assess the optimal marketing structure (cooperative, social enterprise…) for a large-scale production and marketing (to be adapted along the investment cost)
- Assess the possible marketing options and economic operators at local, national and international level included in a detailed market analysis for each crop.
- Identify and engage with potential off-takers for intercrop products to be sold at local level (In the Philippines).
- Assess governmental program which support each crop in order to prepare confounding initiatives.

COTABATO : *(Kidapawan City and Municipality of Makilala)*

Cotabato, formerly but colloquially known as North Cotabato, is a landlocked province in the Philippines located in the SOCCSKSARGEN region in Mindanao. Its capital is Kidapawan City.



Map of North Cotabato *(Source : http://cotabato.gov.ph)*

The Province of (North) Cotabato lies on the eastern part of Region XII and is strategically located in the central part of Mindanao. It is bounded on the North by the Province of Bukidnon, on the northwest by Lanao del Sur, on the East by Davao City, on the Southeast by Davao del Sur, on the West by Maguindanao Province and on the southwest by Sultan Kudarat Province. Mountains to the east peak at Mount Apo, a volcanic cone that is the highest mountain in the Philippines. In the west, the Piapungan Range separates it from Lanao del Sur. [2]

The fertile Pulangi River basin runs in the middle of these two highlands and spreads towards the southwest to the flood plains of Maguindanao. Typhoons do not pass through (North) Cotabato and rainfall is evenly distributed throughout the year.

[2] Socio-economic Profile, North Cotabato – Provincial Planning and Development Office

The rich vast land resources of the Province stretch over an area of 656,590 hectares representing 36 percent of the regional land area (1,815,500 hectares). It ranks first in terms of land area among the four provinces of Region XII. The province of Cotabato is composed of seventeen (17) municipalities and one (1) city with five hundred forty three (543) legally created barangays.

LAND AREA BY LGU, COTABATO

LOCAL GOVERNMENT UNIT	LAND AREA (Hectares)	% DISTRIBUTION
ALAMADA	78,750	12
ALEOSAN	19,330	2.94
ANTIPAS	20,000	2.05
ARAKAN	56,950	8.67
BANILISAN	22,190	3.38
CARMEN	71,300	10.86
KABACAN	23,680	3.61
KIDAPAWAN CITY	31,250	4.76
LIBUNGAN	17,250	2.63
MAGPET	63,250	9.63
MAKILALA	30,750	4.68
MATALAM	47,600	7.25
MIDSAYAP	23,340	3.55
MLANG	36,750	5.60
PIGCAWAYAN	16,860	2.57
PIKIT	27,670	4.21
PRESIDENT ROXAS	41,860	6.38
TULUNAN	27,800	4.23
TOTAL LAND AREA	**656,590**	**100**
Source : *Provincial Planning and Development Office*		

Kidapawan City :

Kidapawan City is situated at the southeastern portion of Cotabato province, located almost midway between the cities of Davao and Cotabato at a distance of 110 kilometers and 120 kilometers, respectively. It is the capital City of Cotabato Province and currently the seat of the Provincial Government.

Originally named a district of Pikit in 1942, Kidapawan was later declared a separate municipality by virtue of Executive Order No. 82 issued by then President Manuel Roxas on August 18, 1947 – thereby becoming the fourth town of the then Empire Province of Cotabato, composed previously of the municipalities of Cotabato (now Cotabato City), Dulawan (later named Datu Piang) and Midsayap.

Kidapawan was legally created by virtue of Republic Act. No 8500, signed by then President Fidel V. Ramos on February 12, 1998, making it a component city of Cotabato Province. The people overwhelming ratified the said Act on March 21, 1998 during a plebiscite conducted for the purpose.

Kidapawan became then the provincial capital of North Cotabato pursuant to Presidential Decree No. 341 dated 22 November 1973, with the provincial seat of government located in Amas. Later, Batas Pambansa No. 660 dated 19 December 1983 renamed the Province of North Cotabato just plain Cotabato. By the time it became the province's capital, Kidapawan had already 40 barangays under its geopolitical jurisdiction.

Kidapawan City has a total land area of 34,007.20 hectares per cadastral survey covering 40 barangays, and about 5,036.4 hectares of which are timberland.

Barangays and Land Area

BARANGAY	LAND AREA (has.)	% DISTRIBUTION
AMAS	1,749.956	5.15
AMAZION	669.281	1.97
BALABAG	952.722	2.80
BALINDOG	576.649	1.69
BINOLIGAN	1,166.903	3.43
BIRADA	567.384	1.67
GAYOLA	764.228	2.25
GINATILAN	606.610	1.78
ILOMAVIS	1,274.380	3.75
INDANGAN	619.969	1.82
JUNCTION	1,029.68	3.03
KALAISAN	778.513	2.29
KALASUYAN	568.105	1.67
KATIPUNAN	858.008	2.52
LANAO	321.342	0.94
LINANGCOB	1,227.62	3.61
LUVIMIN	467.304	1.37
MACEBOLIG	726.98	2.14
MAGSAYSAY	185.181	0.54
MALINAN	715.419	2.10
MANONGOL	759.482	2.23
MARBEL	662.131	1.95
MATEO	489.484	1.44
SIBAWAN	765.867	2.25
MUA-AN	668.894	1.97
NEW BOHOL	513.758	1.51
NUANGAN	563.548	1.66
ONICA	1,425.631	4.19
PACO	958.346	2.82
PATADON	651.92	1.92
PEREZ	1,152.063	3.39
POBLACION	585.117	1.72
SAN ISIDRO	716.135	2.11
SAN ROQUE	564.21	1.66
STO. NIÑO	716.046	2.10
SIKITAN	456.219	1.34
SINGAO	1,321.17	3.88
SUDAPIN	559.136	1.64
SUMBAC	682.756	2.01

BARANGAY	LAND AREA (has.)	% DISTRIBUTION
Mt. Apo Natural Park	3,763.11	
Contested Area	234.91	
Total	34,007.20	
Source: City Planning & Development Office, Kidapawan City		

Soil Type

The largest areas of land are classified as Kilada sandy-clay loam, covering 65.64% of the total land area, or 22,321.58 hectares – typical for intensive agriculture. Other soil types include Kidapawan sandy clay loam at 645.93 (1.89%) hectares, mostly in areas suitable for urban development; San Manuel loam covers 695.92 hectares (2.05%); and mountain soils which cover 10,343.77 hectares (30.42%) that is best suited for forest/reforestation, parks and wildlife. The highest water holding capacity parts are in areas classified under mountain soils.

The other soil types have low water holding capacity. About 69.58% of these soil types are suited for agricultural crops while the rest are best suited for reforestation, pasture, parks and wildlife.

Kidapawan City's land is primarily an agricultural area with 76.84 percent or about 27,150.70 hectares of its total land area has been devoted to agricultural production.[3]

Kidapawan City Population (2015)

Kidapawan City's total population was posted a count of 140,195 persons based on 2015 survey. Respective forty political barangay populations were shown in table below. Barangay Poblacion was most populous with population size making up to 31,586 persons or about 22.53 percent of the city's total population. These followed by Barangay Sudapin and Barangay Lanao with 10,385 persons and 8,271 persons respectively. Barangay Malinan had the least number of persons living in the area. Its share in the total population is only 0.61% or a total of 850 persons.[4]

Agriculture

Kidapawan city is considered as agricultural area. About 79% of the total land area is devoted for agricultural use (based on the latest land use survey). Agriculture sector plays an important role in the economic progress of the city. It contributes to the economic progress and provides employment to a large number of Kidapaweños.

The City Government, through the City Agriculture Office in coordination with other support offices, the Department of Agriculture including the non-government organizations, constantly provides assistance to farmers by way of extension services, provision of farm inputs and construction of support facilities. Trainings and seminars are also conducted to enhance and improve farming practices of farmers.

Despite the support farmers have received from City LGU and the Department of Agriculture, it is noticeable in that some agricultural crops specifically palay, corn, rubber and coconut decreased in production for two-consecutive years. The reason is that for rubber and coconut, farmers are cutting down and replace the old-aged unproductive trees and some were dismayed of the slumping market

[3] Socio-economic Profile, Kidapawan City Planning and Development Office
[4] City Planning and Development Office, Kidapawan City

price of rubber. Some farmers also diverted their interest to plant in demand high value permanent crops like banana, coffee, oil palm and cacao instead of focusing in corn and palay.

The operation of multi-national company like Dole-Stanfilco have boosted the banana industry in Kidapawan City wherein varieties of Cavendish and Lacatan were produced, from then on banana production continuously increased through the years from 18,200 metric tons in 2012 to 28,615.14 metric tons in 2015.

Comparative Data on Agricultural Production; CYs 2012– 2015

Agricultural Products	2014			2015		
	Area Planted (ha)	Area Harvested (ha)	Production (mt)	Area Planted (ha)	Area Harvested (ha)	Production (mt)
Palay	2,615.18	2,004.65	8,378.73	1,778.27	2,983.71	12,500.65
Corn	546.25	558.75	2,194.43	708.3	584.55	2,388.02
Banana	2,152.92	1,544.00	27,792.00	2,209.59	1,802.38	28,615.14
Rubber	3,813.00	2,115.00	7,402.50	3,818	2183.44	7,642.04
Coconut	4,028.49	3,124.96	7,499.90	4,028.49	3124.96	7,499.90
Oil Palm	392.85	224.00	13,440.00	438.35	425.35	25,521.00
Coffee	80.48	51.84	51.84	80.7	35.29	35.29
Cacao	70.83	36.90	36.90	79.86	40.84	40.84
Sugarcane	137.81	137.81	11,024.80	67.00	67	5,360.00
Rambutan	206.24	196.36	1,963.60	165.77	163.74	1,637.40
Durian	423.08	331.09	1,655.45	375.94	347.73	3,129.57
Lanzones	285.44	202.00	4,049.00	249.42	226.58	4,078.44
Pomelo	38.15	34.17	1,70.08	38.95	34.17	136.68
Mangosteen	414.25	265.86	1,329.30	496.02	400.67	3,205.36

Source: Kidapawan City Agriculturist Office

Top Existing Commodity per Barangay, Kidapawan City CY 2015

BARANGAY	BANANA	COCONUT	CACAO	OTHER FRUIT TREES
Amas		√		
Amazion	√	√		
Balabag	√	√		√
Balindog	√	√		√
Binoligan	√	√		
Birada	√	√		√
Gayola	√	√		
Ginatilan	√	√		√
Ilomavis	√	√		√
Indangan	√	√		√
Junction	√	√		
Kalaisan	√	√		
Kalasuyan	√	√		√
Katipunan	√	√		
Lanao	√	√		√
Linangkob	√	√		√

BARANGAY	BANANA	COCONUT	CACAO	OTHER FRUIT TREES
Luvimin	√	√	√	√
Macebolig	√	√		
Magsaysay	√	√		√
Malinan	√	√		
Manongol	√	√		√
Marbel	√	√		
Mateo	√	√		√
Meohao	√	√	√	√
Mua-an	√	√		√
New Bohol	√	√	√	√
Nuangan	√	√		√
Onica		√		
Paco	√	√		√
Patadon		√		√
Perez	√	√	√	√
Poblacion	√	√		
San Isidro	√	√		
San Roque	√	√		
Sibawan	√	√		√
Sikitan	√	√		
Singao	√	√		√
Sto. Niño	√	√		√
Sudapin	√	√		√
Sumbac	√	√		√

Source: City Agriculturist Office

Municipality of Makilala :

Makilala is one of the 17 municipalities in Cotabato Province in the SOCCSKSARGEN Region. The Municipality of Makilala is formerly a baranggay with a name of “Lamitan”. It was created by virtue of Executive Order No. 63 issued on September 8, 1954 by then President of the Philippines, Ramon Magsaysay.

Makilala is a Tagalong word meaning “to be known”. It is derived from the combination of the first syllables of Malasila, Kisante and Lamitan. An additional “la” was added to attain its Tagalog term.

GEOGRAPHIC LOCATION

Makilala is geographically located at the foot of the majestic Mt. Apo along the Davao – Cotabato national high way. It is situated at the Southeastern portion of Cotabato province and serves as the gateway to Central Mindanao and Sarangani province. It shares boundary with Bansalan and Magsaysay, Davao del Sur in the eastern part and with the Municipality of Mlang in the western side. Going north of Makilala is Kidapawan City and to the South, is the Municipality of Tulunan.

Makilala is 129 km from Cotabato City; 101 Km from Davao City; and 111 Km from General Santos City.

Makilala is located approximately at the middle of the three key cities of Davao, Cotabato and General Santos.

CLIMATE

Makilala's climatic condition is characterized by rainfall evenly distributed throughout the year. Mt. Apo, Mt. Libadan, Mt. Gap and Mt. Niponggis serve as rain generators that provide reliable rainfall pattern and cool climate.

LAND AREA AND LAND USE CLASSIFICATION

Makilala is composed of 38 barangays with a total land area of approximately 34, 356.53 hectares. Makilala is predominantly agricultural with about 71.2 percent or 24,459.15 hectares devoted to agricultural production. Mt. Apo reservation covers 6,403.78 hectares or 18.6 percent of the total land area. Timber land covers 2,668.82 hectares while the remaining 824.78 hectares are utilized for built-up, commercial, industrial, roads and water bodies.

DEMOGRAPHY

The 2010 Census conducted by the National Statistics Office estimated its population at 77,508, up by 8.3 percent from 2007 count. It grew by 1.76 annually in 2000-2007 and 3.04 percent yearly in 2007-2010.

ECONOMY

Makilala is a 1st class municipality with an actual annual income of P378,961,849.00 in FY 2011, an increase of 16.6 percent from 2010. The province has an Internal Revenue Allotment of P270,150,479.00 in 2011, up by 9.0 percent from 2010.

Makilala is predominantly agriculture with 71.19% or 24,459.15 hectares are devoted to agricultural production. Mt. Apo reservation covers 6,403.78 hectares or 18.63% of the total land area. Timber land covers 2,668.82 hectares while the remaining 824.78 hectares are utilized for built-up, commercial, industrial, roads and water bodies.[5]

AGRICULTURE SECTOR:

Total land area in the municipality devoted primarily for agriculture uses is 24,034.8904 hectares and this represent 69.95% of the total land area of the municipality covering its total number of 38 barangays.

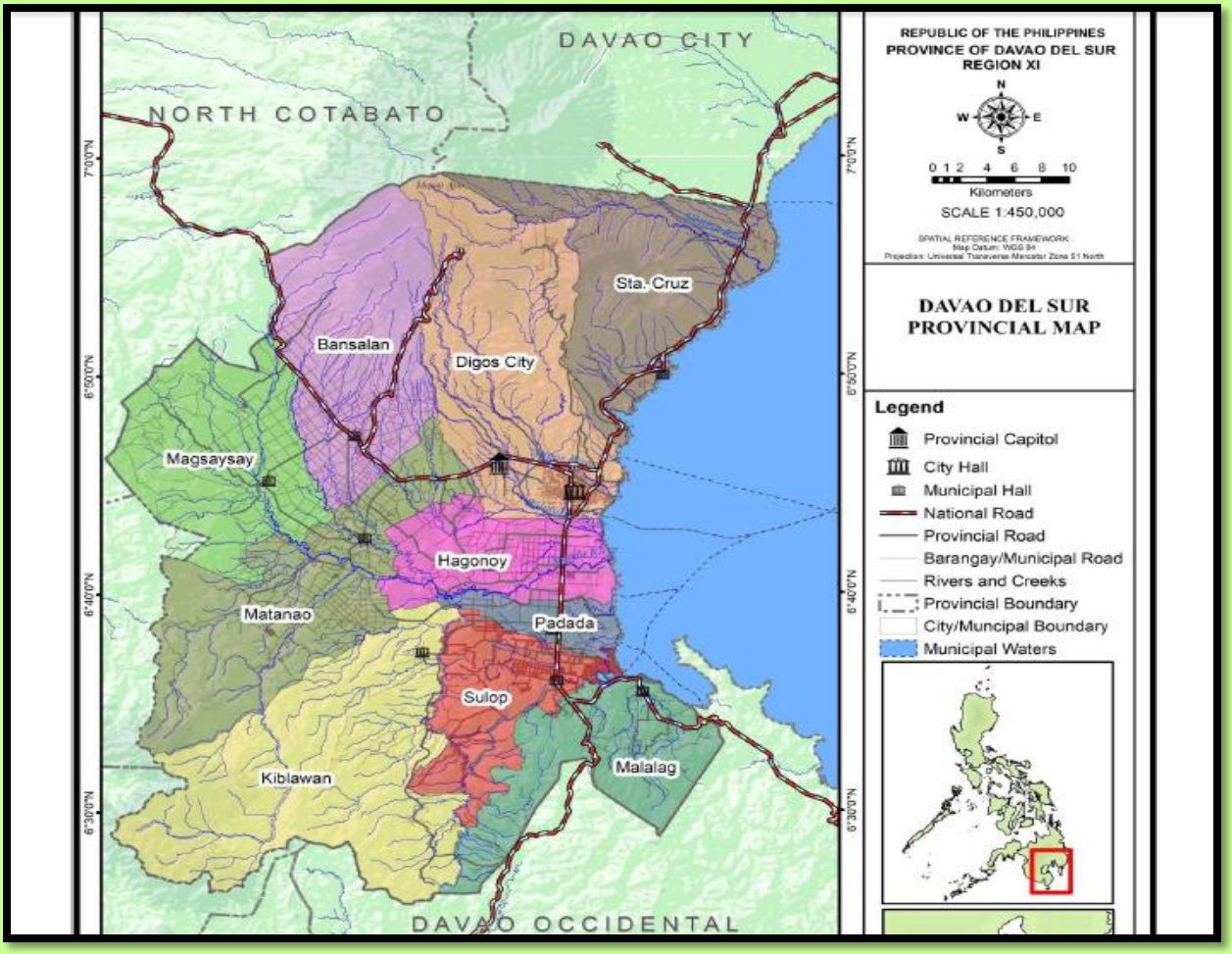
The Municipallity has also a productive Agro-forest land area of 4,468.20 hectares where 3,095.20 hectares are located within the Mt. GAP-Labidangan range and 1,373 hectares located within the Mt. Apo Natural Park.

The existing major agricultural crops in the municipality are Rice, Corn, Rubber, Coconut, Coffee, Banana, Abaca and other types of both leafy and fruit vegetables.

[5] Municipal Planning and Development Office, Municipality of Makilala

Out of eight (8) major types of agricultural crops above mentioned, Corn, Rubber, Coconut and Banana are almost present and /or growing in the 38 Barangays of the Municipality, while Coffee, Abaca and Vegetables are grown in selected areas which number range from 7-16 Barangays.

DAVAO DEL SUR : Municipality of Magsaysay



Source : *Provincial Planning and Development Office, Province of Davao del Sur*

Davao del Sur is strategically located at Southwest part of Davao Region. It geographically lies between 6°26‟5.63”, and 7°0‟8.03”, latitude 125°2‟54.26”,and 125° 29‟32.76” longitude. It is bordered by Davao City to the north,Davao Occidental to the south ,and North Cotabato, Sultan Kudarat and South Cotabato to the west, and Davao Gulf to the east.

One of the distinguishing landmarks of the province is the Mt. Apo, the highest mountain peak in the country with an elevation of 2,954 meters above sea level. Dominant portion of Mt. Apo is along the northwestern portion of the province. The province is composed of nine (9) municipalities and one (1) component city and subdivided into two (2) districts where District 1 is composed of Digos City, Bansalan and Sta. Cruz and the rest of the municipalities (Matanao, Magsaysay, Hagonoy, Padada,

Kiblawan, Sulop and Malalag) constitute District 2. It has 232 barangays with Matanao having the highest number of barangays and Malalag with the least.

Davao del Sur's agricultural sector remains to be the major source of employment and livelihood in the province with area of 58.99 percent as presented in previous table. The total land area devoted for agricultural use is 120,376.55 hectares in the year 2015. Davao del Sur is one of the coconut-producing provinces in the region. The top 6 municipalities in terms of number of hectares planted to coconut are Sta. Cruz with 7,838.18 hectares, Sulop with 6,018.52 hectares, Kiblawan with 4,390.50 hectares, Bansalan with 3,928.75 hectares and Digos City with 2,259.95 hectares. Municipalities of Matanao, Magsaysay and Hagonoy are the rice producing municipalities with a total volume of production of 97,123.15 metric tons, and Malalag for the mango production which produces 27,556.30 metric tons volume of production.[6]

NUMBER OF BARANGAYS PER MUNICIPALITY AND LAND AREA OF DAVAO DEL SUR

CITY/MUNICIPALITY	NO. OF BARANGAY	LAND AREA (SQ. KM.)	% SHARE TO TOTAL LAND AREA
Bansalan	25	159.56	8.04
Digos	26	271.25	13.67
Hagonoy	21	116.64	5.88
Kiblawan	30	393.23	19.82
Magsaysay	22	170.48	8.59
Malalag	15	187.64	9.46
Matanao	33	203.55	10.26
Padada	17	45.12	2.27
Sta. Cruz	18	281.28	14.18
Sulop	25	155.26	7.83
DAVAO DEL SUR	**232**	**1,984.01**	**100**

Source : *Provincial Planning and Development Office, Province of Davao del Sur*

Municipality of Magsaysay

The Municipality of Magsaysay, Davao del Sur was created on June 17, 1967 by virtue of REPUBLIC ACT NO. 4976. The barrios of Magsaysay, Bala, Barayong, Bob, Bacungan, Blocon, Dalawinon, Kanapulo, Kasuga, Mabini, Kialeg, San Isidro, San Miguel, Dalumay, Tacul, Daig, Lipara and Malungon in the Municipality of Bansalan, Province of Davao, del Sur are separated from said municipality and constituted into a distinct and independent municipality, to be known as the Municipality of Magsaysay, of the same province. The seat of government of the new municipality is the present site of Barrio Magsaysay.

GEOGRAPHICAL LOCATION

On the Northwest, Magsaysay is bounded by point of National (Davao- Cotabato) Highway , thence straight line to the West following the Davao- Cotabato boundary, on the southwest point upstream to

[6] Provincial Planning and Development Office, Province of Davao del Sur

the National Highway, thence following the said highway, to the point of Davao - Cotabato boundary, thence straight line to the South following the Western Bansalan boundary up to the point of Matanao-Bansalan boundary. Its geographical location lies along 125) 10' latitude and 6) 45' 9" departure.

It is composed of 22 barangays, namely: Poblacion, Bacungan, Balnate, Barayong, Blocon, Dalawinon, Dalumay, Glamang, Kanapolo, Kasuga, Lower Bala, Mabini. Malawanit, Malongon, Maibo, New Ilocos, New Opon, San Isidro, San Miguel, Tacul , Tagaytay, and Upper Bala.

The total land area of the municipality is 26,899.63 hectares which is about seven percent of the total land area of the province. Among the 22 barangays of the municipality, the largest is Barangay Bacungan with an area of 2,969.202 hectares or 11 percent of the total land area of the municipality while the smallest is Barangay New Ilocos with 449.298 hectares or 1.67 percent of the total municipal land area.

The topographical description of the municipality is characterized by 55% mountainous areas and gently sloping hills while the rest are generally plain. Climate falls under the fourth type category where rainfall is more or less evenly distributed throughout the year.

DEMOGRAPHY

The total population of the municipality per 1995 census is 41,979 with a total households of 7,346. This is about 6% of the total population of the entire province. Gross density of the municipality is 0.63 hectare per person. Growth rate for the period is 2.02 percent. People in the municipality are predominantly Cebuano- speaking, comprising 81% or a total of 31,239 households. Ilocano speaking people account a total of 1,592 households or 4% of the total households in the municipality. The B'laan tribe of the cultural minorities group is considered the pioneer settlers of the locality comprising 3,561 households. Other cultural groups present in the municipality are the Hiligaynons, Warays, Bagobos, Butuanos, Bagobos, Tibolis and Manobos.

ECONOMIC CONDITION

The Municipality of Magsaysay is basically an agricultural area where majority of the people are farmers. Agriculture comprised 60.33% of the total land area of the municipality. However, only about 45.56% of this or a total 10.910.50 hectares are fully cultivated and considered productive areas.

There are three major crops in the municipality, namely: rice; coconut; and corn. The municipality is tagged as the "Rice Granary of Davao del Sur" because it accounts the largest rice production in the entire province. Other crops grown are coffee, cacao, mango, banana, sugarcane, surghum, rootcrops and vegetables.

Land Area by Barangay

Barangay Bacungan and Malawanit are the largest barangays that comprise 11.04% and 9.57% of the total municipal land area, respectively. While New Ilocos and Dalumay are, the smallest barangay that only comprise 1.67 % and 1.7 % of the total land area, respectively. In terms of distance, barangay New Opon, Kanapolo and Malongon are the farthest with a travel distance of 18.5 kms., 17.5 kms., and 15.0 kms., respectively from the central Poblacion.

Land Area Distribution and Travel Distance per Barangay

BARANGAY	DISTANCE (kms.)	AREA
Poblacion		1,075.449
Bacungan	5.6	2,969.202
Balnate	5.4	1,021.344
Barayong	5.5	924.916
Blocon	5.7	522.943
Dalawinon	4.5	625.279
Dalumay	4.4	469.482
Glamang	9.5	1,343.220
Kanapolo	17.5	1,714.026
Kasuga	5.4	541.691
Lower Bala	7.9	1,094.361
Mabini	8.7	706.572
Maibo	12.6	1,903.800
Malawanit	7.5	2,574.901
Malongon	15.0	560.000
New Ilocos	3.5	449.298
New Opon	18.5	1,010.243
San Isidro	5.6	1,545.578
San Miguel	3.5	971.133
Tacul	9.6	1,220.746
Tagaytay	8.4	1,433.242
Upper Bala	10.5	2,222.204
Total		**26,899.630**

Source: *Municipal Planning and Development Office, Municipality of Magsaysay*

Topography

A substantial part of Magsaysay is considered upland characterized by extensive mountain ranges. The mountain range that runs along the western and northern boundary of the municipality is shared with the municipalities of Makilala and Tulunan, North Cotabato and Columbio, Sultan Kudarat. These mountain ranges extend to the northeast and east to the province of Davao Oriental. Along this range is Mt. Apo that has an elevation of about 10.311 feet (3,144 meters) above sea level. It has been considered as semi-active volcano. On a cloudless day it is believed that Mt Apo is viewed best from Magsaysay.

Basic Soil Type

The types of soil predominantly found in the municipality are San Manuel Silty Clay Loam (5,733.02 has.), Miral Clay Loam (10,664.84 has.) and Kidapawan Clay Loam (10,501.77 has.).

Agricultural Production

Agricultural production of the municipality comprises mainly of rice. Rice [production increases by 7% for 2015 or a quantity of 45,957.133 (tons) with the utilization of 6,537.38 has.

Comparative Agricultural Crops Areas and Production, Year 2014 and Year 2015.

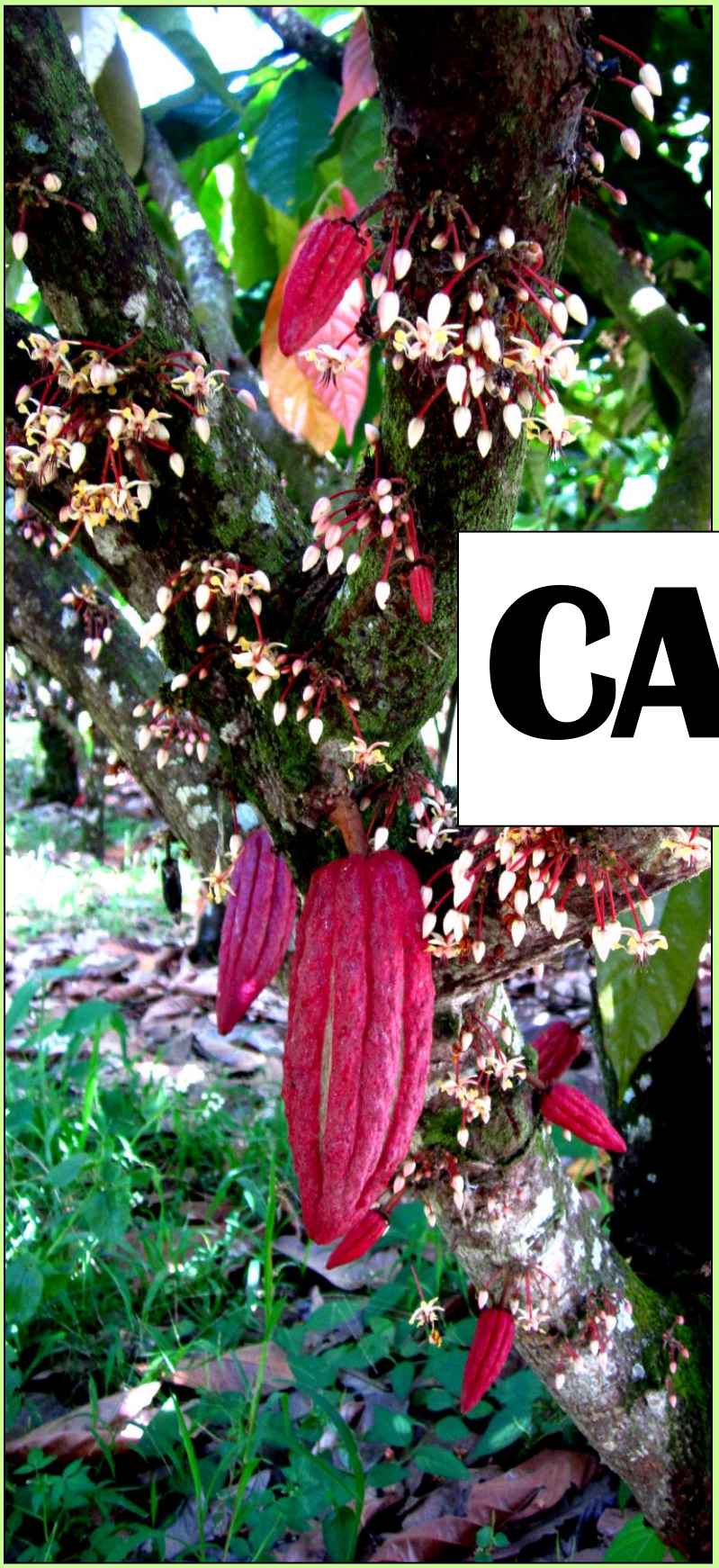
Major Crops	Area		Increase / Decrease	Production		Increase / Decrease
	2014	2015		2014	2015	
Rice	6,537.38	6,537.38		42,950.59	45,957.1313	
Corn	1,587.75	2,178.50		3,793.81	5,079.39	
Banana	1,535.52	1,535.52		8,183.657	8,123.06	
Coconut	2,516.98	3,152.42		3,272.074	3803.77	
Mango	942.20	942.20		8,819.72	1,130.64	
TOTAL	**13,119.83**	**14,346.02**				

Source : *Municipal Planning and Development Office, LGU Magsaysay*

Agricultural Profile (by Commodity, by Barangay) 2016

Barangay	COCONUT					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
1. Bacungan	389.00	471.42	1,885.68	1,885.68	4,073.07	2.16
2. Balnate	344.00	162.78	651.12	651.12	1,406.42	2.16
3. Barayong	133.00	318.00	1,272.00	1,272.00	2,747.52	2.16
4. Blocon	26.00	46.47	185.88	185.88	401.50	2.16
5. Dalawinon	261.00	126.94	507.76	507.76	1,096.76	2.16
6. Dalumay	95.00	125.13	500.52	500.52	1,081.12	2.16
7. Glamang	76.00	53.05	212.20	212.20	458.35	2.16
8. Kanapolo	164.00	143.50	574.00	574.00	1,239.84	2.16
9. Kasuga	196.00	50.59	202.34	202.34	437.05	2.16
10. Lower Bala	155.00	124.17	496.68	496.68	1,072.83	2.16
11. Mabini	237.00	409.14	1,636.56	1,636.56	3,534.97	2.16
12. Maibo	536.00	412.23	1,648.92	1,648.92	3,561.67	2.16
13.Malawanit	88.00	63.79	63.79	63.79	137.79	2.16
14. Malongon	75.00	70.13	70.13	70.13	151.48	2.16
15. New Ilocos	12.00	32.68	32.68	32.68	70.59	2.16
16. New Opon	58.00	110.77	110.77	110.77	239.26	2.16
17.Poblacion	126.00	96.35	96.35	96.35	208.12	2.16
18. San Isidro	172.00	162.88	162.88	162.88	351.82	2.16
19. San Miguel	307.00	279.01	279.01	279.01	602.66	2.16
20. Tacul	361.00	361.00	361.00	361.00	779.76	2.16
21. Tagaytay	318.00	165.56	165.56	165.56	357.61	2.16
22. Upper Bala	577.00	330.79	330.79	330.79	714.51	2.16
TOTAL	**4,706.00**	**4,116.38**	**11,446.62**	**11,446.62**	**24,724.70**	**2.16**

(Source : *Municipal Agriculture Office*)



CACAO

OVERVIEW OF THE INDUSTRY

A. PRODUCT DESCRIPTION

Theobroma cacao, the scientific name of Cacao, literally translates as "food of the gods" in Greek. The name Theobroma cacao was first given to the cocoa tree by Carolus Linnaeus –the Father of Modern Day Taxonomic Plant Classification. Cacao is the Mayan root word to describe the tree and its product. It is grown mainly for its seeds known as the cocoa beans which are used to make cocoa mass, cocoa powder and chocolate.

In the Philippines, there are three major cultivar groups being grown by farmers. These are the Criollo, Forastero, and Trinitario cultivars: [7]

The Criollo is considered as the most prized, rare and expensive variety. It is native to Central and South America. It is believed that the 1st cacao seed planted in the Philippines was the Criollo variety brought via the Acapulco-Manila Galleon Trade in 1670. Only 5% of the world's cacao production is Criollo. This variety is difficult to grow, as extremely susceptible to pests and diseases. The beans are white to pale pink in colour and recognized as a superior quality, less bitter and more aromatic. Considered as the "Prince of Cocoas," Criollo is an ingredient in premium chocolates.

Photo : *TESDA – Wangan National Agricultural School cacao demonstration farm located in Brgy. Wangan, Calinan, Davao City*

The Forastero, a native of the Amazon basin, is the most versatile variety and most commonly grown cocoa. It is mainly grown in Africa, Ecuador and Brazil and accounts for 80% of the world's cocoa supply.

[7] Philippine Cacao Industry Roadmap, 2017-2022 – National Cacao Council

It is significantly harder, disease resistant and high yielding. Beans are purple-coloured and mainly used to give chocolate its full-bodied flavor. They have bitter taste, thus, often blended with superior cocoas. Trinitario, the hybrid of Criollo and Forastero combines the best of the two other main varieties: the hardiness and high yield of Forastero and the refined taste of Criollo. It is the predominant fine flavor cocoa and can be found in all the countries where Criollo cocoa was once grown including Southeast Asia and the Philippines. It is being used in about 10% of the world cacao supply.

Cacao is said to be a non-self-pollinating plant thus, scientists and industry experts are recommending to have at least 3-5 clones in one farm site to facilitate pollination. At present, there are 15 approved varieties/clones registered in the National Seeds Industry Council, to wit: UF18, BR25, K1, K2, PBG123, K4, K7, K8, K9, K10, ICS40, UIT1, TSO1, TSO2 and TSO3. Of these major clones, six (6) are prevalently used, namely: UF18, PBC123, BR25, K1, K2 and K9.

It is the main ingredient in chocolate production and there is no other crop or product that can substitute it in as far as chocolate production is concerned. There are six (6) intermediate products that can be derived from cacao beans: cocoa nibs, cocoa liquor (tablea), cocoa cake, cocoa butter, cocoa powder and chocolate confectionary blocks. Its diversified use, both for food and non-food, provides broader market opportunities. As a health food, cacao is packed with vitamins and antioxidants that make it almost a super food or a natural multivitamin.

Philippines grows cacao as well as produces and consumes chocolate based products. Cocoa travels along a global supply chain crossing countries and continents. The complex production process involves numerous parties including, farmers, buyers, shipping organizations, processors, chocolatiers, and distributers. Overall, it is possible to identify four major product categories based on different stages of processing, namely:

- Dried cocoa beans (fermented/unfermented);
- Semi-finished cocoa products (cocoa paste/liquor, cocoa butter, cocoa powder);
- Coverture, or industrial chocolate;
- Finished chocolate products.Key products from cacao beans are the following

The semi-finished cocoa products are used mainly in the food, cosmetics, and pharmaceutical sectors. About two thirds of global cocoa production is used to produce chocolate and confectionery. The key semi-finished cocoa products are the following:

a) Cocoa butter - the oily liquid obtained by pressing ground roasted cocoa nibs.Cocoa butter is used in the manufacture of chocolate. It is also used in cosmetic products such as moisturising creams, lotions, petroleum jelly, and soaps. Cocoa butter is also used as a suppository and ointment base as well as an

Photo: Cacao-based products produced by members of the Davao Chocolate Processors Association

emollient. The pharmaceutical and cosmetics usually obtain their requirements from sources using solvent extraction or methods other than pressing cocoa butter from cocoa shell. Some use cocoa beans that are not suitable as a food item.

a) Cocoa powder - the dry residual solid mass from cocoa butter production. Cocoa powder can be used as an ingredient in almost any foodstuff. For example, it is used in chocolate flavoured drinks, chocolate flavoured desserts such as ice cream and mousse, chocolate spreads and sauces, and cakes and biscuits.

b) Cocoa liquor - Cocoa liquor is used, with other ingredients, to produce chocolate. Chocolate is used as a product on its own or combined with other ingredients to form confectionery products. The Philippine tablea is cocoa liquor in tablet form.[8]

Cocoa products traded by the Philippines in the international market include the following:

- Cocoa beans, whole/broken, raw/roast
- Cocoa Powder not containing added sugar / other sweetening matter
- Cocoa Paste, not defatted (liquor)
- Cocoa Butter, fat/oil
- Chocolate Confectionery
- Chocolate or Cocoa Powder, chocolate blocks
- Cocoa Paste, wholly / partly defatted (Cocoa Cake)
- Sweetened Cocoa Paste

Among the regions in Mindanao, Davao has the widest range of cocoa products and the widest market outreach. The region produces and trades dried fermented beans and all its key by-products. The most dominant product traded by the region in both domestic and export markets is the cocoabeans with farmers from other regions especially SOCCSKSARGEN contributing to its supply base.

Cocoa beans constitute only 10% of the fresh weight of the cocoa fruit. This means that only about 10% by weight of the cocoa fruit is commercialized while 90% by weight (mainly cocoa pulp and cacao pod husk) is discarded as cocoa waste. The waste from cocoa can be transformed into commercial products and provide farmers with opportunities to diversify their business. These include using cacao pod as organic fertilizers, animal feed, organic mulch and jams and marmalade.

B. PRODUCTION

The Cacao tree is grown in the tropics in a band between 10 to 20 degrees north and south of the equator, sometimes called the “Cocoa Belt”. It grows most notably in Central and South America, West Africa and Southeast Asia specifically Malaysia, Indonesia and the Philippines. The tree is often grown in the shades of other trees and can be as tall as 40 feet. It bears fruits in 18 months but reaches full bearing capacity in 5 years producing 70 to 100 pods or more per tree per year.

The tree is cultivated in many countries. Africa contributes 71% of the world cacao production, followed by Latin America (16%) while Asia and Oceania at 13%. Today, the leading suppliers of cacao are Ivory

[8] Value Chain Analysis, Cocoa Bean Mindanao, Philippine Rural Development Project

Coast, Ghana, Indonesia, Nigeria, Brazil, Cameroon, Ecuador, Dominican Republic and Papua New Guinea.

Ninety percent (90%) of existing cacao farms are small. This ownership profile holds true even in the global scenario where most cacao farms are also small, ranging from 1-3 hectares.

a) Global Production

World cocoa/cacao bean production in 2015/16 reached about 3.997 million metric tons. Global output was dominated by Cote d'Ivoire which accounted for 1,581 million metric tons, followed by Ghana with 778 million metric tons and Indonesia with 320 million metric tons. Data from other cacao producing countries is shown in the table below.

	2015 / 16		Estimates 2016 /17		Forecasts 2017 / 18	
AFRICA	**2,923**	**73.1%**	**3,625**	**76.4%**	**3,490**	**76.1%**
Cameroon	211		246		240	
Cote d'Ivoire	1,581		2,020		2,000	
Ghana	778		970		880	
Nigeria	200		245		240	
Others	153		145		130	
AMERICA	**667**	**16.9%**	**739**	**15.6%**	**748**	**16.3%**
Brazil	141		174		170	
Ecuador	232		270		260	
Others	305		295		318	
ASIA & OCEANIA	**397**	**9.9%**	**379**	**8.0%**	**349**	**7.6%**
Indonesia	320		290		260	
Papua New Guinea	36		40		40	
Others	41		49		49	
WORLD TOTAL	**3,997**	**100.0%**	**4,744**	**100.0%**	**4,587**	**100.0%**

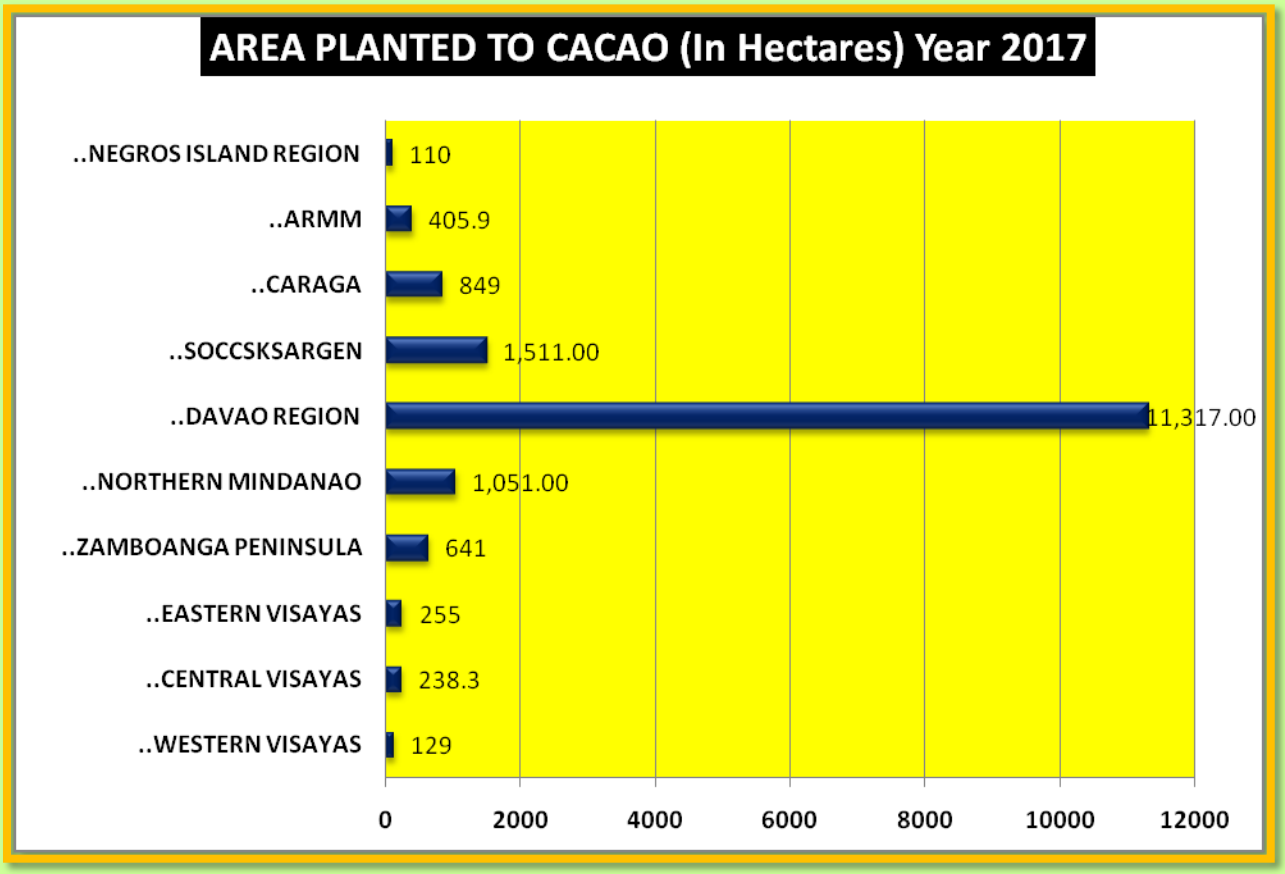
Source : *ICCO Quarterly Bulletin of Cocoa Statistics, Vol. XLIV, No. 2, Cocoa Year 2017/18*

Based on 2017/2018 ICCO forcast, Cote d'Ivoire will remain to dominate the world cocoa production producing 43.6% of the world's cocoa. Ghana follows producing 880 million metric tons or 19.18%. Indonesia the third largest cacao producing country is forecasted to have about 260 million metric tons of 5.67% of the world cocoa production. As the table above shows, in year 2015-2016 76.1% of the world cacao production is produced in Africa, 16.3% from America and 7.6% are from Asia and Oceania.

b) Domestic Production

Based on 2017 Philippine Statistics Authority (PPSA) data, Davao Region remained to be the leading cacao producer in terms of area planted with 11,317 hectares or 61.96%. This is due to the fact the Davao Region has long been growing cacao being a home to the now defunct Philippine Cocoa Estates Corporation (PCEC). In addition, the government, NGO and private sector have been actively promoting growing of cacao especially in areas planted with coconuts.

SOCCSKSARGEN ranked second with area planted to cacao reaching 1,511 hectares of 5.75%. Complete figure of area planted to cacao by region in the Philippines is presented in the chart below.



Source : Based of PSA 2017 Data

Within Mindanao alone, 71.74% or 11,317 hectares of cacao production area is in Davao Region, it is followed by SOCCSKSARGEN with 1,511 hectares or 9.58%. IRDF's pilot project areas of North Cotabato and Davao del Sur contribute 7.07% and 9.51% respectively to Mindanao's cacao production area. The next will show production areas by region in Mindanao with emphasis in North Cotabato and Davao del Sur.

AREA PLANTED TO CACAO (PSA 2017)			
REGION/PROVINCE	**Area Planted (has.)**	**% Contribution to Mindanao**	**% Contribution to Philippines**
..NORTHERN MINDANAO	1,051.00	6.66%	5.75%
..DAVAO REGION	11,317.00	71.74%	61.96%
....Davao del Norte	2,200.00	13.95%	12.05%
....Davao del Sur	1,500.00	9.51%	8.21%
....Davao Oriental	1,437.00	9.11%	7.87%
....Compostela Valley	2,415.00	15.31%	13.22%
.....Davao City	3,765.00	23.87%	20.61%

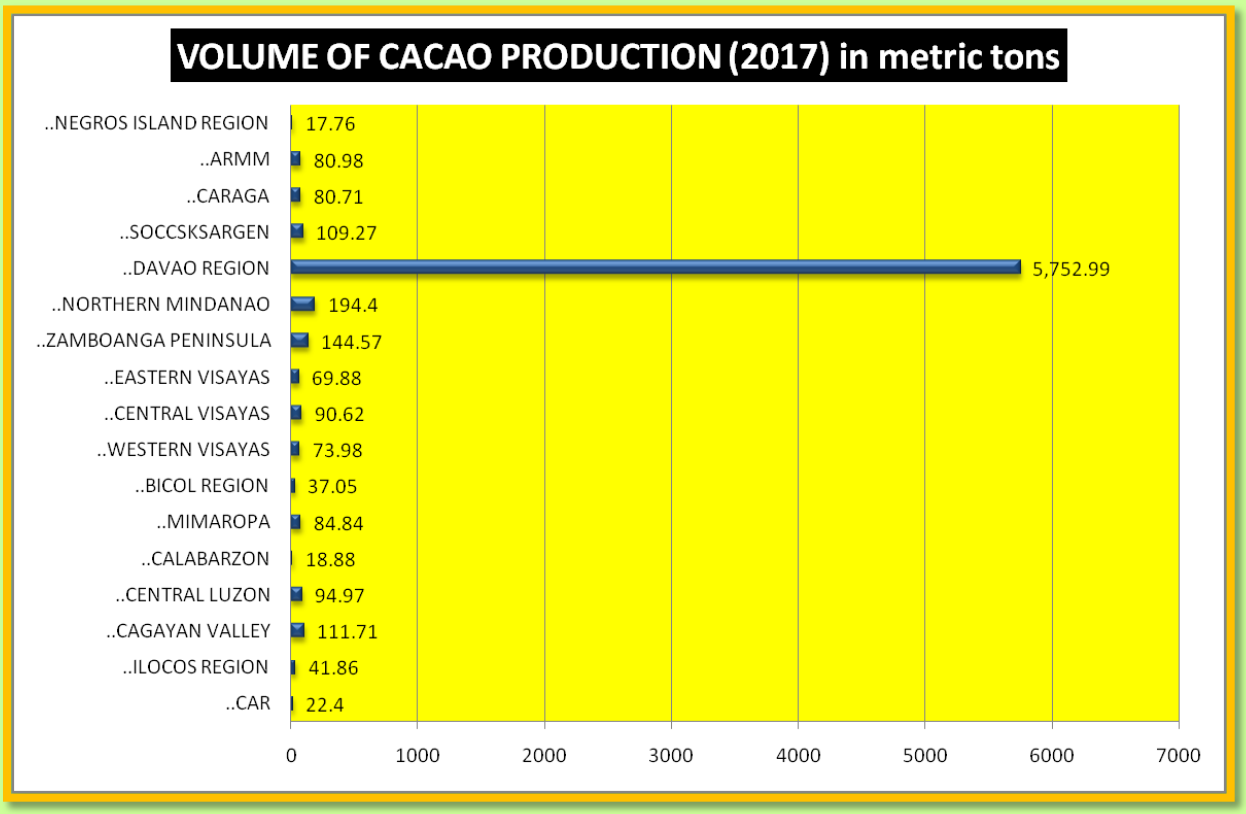
AREA PLANTED TO CACAO (PSA 2017)			
REGION/PROVINCE	**Area Planted (has.)**	**% Contribution to Mindanao**	**% Contribution to Philippines**
..SOCCSKSARGEN	1,511.00	9.58%	8.27%
....North Cotabato	1,115.00	7.07%	6.10%
....Sarangani	125	0.79%	0.68%
....South Cotabato	101	0.64%	0.55%
....Sultan Kudarat	170	1.08%	0.93%
..CARAGA	849	5.38%	4.65%
..ARMM	405.9	2.57%	2.22%
..ZAMBOANGA PENINSULA	641	4.06%	3.51%
....Zamboanga del Norte	499	3.16%	2.73%
....Zamboanga del Sur	30	0.19%	0.16%
....Zamboanga Sibugay	101	0.64%	0.55%
.....Zamboanga City	11	0.07%	0.06%
TOTAL MINDANAO	**15,774.90**	**TOTAL PHILIPPINES**	**18,264.44**

Over the years, Davao del Sur has been the leading province in the entire country in terms of cacao production. The municipalities of Sta. Maria and Malita (now part of Davao Occidental) are where multi-national companies used to have vast cacao plantation. These areas were subjected under the Comprehensive Agrarian Reform Program (CARP) and lands were distributed to farmers.

Photo: Coconut farm intercropped with cacao and banana in Kiblawan, Davao del Sur

As a result of the implementation of CARP, cacao production has since declined as farmers were not able to carry out cultural management practices implemented by the companies. Infestation of pests and diseases has affected cacao production areas and farmers have shifted to other crops.

The past ten (10) years, the rebirth of Philippine cacao industry started. This was made possible by the intervention of Non-Government Organizations that promotes cacao production through farm diversification by intercropping with coconuts. The local governments of Davao City, Compostela Valley and Davao del Norte along with the private sector are among those who showed great appreciation of cacao production's income earning potential. Massive campaigns on cacao planting were made and cacao production programs were implemented. As a result, Davao City now leads in the cacao production areas followed by Composte Valley Provice and Davao del Norte. Davao del Sur and Davao Oriental, the former cacao production leaders ranked fourth and fifth respectively.



Source : Based on PSA 2017 Data

Based on PSA data, volume of cacao production produced by Davao Region is year 2017 reached 5,752.99 metric tons. Bulk of production is produced by Davao City contributing 32.40% to Mindanao cacao production and 29.97% to Philippine cacao production volume or a total of 2,061.45 metric tons. Davao del Sur ranked second with 1,750.12 metric tons. Compostela Valley Province which ranked second and third in terms of area planted to cacao ranked fifth in terms of volume of production. This is because massive cacao production only started the past two (2) years and most of the cacao grown are not yet on productive stage. The same holds true for Davao for Davao del Norte, although the Municipality of San Isidro in Davao del Norte has been a cacao growing area for decades.

VOLUME OF CACAO PRODUCTION (PSA 2017)			
REGION/PROVINCE	**AREA PLANTED (has.)**	**% Contribution to Mindanao**	**% Contribution to Philippines**
..ZAMBOANGA PENINSULA	144.57	2.27%	2.06%
..NORTHERN MINDANAO	194.4	3.06%	2.77%
..DAVAO REGION	5,752.99	90.41%	82.08%
....Davao del Norte	999.15	15.70%	14.26%
....Davao del Sur	1,750.12	27.50%	24.97%
....Davao Oriental	521.19	8.19%	7.44%
....Compostela Valley	421.08	6.62%	6.01%
.....Davao City	2,061.45	32.40%	29.41%
..SOCCSKSARGEN	109.27	1.72%	1.56%
....North Cotabato	50.69	0.80%	0.72%
....Sarangani	27.7	0.44%	0.40%
....South Cotabato	23.67	0.37%	0.34%
....Sultan Kudarat	7.21	0.11%	0.10%
..CARAGA	80.71	1.27%	1.15%
..ARMM	80.98	1.27%	1.16%
TOTAL MINDANAO	**6,362.92**	**TOTAL PHILIPPINES**	**7,009.10**

For SOCCSKSARGEN, the province of North Cotabato leads in both areas planted to cacao and volume of production. North Cotabato has a total of 1,115 hectares of land and a production volume of 50.69 metric tons. Overall, SOCCSKSARGEN has a total of 1,511 hectares planted to cacao and a total volume of production of 109.27 metric tons.

Kidapawan City

- As of December 2017, Kidapawan City have a total of 203.56 hectares of land planted to cacao. Around 66.5 hectares of these are already productive and 137.06 are non-productive. Based on the data from the Kidapawan City Agriculture Office, there are 680 farmers in the area that are growing cacao.
- The Local Government Unity of Kidapawan City in collaboration with the Department of Agriculture is also actively promoting and implementing cacao production support program. The city has also organized its cacao farmers.
- During the conduct of focus group discussion at Barangay Manongol, there are farmers who were provided with seedlings by the LGU the past two (2) years which are expecting their first harvest this season.
- Total volume of production is estimated to be around 66.5 metric tons with an average yield of 1 ton per hectare [9]

Makilala

- In 2009, Makilala has a total of 85 hectares of land planted with cacao, production reduced by 26% in 2019 and the municipality only has 63.6 hectares.

[9] City Agriculture Office – *Kidapawan City*

- Annual cacao production of the municipality as of 2010 is 3.81 metric tons[10]
- Over the past years, there has been an observed increasing number of farmers engaged on cacao production as private sector, NGOs and the government are not investing in cacao production

Magsaysay

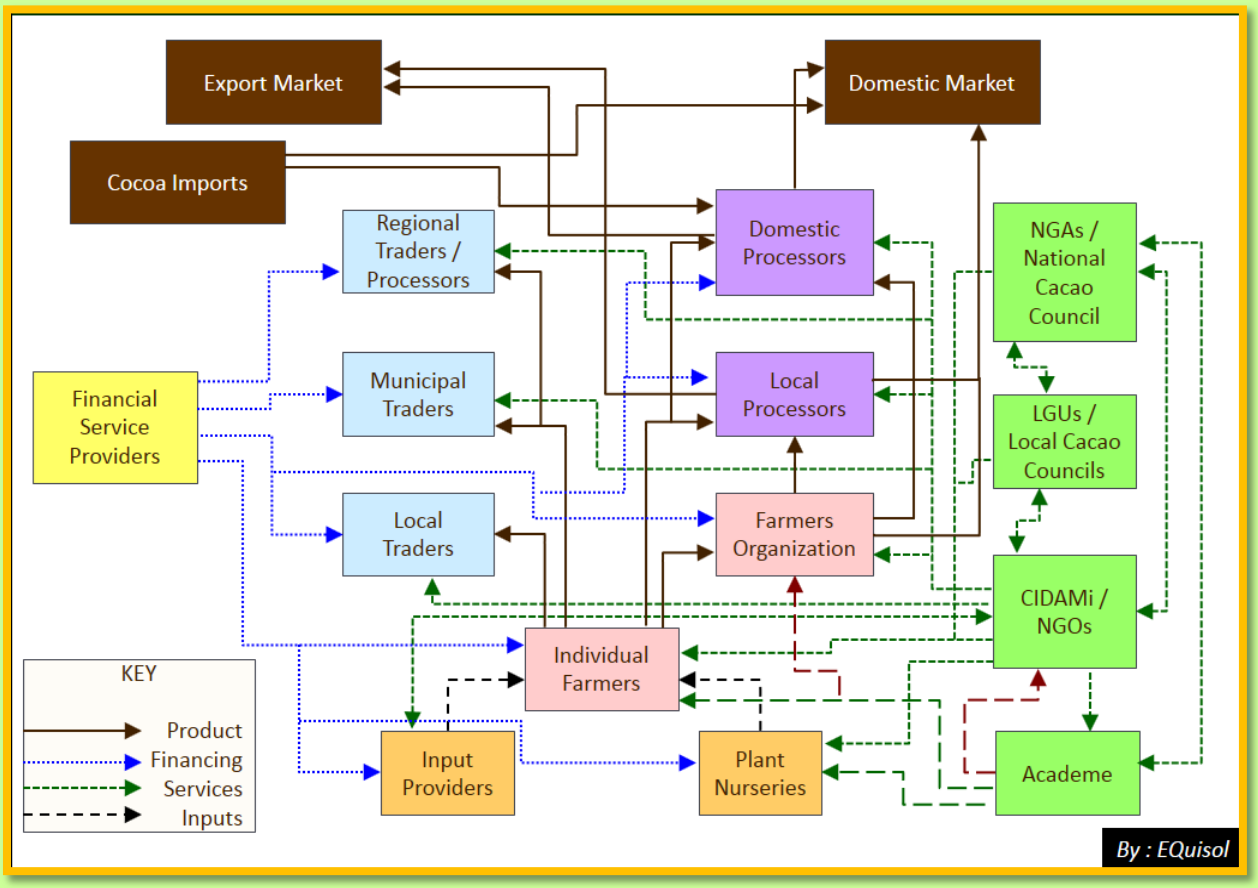
- The Department of Agriculture Region XI, Provincial Agriculture Office of Davao del Sur and the Municipal Government Unit of Magsaysay have been actively promoting and investing in cacao production program.
- Over the past 3 years, cacao seedling dispersal and production training were conducted in 22 barangays in Magsaysay
- There were NGOs also who conducted training in cacao production including provision of cacao planting materials.
- To ensure cacao seedling planted are properly taken-cared of by farmers and training programs are implemented, the LGU of Magsaysay through its Municipal Agriculture Office have organized farmer organizations per Barangay. Further, the Municipal Mayor of Magsaysay is also a strong advocate of cacao-coconut intercropping as their family has the biggest cacao farm in the area.

Barangay	MUNICIPALITY OF MAGSASAY DAVAO DEL SUR CACAO PRODUCTION DATA					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
1. Bacungan	89.00	52.54	52.54	21.25	12.75	0.60
2. Balnate	52.00	47.95	47.95	23.75	11.88	0.50
3. Barayong	91.00	62.00	62.00	4.00	2.00	0.50
4. Blocon	23.00	0.25	0.25	0.25	1.25	5.00
5. Dalawinon	57.00	29.15	29.15	1.75	1.05	0.60
6. Dalumay	10.00	3.40	3.40	0.20	0.12	0.60
7. Glamang	77.00	16.65	16.65	5.25	2.63	0.50
8. Kanapolo	77.00	40.59	40.59	0.59	0.44	0.75
9. Kasuga	12.00	11.20	11.20	4.00	2.40	0.60
10. Lower Bala	118.00	64.62	64.62	6.62	4.97	0.75
11. Mabini	119.00	91.80	91.80	15.20	11.40	0.75
12. Maibo	100.00	58.35	58.35	8.35	5.01	0.60
13.Malawanit	101.00	18.19	18.19	4.19	2.10	0.50
14. Malongon	45.00	12.16	12.16	2.16	1.08	0.50
15. New Ilocos	15.00	7.00	7.00	7.00	3.50	0.50
16. New Opon	39.00	19.00	19.00	9.00	4.50	0.50
17.Poblacion	2.00	0.10	0.10	0.10	0.05	0.50
18. San Isidro	68.00	69.93	69.93	19.93	11.96	0.60
19. San Miguel	84.00	26.00	26.00	5.00	2.50	0.50
20. Tacul	83.00	50.71	50.71	0.71	0.43	0.60
21. Tagaytay	124.00	41.55	41.55	28.15	19.71	0.70
22. Upper Bala	106.00	66.38	66.38	13.38	8.03	0.60
TOTAL	1,492.00	789.52	789.52	180.83	109.73	0.61
Source: Municipal Agriculture Office of Magsaysay Davao del Sur						

[10] Municipality of Makilala Socio-economic Profile, *Municipal Planning and Development Office*

NATURE AND STRUCTURE OF THE INDUSTRY

A. CACAO VALUE CHAIN MAP



Mindanao leads the country's cacao production among the country's major island groups. Davao, the leading cacao producing region is a home to several cacao industry players. The past ten years sparked the rebirth of cacao industry in the Philippines when the USDA Funded Success Alliance Project and CoCoPal Projects were implemented by ACDI/VOCA. The project has led the entry of international players such as Mars when then established the Mars Cacao Development Center in Davao City.

In year 2011, during a Cacao Industry Stakeholder's Forum in Davao City organized by ACDI/VOCA, industry players identified "Lack of Industry Leadership" as a major constraint the hinder the growth of the industry. The forum has led to the creation of Cacao Industry Development Association in Mindanao Inc., (CIDAMi), see, http://www.cidami.org/about-us/

The establishment of CIDAMi has brought positive development as yearly local and international cacao conferences has been organized by CIDAMi. Local and international technical experts, buyers and processors, farmer/farmer organizations, input suppliers, technical and financial service providers and industry enablers gather yearly to tackle issues and plans the promotes cacao industry development.

Cacao industry players now are well interconnected. The creation of National Cacao Council resulted to the creation of regional, provincial and city/municipal cacao councils in cacao producing areas all over the country. This resulted to a better flow of information between and among cacao industry players. CIDAMi Chairperson, Valente Turtur now sits as the elected president of the national cacao council.

The value chain map describes the interconnectivity and value transformation of cacao from production to processing. In Kidapawan City, Makilala and Magsaysay flow of transaction and players are mostly those at the production level. These are the input suppliers and farmers/growers. Technical support services are mostly provided at the production level by the agriculture technicians from the local government units. There are few areas where some farmers get technical support services from the local NGOs.

At the trading and processing levels, players most operate at the regional scale. Big traders, processors and exporters are mostly based in Davao City. There are home-based micro processors operating in the locality and their processed products are either intended for home consumption and for local market.

Other technical service providers include the academe such as University to Southern Mindanao (USM) in Kabacan, North Cotabato and SPAMAST in Davao del Sur.

Financial services for production are available through Land Bank of the Philippines. There are also credit cooperatives the offers financial products for cacao especially in production. These include BCS Credit Cooperative and USPD Credit Cooperative.

B. KEY PLAYERS AND FUNCTIONS

1. Input Provision

Farmers acquire planting materials via the following ways:

a) Seeds from larger fruits in own farm to plant seedlings, which is a common practice among smallholders and the “old-timers” in cacao farming: In many cases, these farms have low yield and are highly vulnerable to pests and diseases;
b) Free/subsidized planting materials from development programs implemented by NGOs, national and local government agencies; this has significantly contributed to the expansion of cocoa farms
c) Purchase of planting materials from nurseries: Main clientele of nurseries are the commercial farmers, new entrants to cacao farming, and government and development agencies.

Most of accredited cacao nursery operators are located in Davao City. These nursery operators are contracted by the government, NGOs and private companies to deliver grafted cacao seedlings in different parts of the country.

Photo: Cacao nursery located in Brgy. Lanao, Kidapawan City

In North Cotabato, there are small nursery operators that have started to produce grafted cacao seedlings. In Kidapawan City, there is a cacao nursery with an estimated seedling capacity of 50,000 planted under lanzones farm. This is not a commended practice though as cacao seedlings are ideally planted inside a nursery structure with shade nets to protect the plants from pests and disease infestation including exposure from too much sunlight.

In Makilala North Cotabato, there are few cacao nurseries operated by cacao growers who have been trained by private sector and NGO programs in Davao Region. These are Ipong Farms and Yarte Farms. There are BPI accredited nurseries in North Cotabato but these nurseries are mainly producing rubber seedlings.

In Magsaysay Davao del Sur, there is no cacao nursery. Most of the seedlings planted in the municipality are provided by the government through the Cacao Double-up Program and PRDP Program.

Fertilizers (Organic and Inorganic Input)

Kidapawan City, Municipality of Makilala and Municipality of Magsaysay are agricultural areas. In terms of access to fertilizers and pesticides, suppliers of these inputs can be found in city and municipal business centers. Based on 2015 socio-economic data, Kidapawan City has a total of 27 registered agri-vet supply businesses. For municipality of Makilala, in year 2010 it has 18 registed agri-vet supply businesses.

2. Farming

As per CIDAMI and other industry stakeholders, there are about 15,000 farmers nationwide and of which 13,500 are in Mindanao. Of the 13,500 farmers, 68% are in Davao Region.[11] About 90% of current production of cacao beans comes from smallholders with farm size ranging from 1 to 3 hectares. Cacao is a labor-intensive crop making it more suitable for smallholder farms than large-scale plantations dependent on external labor.

Majority of cacao farmers are intercropped with coconuts as both crops are proven to complement each other and are fit in farm diversification. Kidapawan, Makilala and Magsaysay areas are relatively new to cacao farming. Most of cacao trees planted by farmers were provided by the governments' through high value crops development program that promotes cacao production.

[11] Cacao Value Chain Analysis - PRDP

Farmers provided with cacao seedling were trained by local agriculture technicians on cacao production. In addition, through private sector and NGO initiatives, there are already identified farmer leaders who are also training new cacao farmers in cacao production and cacao rehabilitation technologies.

Photo: Coconut-based farm diversification. Integrating cacao, banana, ginger and anthurium under coconut trees. Brgy. Biangan, Makilala, North Cotabato

The Philippine Coconut Authority (PCA) through its coconut farm productivity program called KAANIB also promotes cacao-coconut intercropping. Through Kaanib Program, farmers were provided with cacao seedlings and other inputs. Kaanib seeks to increase overall farm income through coconut-based farm diversification.

Kidapawan, Makilala and Magsaysay are coconut growing areas, and most of cacao trees grown in the area are intercropped with coconuts. There are farms however especially in Makilala that intercropped cacao and coconut and integrated anthurium flower on the ground under the cacao trees. Some farmers planted ginger under the cacao trees.

3. Post Harvest Practice

Most of the cacao planted in Kidapawan, Makilala and Magsasay were provided by the government through their respective agriculture offices. Cacao seedling dispersal happened only in the past 2 years. Majority of the cacao in the area are not yet in productive stage but are expected to bear fruit by year 2019.

As such, traditional post harvest practice is still used by many farmers. That is, they harvest their cacao pods, break the pod and dry the wet beans in plastic sheets or in pavements. In Makilala, farmer leader and cacao trainer Arthur Yarte practices proper cacao bean harvesting and post harvest handling.

Mr. Yarte owns a small cacao fermentary unit and a solar drier. He also buys cacao beans which he process into cocoa liquor, locally known as “tablea”. His sells his excess beans to cacao processors based in Davao City.

Photo : *Mr. Arthur Yarte, cacao farmer trainer, nursery operator, trader and tablea processor*
Location : *Sitio San Isidro, Brgy. Malasila, Makilala, North Cotabato*

MARKET AND MARKET OPPORTUNITIES

Market of both dry and cacao beans is readily available. Because of the increasing numbers of processors in Davao City, buyers have now expanded beyond Davao Region to buy cacao beans. Several buyers are readily available but current volume of cacao beans in areas outside Davao Region is still low.

According to the Department of Agriculture, the global demand is expected to reach between 4.7 Million to 5 Million metric tons by the year 2020, and global supply will be at a deficit of 1 Million MT. For the Philippines alone, the local consumption is at 50,000MT annually, but the local supply is only around 10,000MT, making the country a net importer. This looming deficit has given rise to the Philippine Cacao Challenge, which commits the Philippines to producing 100,000MT by the year 2020 and onwards. [12]

Photo: Chocolate products produced by Davao City chocolate processors are available at Cacao City, an artisan chocolate shop that features select Davao artisan chocolates. In photo (L-R) Val Turtur - CIDAMi Chaiperson, Charita Puentespina – Malagos Chocolate, Janice Ginez – CIDAMi Secretary, and Emmanuel Quisol

Davao Region has about 70 to 80 traders. In other regions, number of traders range from 2 to 5. While traders in Davao Region have markets outside the region, traders in the other regions usually sell to public market retailers and to processors within the province or region.

In Davao where trading is more vibrant, the bean passes through at least two to three intermediaries (barangay/village level trader – municipal trader – lead trader). Some of the traders and consolidators buy directly from the lower levels of the supply chain. Some cooperatives are engaged in cacao bean trading. Transactions are generally spot and on cash basis. Other functions performed by these traders include bulking, transport, quality assurance and financial services function. In many cases, the lead trader provides its network of intermediaries with money for cash advances.

Farmers generally prefer to sell to village traders due to lower cost of transaction (e.g., products are picked up from the farm or delivered to a village store within the locality) and the cash advances. Some of these traders have small sari – sari stores where cacao farmer can get their household needs on

[12] Cacao Industry Development Association in Mindanao Inc., *http://www.cidami.org/philippine-2020-challenge/*

credit. Long – time suppliers may also avail of financing from these traders. These advances are deducted from the proceeds of cocoa beans delivered to the trader.

In Kidapawan, Makilala and Magsaysay areas, there are no big buyers and exporters operating. This is mainly because of lack of volume of cacao available. Big traders and exporters however are very much willing to set-up buying stations if there is a justifiable amount of cacao bean available for them to buy and operate at a profit. There are local Chinese traders operating in the Poblacion area on each municipality that buys cacao beans along with other agricultural produce. The nearest buyer that purchases wet cacao beans and dry cacao beans in BCS Multi-purpose Cooperative located in Bansalan, Davao del Sur. BCS MPC signifies its intention to buy cacao beans from Makilala, Kidapawan City and Magsasay areas.

At the moment, farmers either sell their products to Poblacion agri-traders or process their products into tablea for household consumption. In Makilala, farmer leaders like Arthur Yarte in Brgy. Malasila and Mr. Roy Onez in Brgy. Biangan operates a cacao buy and sell business in their respective Barangays.

4. Export Marketing

The 12 exporters cum grinders/processors are based in Davao Region. These exporters buy beans from collectors and traders who deliver to their warehouses, and then sell primarily to regional buyers for processing. Both small and medium/large scale exporters have found it increasingly difficult to compete with the integrators/consolidators affiliated with multinational companies. As a result, many have begun selling their cocoa beans to the integrators rather than continue to export directly themselves.

There are at least 5 integrators sourcing in Mindanao, namely. Kennemer Food International Inc., Filipina Oro De Cacao, CSI Trade Ventures, Seed Core Enterprise, and the Federation of Cooperatives. These integrators purchase wet beans from collectors and traders, ferment, dry, sort and grade them for quality, and then sell them to buyers in European countries, Indonesia, and Singapore. In many cases, they are sourcing for one or two global grinders and chocolate manufacturers. Oftentimes, they work together with the multinational companies in providing development support to cocoa farmers.CSI facilitated the gainful participation of cocoa farmers by allowing them to acquire 30% share in the company addition to facilitating supplier's access to postharvest facilities, CSI has established a nursery to ensure that farmer – suppliers and shareholders have access to good quality planting materials. Except for Philcocoa who is based in Manila, the companies have their head office and base operations in Davao Region.

Integrator – Exporters Sourcing in Mindanao	
Company	**Global Player Affiliated With**
Kennemer Food International (KFI)	Mars Chocolate
CSI Trade Venture	Traden, Poland
Seed Core Enterprises	Barry Callebaut
Federation of Cooperatives	ADM Asia
Source: *PRDP Cacao VCA*	

5. **Grinding/Processing**

Cocoa processing, or grinding, entails the transformation of dried beans into a variety of processed cocoa products such as cocoa paste or liquor, cake, powder, and butter. To date, main product produced in Mindanao is the tablea or cocoa liquor. Makers of tablea range from home-based processors to small scale companies.

A greater number of tablea processors are home-based informal enterprises. These are usually households with cacao farms. According to farmer cum tablea makers, they process the cocoa beans into tablea to optimize the produce from their farms. It also mitigates price fluctuation of cocoa beans as price of tableya is relatively stable. These households make the tablea with the assistance of household members. Oftentimes, the tableas are sold to trades and retailers within the province or region.

The formal enterprises generally have a wider market. Established and known companies like Malagos Chocolate, Kablon Farms, Chocolate de San Isidro, Auro Chocolate, Nutrarich, Rosarios Chocolate, ComVal Tropical, Cacao de Davao, FEDCO, etc., sell to specialty shops and supermarkets within and outside of the region (Cebu/Manila). CSI seems to be the only company producing cocoa blocks.
In the international market, the Netherlands is the world's leading cocoa grinder. Three companies – Cargill, Archer Daniels Midland (ADM), and Barry Callebaut – grind 40% of the world's cocoa.
Singapore-based company, Olam/Petra Foods and Blommer complete the Top 5 cocoa grinders. In essence there are three main categories of companies operating in the grinding segment (UNCTAD):

i. Companies with backgrounds in commodity trading and a widely diversified range of trading interests (such as ADM and Cargill);
ii. Companies whose primary interest has traditionally been in producing semi-finished cocoa products and couverture, mainly for sale to third parties (for example, Barry Callebaut, Petra Foods and Bloomer);
iii. Large chocolate companies that are primarily active in the branded consumer market, yet retain some grinding capacities to meet their specialty requirements (for example, Nestlé, Cadbury, Ferrero and Cemoi).

US based companies ADM and Cargill are active in both producing countries (cocoa sourcing and logistics and, in some countries, cocoa processing) and consumer countries (manufacture and supply of semi-finished cocoa products and, a further step down the chain, couverture production and supply).

The Swiss-based Barry Callebaut group was created out of the 1996 merger of Callebaut, a leading industrial chocolate group, and Barry, with complementary sourcing activities and cocoa-processing operations. In cocoa bean producing countries, the company is active in primary processing stages.
In consumer countries, it is increasingly moving from semi-finished cocoa products and couverture (the latter being its traditional core business) into the manufacture of consumer chocolate.[13]

6. Manufacturing (Consumer/Finished Products)

At the national scene, chocolate manufacturing is a billion peso industry. The top 3 largest chocolate producers in the country are: Universal Robina Corporation, Commonwealth Foods Inc., and Delfi Foods

[13] VCA Cocoa Bean in Mindanao, *Philippine Rural Development Project*

Inc. Other chocolate manufacturers are: Multirich Foods Corp. (Choco Mucho), Columbia International Food Products Inc. (Klicx Cruncher and Chocquick bars), Monde Nissin (Snitch Choco Bar), Twin Oaks Foods Corp. (Mayfair), Stateline Snack Food Corp. (Stateline Nimble Chocolates), New Unity Sweets Mfg. Corp. (Choc-Nut), Annie Candy Manufacturing (Hany Milk Chocolate), and Gracepoint Ent. (Lala). [14]

Top Three Chocolate Producers in the Philippines *(VCA Cocoa Bean in Mindanao – PRDP)*	
Company	**Description**
Universal Robina Corporation.	Market leader in chocolates and the leading branded convenience food and beverage company in the country. Manufactures enrobed chocolates and panned chocolates. Its popular enrobed chocolate brands are Cloud 9, Big Bang, Chooey, and Monster Munch while its panned chocolate, Nips, is the most popular in its category. Also exports chocolates to Thailand, Malaysia, Singapore, Indonesia and Hong Kong.
Commonwealth Foods, Inc.	Manufacturer of chocolates as well as other products like coffee, cookies, biscuits, milk products, coffee beans, flour, and sugar. Its chocolate brands are Flat Tops, Curly Tops, Choco Mallows, and Chocolate Crunchies.
Delfi Foods, Inc.	Delfi Foods Inc bought the manufacturing plant and sales and distribution assets of Nestle Philippines together with Goya for an aggregate deal of US$5 million in March 2006. Delfi Foods Inc is a wholly owned subsidiary of Petra Foods Inc., a Singapore-based manufacturer of branded consumer confectionery. Popular Goya products are chocolate coins and eggs The company sources cocoa beans from Ivory Coast and Indonesia. Delfi/Petra has a long-term target to source 50% of its cocoa requirements directly from the producers (from about 10% currently). In addition, to ensure long-term uninterrupted supply of quality cocoa, Petra Foods is stepping up efforts to help develop a sustainable cocoa industry.
Source: *The Sweet World of Chocolates in the Philippines, Agriculture and Agrifood in Canada*	

There are also a few artisan chocolate manufacturers in the country such as Theo and Pilo, Malagos Chocolate which is based in Davao City, Rosarios Chocolate, Nutrarich, Kablon Farms in SOCCSKSARGEN, Xocolate, Sikwate, Cacao and Beyond, Wits Swits, Cacao de Davao, ect. These companies source a greater percentage of their cocoa beans from Mindanao. On the average, they consume 1 ton of cocoa beans per month. Many of those engaged in the manufacture of artisan chocolates have their own cacao farms.

The large chocolate manufacturers use imported cocoa powder primarily from Malaysia. Quality constraints and reliability of supply prevent some of the big domestic manufacturers and processors from sourcing from the Philippines. These concerns include coarse grinding because of low quality grinding equipment, inconsistent supply, inadequate drying, lack of fermentation or low quality

[14] PRDP Cacao VCA

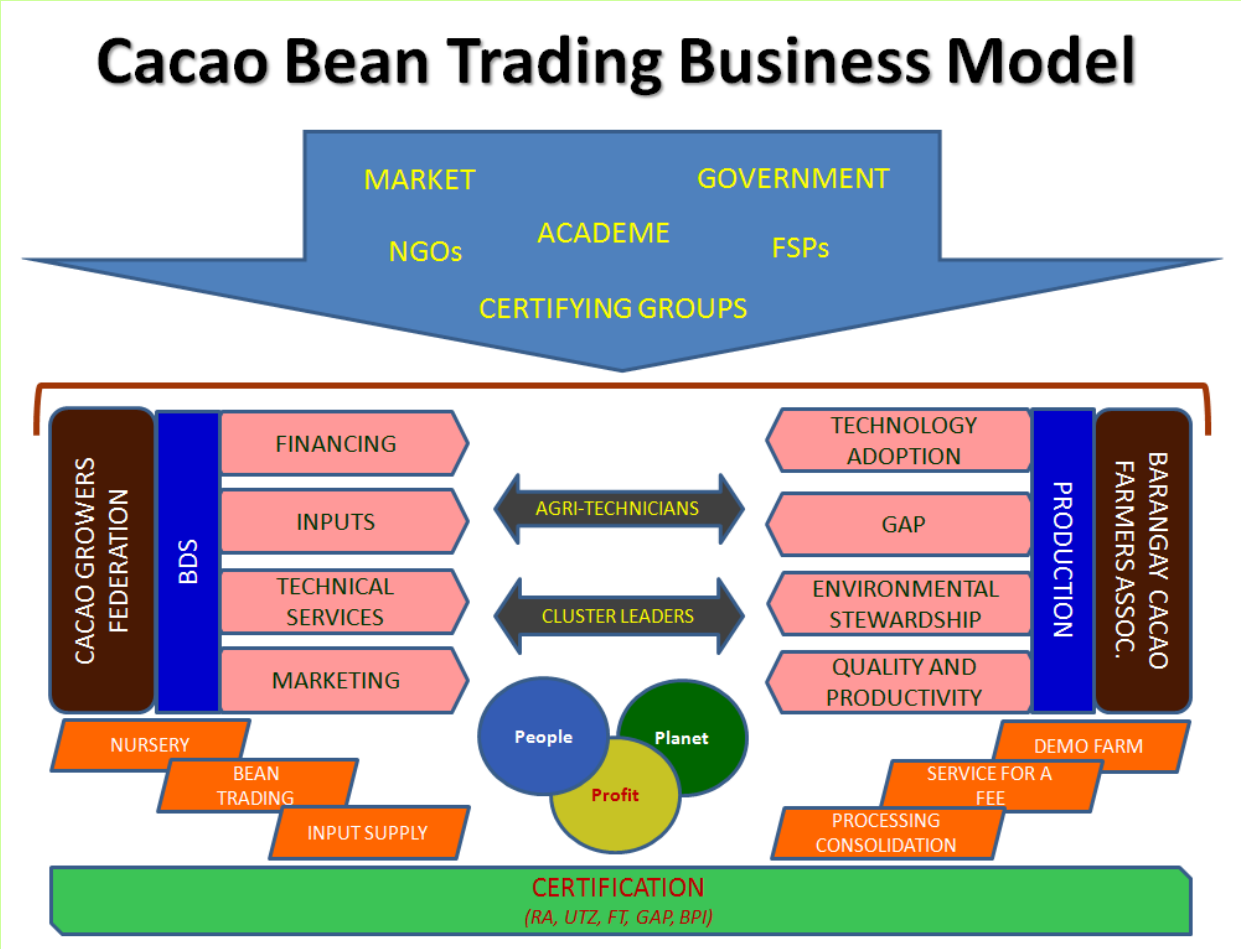
fermentation and overly bitter beans.[15]

The top five chocolate and confectionery companies in the world are Mars Incorporated, Mondelez International (Kraft), Nestlé, Meiji Holdings, and Ferrero Group. These companies control more than half of the European market for consumer chocolate. Mars Chocolate, which has the largest share in the world market, requires about 300,000 MT of cocoa beans annually.

Top Ten Global Chocolate and Confectionery Manufacturers, 2013		
Rank	**Company**	**Net Sales 2017 (US$ billions)**
1	Mars Wrigley Confectionery (USA)	18
2	Ferrero Group (Luxembourg / Italy)	12
3	Mondelez International (USA)	11.6
4	Meiji Co Ltd (Japan)	9.7
5	Nestle SA (Switzerland)	8.8
6	Hershey Co. (USA)	7.5
7	Lindt & Sprüngli AG (Switzerland)	4.1
8	Ezaki Glico Co Ltd (Japan)	3.2
9	Arcor (Argentina)	3.1
10	Pladis (UK)	2.8
Source : ICCO (www.icco.org)		

[15]ACDIVOCA Cocoa VCA Report

BUSINESS MODELS



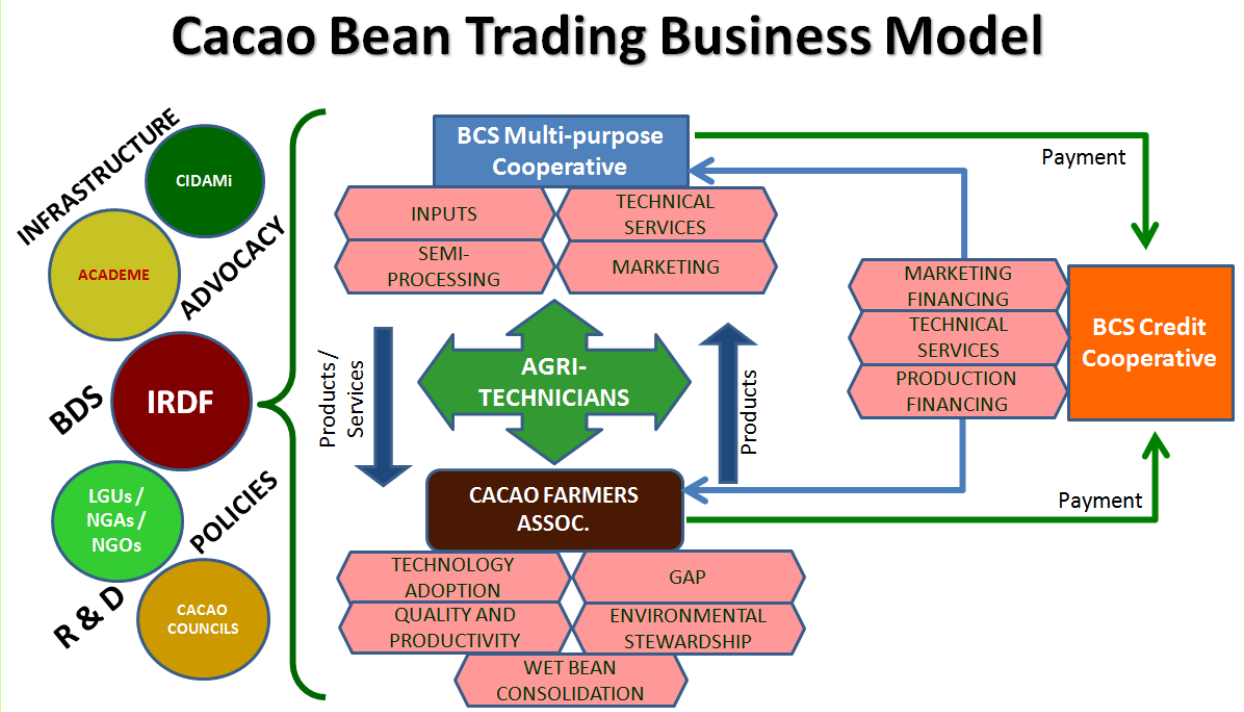
Cacao Trading Business Model – 1

There are two (2) cacao trading business model that the project can potentially choose from depending on the set-up and existing dynamics and industry structure in the project areas. These business models can easily be replicated once the project expands to other areas and/or expand the breath of operation if any these succeed in the pilot implementation area.

Model 1 is a collaborative business of a cacao farmer federation, an enterprise that can potentially be set-up in areas where there are available cacao growers federation as well as farmers association at the barangay level. This however needs further discussion and business planning with industry players as the federation may have existing members who are already engaged in cacao trading business and this model may compete with the business on its members.

To avoid this, the project can explore with a potential taker such as farmer cooperative that can take the lead and/or farmer association. It is important that needed resources such as land and structures such as post harvest facilities should be in place, or the project can bring in other potential providers such as the government to invest in these facilities.

For business model 2, the project can work with existing player which is already in the area. Critical partner that the project can potentially bring in is the BCS Multi-purpose cooperative (BCS MPC). BCS MPC is a farmer cooperative based in Bansalan, Davao del Sur engaged in plant material production such as cacao and coconut and buying and trading of wet and dry cacao beans. BCS MPC also engaged in training and promotion of coconut-based farm diversification using cacao as an intercrop. It also sells inputs to its cacao farmer members and non-members. BCS MPC has trained several farmers in Makilala, North Cotabato.



Cacao Trading Business Model – 2

In the event where production financing in needed, BCS Credit Cooperative can come in to fill this gap. BCS Credit cooperative have several branches in Southern Mindanao and North Cotabato. BCS Credit Cooperative has pioneered in the provision of financial package on cacao production and rehabilitation. It currently works with BCS MPC for the latter to provide the technical services to its farmer borrowers.

The project can meet with BCS MPC and BCS Credit altogether or separately to discuss potential collaboration and business opportunities.

Whichever among the proposed model the project may choose, it is highly recommended that business planning and series of consultation should be conducted to minimize potential risk. Further, the project team can tweak and/or revise these proposed models as necessary.

PROFITABILITY ANALYSIS

Complete data related to profitability analysis is available on a separate excel files provided to IRDF.

COCONUT & CACAO Farming System PROFIT & LOSS

Estimate for a 1 hectare farm with 100 coconut trees intercropped w/ 600 cacao trees

ASSUMPTIONS / CONVERTIONS:

	Coconut	Cacao
Planting distance	*10 x 10 meters*	
Age of trees	*32 years*	*newly planted*
Variety	*Tagnanan Tall*	*UF 18*
Harvest	*once every quarter*	*starting at 18 months*
Yield	*1 bunch per month or 3 bunches per quarter/harvest*	*1 kg wet beans = 7 pods*
	8 nuts per bunch per harvest	*year 1 no yield*
	9,600 nuts per year	*year 2 429kg*
	1 nut = 1 kilo	*year 3 2,486kg*
		year 4 4,543kg
		year 5 5,914kg
Price	*Php6.50/kg of whole nuts*	*Php30.00/kg of Wet Beans*
Estimated Cost / Kilo	*PHP 1.96*	*PHP 7.46*
Gross Profit Rate	*69.92%*	*75.12%*
Payback Period of Investment		*3.86 Years*

Coco shell product = 793.13 Kilos per quarter (15x12x141/8)

		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
I Farm Establishment		**65,842.00**				**2,000.00**	**67,842.00**
i. Planting Materials		**13,200.00**					**13,200.00**
ii. Land Preparation		**12,900.00**					**12,900.00**
iii. Fertilizer (Basal)		**10,860.00**					**10,860.00**
iv. Farm Tools & Equipment		**4,500.00**				**2,000.00**	**6,500.00**
II ANNUAL PRODUCTION COSTS		**36,592.50**	**50,977.50**	**54,418.50**	**60,919.50**	**62,908.50**	**265,816.50**
i. Fertilizer		***6,472.50***	***18,562.50***	***19,672.50***	***19,672.50***	***19,672.50***	***84,052.50***
ii. Pest Control		***-***	***315.00***	***1,530.00***	***2,655.00***	***3,150.00***	***7,650.00***
iii. Weed Control		***720.00***	***360.00***	***180.00***	***180.00***	***180.00***	***1,620.00***
iv. Harvesting Materials		***-***	***120.00***	***696.00***	***1,272.00***	***1,656.00***	**3,744.00**
v. Labor: Farm Maintenance		**13,200.00**	***14,820.00***	***12,840.00***	***15,540.00***	***16,800.00***	**73,200.00**
vii. HARVESTING	**Labor: Harvesting & Pod Breaking**	**-**	**600.00**	**3,300.00**	**5,400.00**	**5,250.00**	**14,550.00**
viii PROCESSING	**Dehusking**	**5,400.00**	**5,400.00**	**5,400.00**	**5,400.00**	**5,400.00**	**27,000.00**
ix. MARKETING	**Hauling of Nuts**	**10,800.00**	**10,800.00**	**10,800.00**	**10,800.00**	**10,800.00**	**54,000.00**
x. FARM OVERHEAD		**-**	**-**	**-**	**-**	**-**	**-**
III YIELD AND SALES		**62,400.00**	**75,257.14**	**136,971.43**	**198,685.71**	**239,828.57**	**713,142.86**
i. Wet Beans		-	428.57	2486	4543	5914	13,371.43
ii. Buying Price/ Kilogram			30.00	30.00	30.00	30.00	30.00
iii. Gross Value of Wet Beans		-	12,857	74,571	136,286	177,429	401,142.86
iv. Whole nuts (kg)		9,600	9,600	9,600	9,600	9,600	48,000.00
v. Buying Price Whole Nuts (kg)		6.50	6.50	6.50	6.50	6.50	
vi. Gross Value of Whole Nuts		62,400	62,400	62,400	62,400	62,400	312,000.00
IV CASH INCOME		**25,807.50**	**24,279.64**	**82,552.93**	**137,766.21**	**176,920.07**	**447,326.36**
V. RATES OF RETURN AND COSTS							
i. Cost per Kilo							
iii. Gross Profit Rate							
iv. Annual Net Cash Flow		(40,034.50)	24,279.64	82,552.93	137,766.21	174,920.07	
v. Cummulative Cash Flow		(40,034.50)	(15,754.86)	66,798.07	204,564.29	***379,484.36***	
vi. Return on Investment							
vii. Payback Period (Years)							

TABLEYA PROCESSING
PROFIT & LOSS STATEMENT
Assumptions and Conversions

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Kilograms / batch (daily)	100	120	133	153	167
Capacity per Day (kg)	70	84	93	107	117
Production Days/ month	15	18	20	23	25
Direct Labor	9	11	12	14	15
Labor / Manday	300	300	325	350	350
Recovery Rate	70%	70%	70%	70%	70%
Packaging (g)	200	200	200	200	200
Packagin Materials/200g	10	15	20	25	30
Buying Price of Sorted Beans	150	150	150	150	150
Selling Price /200g pack	80	85	90	95	100
Daily Volume (200g pack)	350	420	467	537	583

PRODUCTION (200g packs)	63,000	90,720	112,000	148,120	175,000
Inventory (I month supply)	1,050	1,512	1,867	2,469	2,917
PURCHASES - Beans	2,700,000	3,888,000	4,800,000	6,348,000	7,500,000
Packaging Materials	630,000	1,360,800	2,240,000	3,703,000	5,250,000
Direct Labor	486,000	699,840	936,000	1,333,080	1,575,000
Direct Cost/200g pack	60.57	65.57	71.21	76.86	81.86
SALES	4,620,000.00	7,068,600	9,240,000	12,898,783	16,041,667
Gross Profit/ 200g pack	19.43	19.43	18.79	18.14	18.14

PROJECTED PROFIT & LOSS

TABLEYA PROCESSING

Price	18	18	18	18	18
	Y1	***Y2***	***Y3***	***Y4***	***Y5***
SALES	4,620,000.00	7,068,600.00	9,240,000.00	12,898,783.33	16,041,666.67
Beg. Inventory	-	63,600.00	99,144.00	132,933.33	189,734.67
Direct Materials	3,330,000.00	5,248,800.00	7,040,000.00	10,051,000.00	12,750,000.00
Direct Labor	*486,000.00*	*699,840.00*	*936,000.00*	*1,333,080.00*	*1,575,000.00*
Cost of Goods Available for Sale	*3,816,000.00*	*5,948,640.00*	*7,976,000.00*	*11,384,080.00*	*14,325,000.00*
Less; Ending Inventory	63,600.00	99,144.00	132,933.33	189,734.67	238,750.00
Cost of Goods Available for Sale	3,752,400.00	5,849,496.00	7,843,066.67	11,194,345.33	14,086,250.00
GROSS PROFIT	***867,600.00***	***1,219,104.00***	***1,396,933.33***	***1,704,438.00***	***1,955,416.67***
OPERATING EXPENSES					
Salaries & Wages			96,000.00	96,000.00	96,000.00
Transportation	12,000.00	13,200.00	14,520.00	15,972.00	17,569.20
Water	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Light	18,000.00	19,800.00	21,780.00	23,958.00	26,353.80
Communication	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Depreciation	9,600.00	9,600.00	12,480.00	12,480.00	12,480.00
TOTAL OPERATING EXPENSES	51,600.00	55,800.00	159,300.00	164,382.00	169,972.20
OTHER INCOME					
Project Subsidy	-	-	-	-	
NET INCOME	***816,000.00***	***1,163,304.00***	***1,237,633.33***	***1,540,056.00***	***1,785,444.47***

Property & Equipment				
Roaster	50,000.00	5	2,000.00	
deshelling machine	25,000.00	5	1,000.00	
grinder	35,000.00	3	3,888.89	
Molder	10,000.00	3	1,111.11	
Chiller	35,000.00	5	1,400.00	
Processing Utensils	5,000.00	5	200.00	
			9,600.00	

PROFITABILITY ANALYSIS

BREAK-EVEN

	Y1	Y2	Y3	Y4	Y5
Selling Price	80.00	80.00	80.00	80.00	80.00
Direct Cost	60.57	65.57	71.21	76.86	81.86
Contribution Margin	19.43	14.43	8.79	3.14	(1.86)
Indirect Cost/OPEX	51,600.00	55,800.00	159,300.00	164,382.00	169,972.20
BREAK-EVEN UNITS	***2,656***	***3,867***	***18,132***	***52,303***	***(91,523)***

PROFITABILITY

Profit Margin Ratio	**17.66%**	**16.46%**	**13.39%**	**11.94%**	**11.13%**
Net Income	816,000.00	1,163,304.00	1,237,633.33	1,540,056.00	1,785,444.47
Net Sales	4,620,000.00	7,068,600.00	9,240,000.00	12,898,783.33	16,041,666.67
Gross Profit Rate	**18.78%**	**17.25%**	**15.12%**	**13.21%**	**12.19%**
Gross Margin	867,600.00	1,219,104.00	1,396,933.33	1,704,438.00	1,955,416.67
Sales	4,620,000.00	7,068,600.00	9,240,000.00	12,898,783.33	16,041,666.67

EFFICIENCY RATIO

Inventory Turn-over	**1.97**	**1.95**	**1.94**	**1.94**	**1.94**
Cost of Sales	3,752,400.00	5,849,496.00	7,843,066.67	11,194,345.33	14,086,250.00
Average Inventory	1,908,000.00	3,006,120.00	4,037,572.00	5,758,506.67	7,257,367.33
Days Sales of Inventory	**185.59**	**187.58**	**187.90**	**187.76**	**188.05**

SUMMARY OF CONSTRAINTS AND OPPORTUNITIES

Constraints and opportunities presented in this section are adapted from the result of PRDP Cacao Value Chain analysis as they also reflect those that were found out during the field interviews. Further, there are addition information presented herein which were found out during interviews specifically for Kidapawan, Makilala and Magsaysay areas.

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
INPUT PROVISION		
Use of good quality grafted seedlings of high yielding varieties can result to uniform and increased yield and shorter gestation period. Existing nurseries and budwood gardens interested to upgrade and scale up operations Farmer groups and LGUs interested to engage in bud wood garden and nursery operations	Lack of supply of grafted seedlings of high yielding varieties due to: - Lack of budwood garden producing good quality scions - Limited skills and capacity of existing nurseries and budwood gardens - Lack of nurseries Limited number of accredited nurseries resulting on inconsistent quality of planting materials available in the market Limited utilization of grafted seedlings due to: - inadequate knowledge among farmers on the benefits of investing in improved seeds, - lack of capacity among smallholders to pay upfront for seeds - Grafted planting materials not being readily available within proximity of farms and at the times when the farmers need them.	Kidapawan Makilala Magsaysay
Proper application and management of fertilizer and pesticides together with use of quality planting materials and good agronomic practices can potentially result to yield of 2 MT/ha. Cocoa pods and other agri-waste can be used in the production of organic fertilizer. There are also existing enterprises engaged in production of organic fertilizer but not specifically for cacao,	High cost of chemical inputs both to farmers and environment Limited availability and commercial distribution of organic fertilizer and inputs specific for cacao Low use of fertilizer among smallholders due to lack of understanding among farmers on cost benefits of proper and efficient use of fertilizer, risk aversion, and limited purchasing capacity Lack of access to soil analysis services/ Lack of technical know-how on proper fertilizer	Kidapawan Makilala Magsaysay

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
the closest are Lao Integrated Farms, Mindanao Baptist Rural Life Center (MBRLC) and Magsaysay Rice (MagRice) Producers	management and application	
FARMING		
Good agronomic practices and sustainable farming practices can reduce incidence of pests and diseases and improve resilience to climate change resulting to overall increase in productivity and better market access. Technical assistance provided by integrators to cacao farmers can complement extension services from government. Global buyers are increasingly sourcing only from suppliers certified to be sustainable. This can potential provide incentives to adopt good practices.	Limited outreach of existing extension services and providers Low uptake and adoption of good agricultural practices and sustainable production practices Lack of skilled laborers/caretakers Lack of capacity to comply with certification requirements	Kidapawan Makilala Magsaysay
FERMENTATION AND DRYING		
Growing deficit of quality fermented beans in the Asia and Oceania Region. Fermentation in bulk improves quality and efficiency	Lack of access to facilities to consistently produce high quality fermented dry beans. Limited know-how and skills on Good Manufacturing Practices (GMP) and Sustainable Production Practices	Kidapawan Makilala Magsaysay
PROCESSING		
Increasing per capita consumption of chocolate in the Philippines and Asia Implementation and adoption of standards such as GMP and HACCP can play a positive role in providing the catalyst and incentives for the modernization of the industry and in facilitating access to markets	Limited product lines Non-GMP compliant manufacturing facilities and processes	Kidapawan Makilala Magsaysay

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
MARKETING		
World market demand exceeds supply with supply deficit projected to be at 1 million MT by 2020. Domestic chocolate manufacturers import most of their cocoa requirements. Annual domestic consumption is about 30,000 to 40,000 MT. Mindanao has the land resources and climate suitable for cacao cultivation. There are also significant numbers of banana and coconut farms that can be planted with cacao (intercropping/mixed farming system). Contract growing agreements offered by integrators can facilitate access to resources needed to start cacao growing.	Current cocoa bean production is very low. Banana and coconut farmers are not aware of opportunities and viability of cacao –coconut and cacao – banana intercropping. Majority do not have the upfront resources to establish cacao farms.	Kidapawan Makilala Magsaysay
Longer term contractual arrangements such as contract growing agreements can to a significant extent insulate farmers from price fluctuations in the world market.	Dominance of spot transactions makes farmers more vulnerable to price fluctuation. Volatility of prices makes farmers wary to invest in cacao cultivation and upgrading.	Kidapawan Makilala Magsaysay
Good roads to cacao production areas (existing and potential) can contribute to reducing cost of transactions and facilitate improved access to product, support, and inputs markets.	Poor farm to market roads	Kidapawan Makilala Magsaysay
INTERFIRM RELATIONSHIPS AND SUPPLY CHAIN GOVERNANCE		
The Philippines has formulated the standards for cocoa beans which could be the basis for the development of a pricing scheme that rewards production of quality beans. .	Lack of market-based /price incentives for farmers to produce quality beans Unhealthy competition among and between traders stifles upgrading and provides disincentives to consistent production of good	Kidapawan Makilala Magsaysay

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
Improved cooperation and flow of flow of information along the different links + traceability system will allow flexibility; spur innovation, and faster response to market requirements and trends. Forward and backward coordination will minimize the risk over the trends and changes in the market and facilitate consistent production of quality beans.	quality beans. Poor flow of information on standards, prices, and market opportunities Varying interpretation, understanding, and implementation of standards Weak supply chain collaboration Poor quality assurance system and absence of traceability system	
Cooperation and collaboration among individual smallholders can position farmers better to negotiate in marketing their cocoa beans and procurement of inputs and other services Large buyers are willing to source from smallholders if they can work effectively together Farmers in the same village know each other quite well and have had experiences of working together. Such 'natural–social constituents' can be harnessed to get them to work together	Weak capacity among farmers to organize themselves into structured groups Lack of trust and cooperation between and among farmers Lack of entrepreneurial skills Lack of experiences in formal organizational setting	Kidapawan Makilala Magsaysay

BANANA
Cardava

OVERVIEW OF THE INDUSTRY

A. PRODUCT DESCRIPTION

The Philippines economy is predominantly agri-based and banana is one of the important crops cultivated in different regions of the country. Said to be native to Southeast Asia with the Philippines as within its center of origin and diversity, bananas are a staple fruit on many a Filipino's diets, finding its way to many of our dining tables (and local dishes). Philippines is one of the world's largest banana exporter with banana exports in year 2017 valued at USD $687.4 million or 5.6% of world banana export[16]. Banana is a very important crop in the Philippines such that about a hundred different varieties—both wild and cultivated—have been identified in the country.

Banana is the leading fruit grown in the Philippines and a consistent top dollar earner. The prospect of Philippine bananas in the domestic and foreign market is still promising. Fresh cavendish banana and banana chips for export are the top exports particularly in Mindanao. Other cultivars such as lakatan and latundan are also grown and sold locally as desert bananas.

Photo: Coconut farm in Brgy. Mabini, Magsaysay, Davao del Sur intercropped with Cardava banana.

Bananas are generally classified into two main categories: cooking bananas and dessert bananas. Cooking bananas are categorically known as balbisiana cultivars. There are numerous cooking banana cultivars such as the Cardava, Abutan, Inabaniko, Turangkog, Sabang puti, Mundo, Gubao, Saba sa Hapon and Bigihan. However, the most common cultivar in the Philippines with both social and economic importance is the Cardava or Saba[17].

[16] http://www.worldstopexports.com/bananas-exports-country/
[17] Cardava Banana Mindanao VCA, *Philippine Rural Development Project*

Unlike the Cavendish which is cultivated primarily by large plantations as monocrop, Cardava is grown in backyards of rural households and in small farms intercropped with coconuts. Cardava bananas can be cultivated in nearly all kinds of soil but deep and friable loam soil with good drainage and aeration offers higher production and better fruit quality. Areas with uniform warm and humid conditions with a minimum rainfall of 60 inches annually, whether through heavy and evenly spaced rainfall and a temperature between 27 and 30 degrees centigrade offers the most favorable condition for growing Cardava banana.

Photo : *Big bunches of cardava banana on display during the Kalivungan Festival Farmers' Fair 2018 at Provincial Capitol Grounds*

Cardava bunches are big with 8 to 16 hands having 12 to 20 fingers per hand. The fruits are short and stubby and highly angular. The skin is thick and yellow when ripe. The flesh is white, starchy, and fine textured, making it ideal for cooking and processing.

The Cardava can be processed into various product forms such as chips, sauce, flour, and made into snacks. To date, the most dominant users of Cardava are the banana chips industry, snack food subsector, and home consumption for the preparation of various traditional Filipino desserts and dishes.

Banana chips are thin slices of banana which are deep-fried to become crispy. Chip products may be sweetened, honey-dipped, unsweetened, cinnamon- or chocolate-flavored and salted. Chips are available in various cuts such as whole, halves, quarters, diagonals, diced and broken cuts. These are consumed as a snack or used as ingredient for breakfast cereals, muesli, mixed fruits, and chocolates. Products are mainly geared for the export market.

Photo : Cardava banana chips produced by PARBUP MPC in Kiblawan, Davao del Sur

The most popular snacks made of Cardava are the "banana cue" (whole fried bananas dipped in brown sugar and sold in bamboo skewers) and "turon" (fried banana spring rolls). Another popular Cardava-based snack is the "maruya" or banana fritters. These are usually consumed as mid-afternoon snacks. The snack foods are sold via street vendors, school canteens, and restaurants. During the recent years, a Davao-based manufacturer has started exporting frozen turon and boiled banana to countries with significant Filipino and Asian population. A banana chips company in Davao has also expanded into individually quick frozen (IQF) snack products.

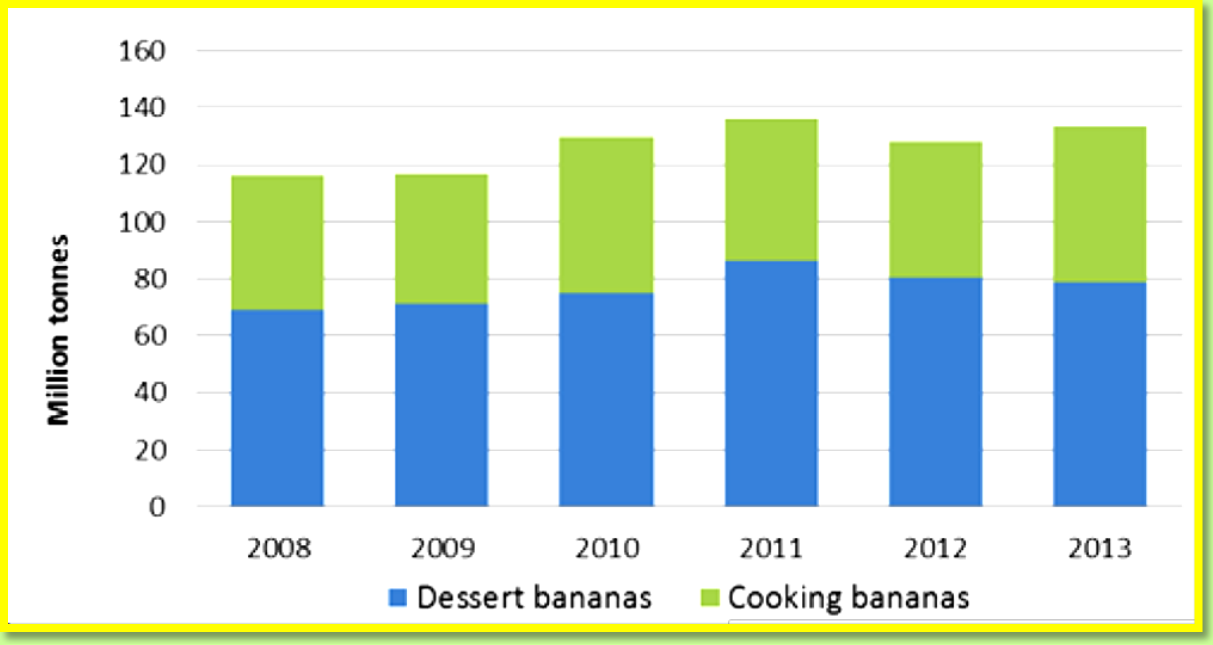
The banana chips industry requires the processed grade Cardava while those intended for home consumption would generally be medium to jumbo sizes. Small ripe bananas go to the snack food market. In a way, the varying requirements of these three dominant users provide markets for different qualities and sizes of banana.

B. PRODUCTION TRENDS

a) Global Production

Bananas (*Musa spp*.), including dessert banana, plantain, and cooking banana, are the eighth most important food crop in the world, and the fourth most important in the least developed countries (FAOSTAT, 2013). Bananas are produced in 135 countries and territories across the tropics and subtropics. The vast majority of producers are smallholder farmers who grow the crop for either home consumption or for local markets (less than 15% of the global production of more than 100 million MT is exported). The international banana export trade (17 million MT approximately) is worth some US$ 7 billion per year.

World Banana Production, in million tones, 2018-2013



Source : UNCTAD

As UNCTAD data on world banana production above shows, in 2013 production amounted to nearly 134 million tonnes. Approximately 40 per cent (i.e. nearly 55 million tonnes) were cooking banana varieties (plantain and other types), and 60 per cent (approximately 79 million tonnes) dessert banana varieties (Cavendish, Gros Michel and others)16. Banana is a staple part of the diet of various populations across the world. Banana production has grown rapidly, registering a performance of +15 per cent since 2008.[18]

Banana cultivation is nowadays present across the globe, in tropical and subtropical regions. The main production zones are located in Asia, representing 44 per cent of world volumes, followed by Africa (25 per cent) and Central and South America (22 per cent).

[18] Banana, An INFOCOMM Commodity Profile, UNCTAD

Estimated banana production (dessert and cooking), tonnes, 2013

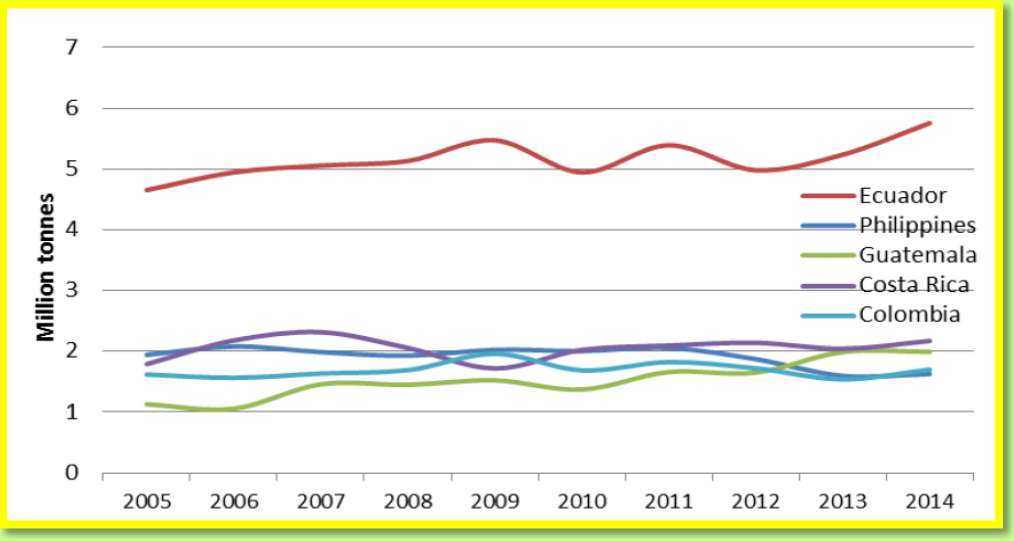
	Total production	Dessert bananas	Cooking bananas
World total	133 691 965	78 860 773	54 831 192
India	27 575 000	17 075 000	10 500 000
China	12 075 238	11 506 238	569 000
Uganda	8 926 308	500 000	8 426 308
Philippines	8 645 749	5 790 091	2 855 658
Brazil	6 892 622	6 402 622	490 000
Ecuador	6 739 739	6 145 527	594 212
Colombia	5 405 365	2 587 625	2 817 740
Indonesia	5 359 115	3 289 115	2 070 000
Rwanda	3 263 462	250 000	3 013 462
Nigeria	3 222 000	315 000	2 907 000

Source : UNCTAD

Banana is the number one fruit traded in the world in terms of quantities, ahead of the apple or citruses groups. However, self-consumption by local populations remains the main outlet for banana production: this figure is estimated at 85 per cent of dessert and cooking banana volumes produced in the world. Hence exports represent only 15 per cent of world production. In 2014, more than 17 million tonnes of dessert bananas were exported, mainly in the Cavendish variety, as opposed to only 900 000 tonnes of cooking bananas. Considering the supremacy of dessert bananas in world trade this document will deal only with the export dessert banana.

The dynamic world trade remains as positive as production, registering steady growth. Exports have risen by more than 3 million tonnes over the past 10 years. Ecuador dominates the world dessert banana trade with exports exceeding 5.7 million tonnes in 2014.

Export by Major Banana Exporters, million tonnes, 2005 - 2014



Source : UNCTAD INFOCOMM

Ecuador dominates the world dessert banana trade, with exports exceeding 5.7 million tonnes in 2014. This is followed by the Philippines, Guatemala, Costa Rice and Columbia.

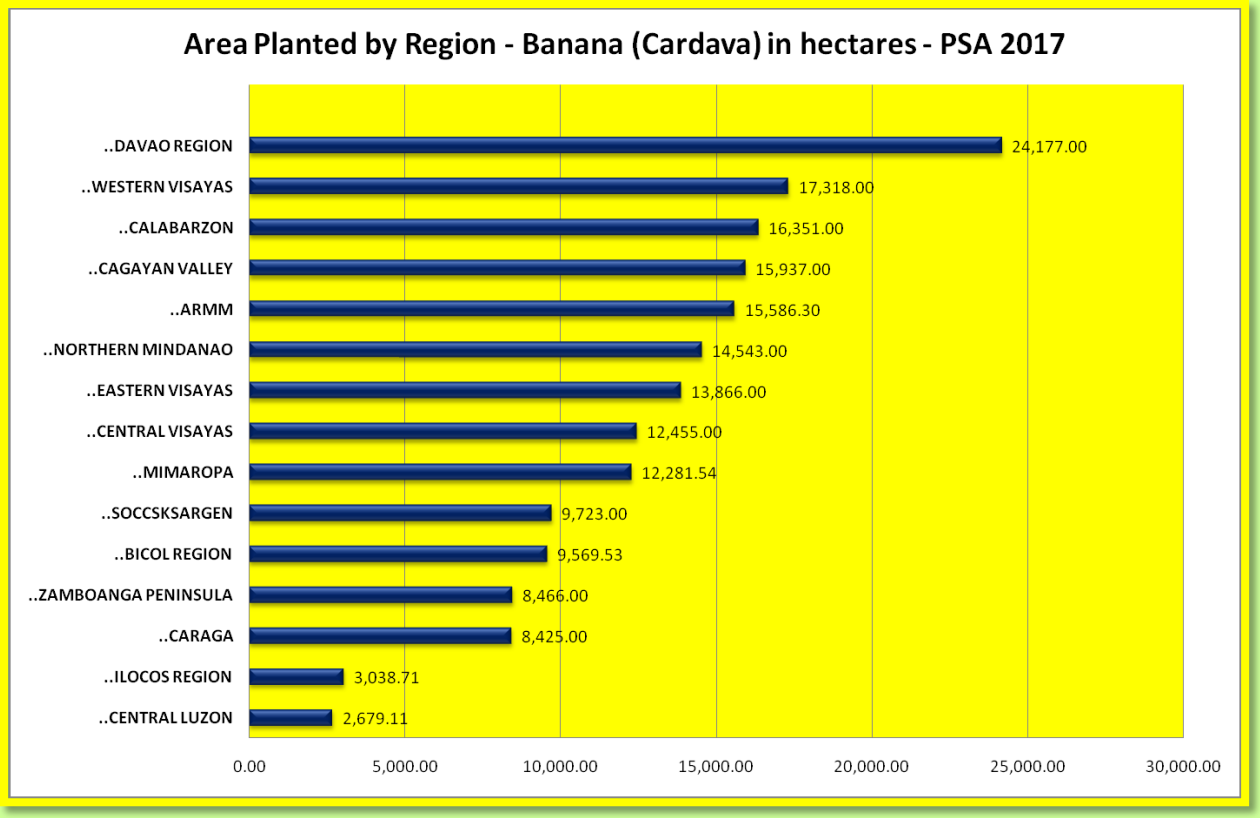
World production of Banana, 2009 and 2012					
Country	**Volume (MT) 2009**	**% Share**	**Country**	**Volume (MT) 2012**	**% Share**
World	100,223,702	100%	World	101,992,743	100%
India	26,469,500	26.41%	India	24,869,490	24.38%
Philippines	9,013,186	8.99%	China	10,845,265	10.63%
China	9,006,454	8.99%	Philippines	9,225,998	9.05%
Ecuador	7,637,324	7.62%	Ecuador	7,012,244	6.88%
Brazil	6,783,482	6.77%	Brazil	6,902,184	6.77%
Indonesia	6,373,533	6.36%	Indonesia	6,189,052	6.07%
Tanzania	3,006,400	3.00%	Angola	2,991,454	2.93%
Guatemala	2,544,240	2.54%	Guatemala	2,700,000	2.65%
Mexico	2,232,361	2.23%	Tanzania	2,524,740	2.48%
Colombia	1,993,759	1.99%	Mexico	2,203,861	2.16%
Others	25,163,463	25.11%	Others	26,528,455	26.01%
Source: FAOSTAT (updated)					

World banana production increased from 100,223,702 MT in 2009 to 101,992,743 MT in 2012.With the significant increase in China's production, Philippines dropped from being the 2nd largest producer in 2009 to 3rd place in 2012. India remains the top producer of banana in the world. Philippines accounted for about 9.05% of the global banana production in 2012. Philippine production increased from 9,013,186 MT in 2009 to 9,225,998 MT in 2012.

The Philippines is the only producer of Cardava banana. Other countries such as Thailand, Indonesia, Ecuador, and African nations have their own local cooking banana varieties. Based on the 2010 statistics, cooking bananas which included plantains (under CIRAD categorization) comprised 41% of total world banana production. The Philippine Cardava or Saba variety accounted for about 6% of the estimated 47,208,190 MT cooking banana world production in 2010.

b) Domestic Production

Based on BAS data, the country produced 2,520,010.28MT of cardava in 2017 in 185,278.84 hectares of land. Around 43.67 % or 80,920.30 hectares of this is in Mindanao. At the regional level, in the entire Philippines, Davao Region is the number one (1) Cardava banana producing region. It is followed by, Western Visayas, Calabarzon, Cagayan Valley and ARMM as the top 5. SOCCSKSARGEN ranked number 10 with a total land area planted with cardava banana of 9,723 hectares.



Source : Based on PSA 2017 Data

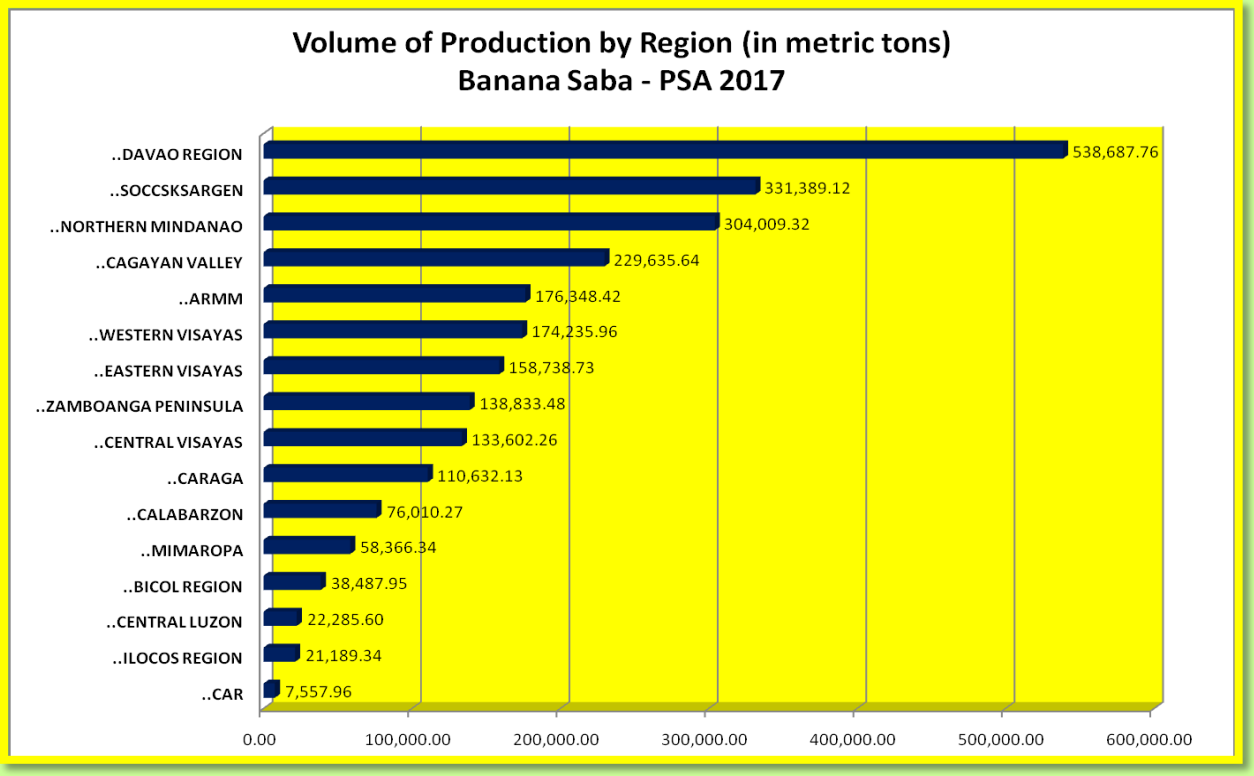
Davao Region 13.05% to the Philippines' total land area planted with cardava and 29.88% to Mindanao. Within Davao Region, the province of Davao del Sur ranked as the number 1 cardava producing province in terms of land area witn 6,691 hectares. It contributes 3.61% to the national cardava production area and 8.27% to Mindanao. It is followed by Compostela Valley, Davao Oriental, Davao del Norte and Davao City. The 2017 PSA data did not yet separate the province of Davao Occidental.

Caradava Banana Production Area (Mindanao) – PSA 2017

REGION/PROVINCE	PRODUCTION AREA (has)	% Contribution to Mindanao	% Contribution to Philippines
..ZAMBOANGA PENINSULA	8,466.00	10.46%	4.57%
..NORTHERN MINDANAO	14,543.00	17.97%	7.85%
..DAVAO REGION	24,177.00	29.88%	13.05%
....Davao del Norte	4,784.00	5.91%	2.58%
....Davao del Sur	6,691.00	8.27%	3.61%
....Davao Oriental	5,167.00	6.39%	2.79%
....Compostela Valley	5,970.00	7.38%	3.22%
......Davao City	1,565.00	1.93%	0.84%
..SOCCSKSARGEN	9,723.00	12.02%	5.25%
....North Cotabato	6,325.00	7.82%	3.41%
....Sarangani	960	1.19%	0.52%
....South Cotabato	980	1.21%	0.53%
....Sultan Kudarat	1,458.00	1.80%	0.79%
..CARAGA	8,425.00	10.41%	4.55%
..ARMM	15,586.30	19.26%	8.41%

REGION/PROVINCE	PRODUCTION AREA (has)	% Contribution to Mindanao	% Contribution to Philippines
TOTAL MINDANAO	80,920.30	100.00%	43.67%
TOTAL PHILIPPINES	185,278.84		100.00%

SOCCSKSARGEN region contributes 5.25% to Philippines' cardava banana production area and 12.02% to Mindanao. SOCCSKSARGEN's number one cardava producing province in terms of area planted is North Cotabato with 6,325 hectares. North Cotabato contributes 3.41% to national cardava production area 7.82% to Mindanao.



Source: Based on PSA 2017 Data

In terms of production volume, Davao Region ranked number one (1) all over the country producing a total of 538,687.76 metric tons in 2017 based on PSA data. Surprisingly, SOCCSKSARGEN which ranked number 10 in terms of area planted ranked number 2 all over the country in terms of production volume. This shows that yield per tree/hectare in SOCCSKSARGEN in higher than the rest of the other regions.

The provinces of Davao del Sur and North Cotabato which are both IRDF's project area are the top provinces where huge volumes of cardava bananas are produced. Davao del Sur with a total volume of 289,596.34 metric tons contributed 11.49% to the country's overall cardava banana production and 18.10 to Mindanao. North Cotabato on the other hand produced a total of 231, 908.35 metric tons in 2017 and contributed 9.20 to country's overall cardava banana production and 14.50% to Mindanao. Production volume figures from the rest of the provinces in Davao Region and SOCCSKSARGEN in shown in the next table.

Caradava Banana Production Volume (Mindanao) – PSA 2017

REGION / PROVINCE	Production Volume (in metric tons)	% Contribution to Mindanao	% Contribution to Philippines
..ZAMBOANGA PENINSULA	138,833.48	8.68%	5.51%
..NORTHERN MINDANAO	304,009.32	19.00%	12.06%
..DAVAO REGION	538,687.76	33.67%	21.38%
....Davao del Norte	48,847.26	3.05%	1.94%
....Davao del Sur	289,596.34	18.10%	11.49%
....Davao Oriental	78,097.12	4.88%	3.10%
....Compostela Valley	99,969.66	6.25%	3.97%
......Davao City	22,177.38	1.39%	0.88%
..SOCCSKSARGEN	331,389.12	20.71%	13.15%
....North Cotabato	231,908.35	14.50%	9.20%
....Sarangani	39,525.00	2.47%	1.57%
....South Cotabato	29,102.09	1.82%	1.15%
....Sultan Kudarat	30,853.68	1.93%	1.22%
..CARAGA	110,632.13	6.91%	4.39%
..ARMM	176,348.42	11.02%	7.00%
TOTAL MINDANAO	1,599,900.23	100.00%	63.49%
TOTAL PHILIPPINES	2,520,010.28		100.00%

For Kidapawan City, data collected from the City Agriculture Office (CAO) showed that as of December 2017, the city 84.26 hectares of land planted with Cardava Banana. Total volume produced for the same year reached 1,561.68 metric tons. There are 1,747 farmers in Kidapawan City engaged in growing cardava bananas.

Kidapawan City Banana Production; CY 2017

Agricultural Products	Area Planted (ha)	Area Harvested (ha)	Production (mt)
Cardava Banana	84.26	84.26	1,516.68

Source: City Agriculturist Office

Shown in table below are the Barangays engaged in banana production. This table however accounts for all the bananas regardless of the cultivars.

Barangays with Banana Production, Kidapawan City CY 2015

BARANGAY	BANANA	BARANGAY	BANANA
Amas		Poblacion	√
Amazion	√	San Isidro	√
Balabag	√	San Roque	√
Balindog	√	Sibawan	√
Binoligan	√	Sikitan	√
Birada	√	Singao	√
Gayola	√	Sto. Niño	√
Ginatilan	√	Sudapin	√
Ilomavis	√	Sumbac	√

BARANGAY	BANANA	BARANGAY	BANANA
Indangan	√	Manongol	√
Junction	√	Marbel	√
Kalaisan	√	Mateo	√
Kalasuyan	√	Meohao	√
Katipunan	√	Mua-an	√
Lanao	√	New Bohol	√
Linangkob	√	Nuangan	√
Luvimin	√	Onica	
Macebolig	√	Paco	√
Magsaysay	√	Patadon	
Malinan	√	Perez	√

Source: City Agriculturist Office

For the Municipality of Makilala, agriculture data available treated banana industry as one. There is no segregation in terms of banana cultivars. Data gathered based on municipality's socio-economic profile showed that as of 2010, the municipality of Makilala has a total of 1,725.03 hectares planted with banana with a total production of the same year reaching 14,96 metric tons valued at Php 129,184,440.00. Banana production data per barangay of Makilala is shown in the table below.

Banana Producing Barangays in Makilala, 2010

Barangay	Area in Hectares	Production Volume	Value (Php)	Product Market	
				Local	Export
1. Batasan	66.52	191,250	2,295,000.00	X	X
2. Bato	18.04	3,500	105,000.00	X	X
3. Biangan	15.95	232,500	2,790,000.00	X	X
4. Buenavida	148.66	439,500	5,274,000.00	X	X
5. Buhay	146.96	660,000	7,920,000	X	X
6. Bulacanon	5.32	82,500	990,000.00	X	X
7. Cabilao	6.67	322,500	3,870,000.00	X	X
8. Concepcion	6.11	1,050,000	12,600,000.00	X	X
9. Dagupan	7.73	142,500	1,710,000.00	X	X
10. Garsika	213.26	217,500	2,610,000.00	X	X
11. Guangan	11.27	202,500	2,430,000.00	X	X
12. Indangan	165.87	967,500	11,610,000.00	X	X
13. Jose Rizal	13.84	199,500	2,394,000.00	X	X
14. Katipunan II	6.82	210,000	2,520,000.00	X	X
15. Kawayanon	1.4	67,500	810,000.00	X	X
16. Kisante	159.33	870,000	10,440.00	X	X
17. Leboce	4.44	41,250	495,000.00	X	X
18. Libertad	3.95	274,500	3,294,000.00	X	X
19. Luayon	5.06	157,500	1,890,000	X	X
20. Luna Norte	131.14	84,000	1,008,000	X	X
21. Luna Sur	5.27	27,000	324,000.00	X	X

Barangay	Area in Hectares	Production Volume	Value (Php)	Product Market	
				Local	Export
22. Malabuan	135.5	22,500	270,000.00	X	X
23. Malasila	22.45	990,000	11,880,000	X	X
24. Malungon	16.47	450,000	5,400,000.00	X	X
25. New Baguio	4.05	126,750	1,521,000.00	X	X
26. New Bulatukan	10.56	120,000	1,440,000.00	X	X
27. New Cebu	8.16	345,000	4,140,000	X	X
28. New Israel	14.23	3,705,000	4,500,000.00	X	X
29. Old Bulatukan	9.5	420,000	5,040,000	X	X
30. Poblacion	3.57	375,000	4,500,000	X	
31. Rodero	10.5	199,500	2,394,000	X	X
32. Saguing	214.1	1,200,000	14,400,000	X	X
33. San Vicente	76.34	157,500	1,890,000	X	
34. Sinkatulan	17.76	52,500	630,000	X	X
35. Sta. Felomina	4.52	97,500	1,170,000	X	X
36. Sto. Niño	4.43	127,500	1,530,000	X	X
37. Taluntalunan	3.07	67,500	810,000	X	X
38. Villaflores	26.21	60,000	720,000	X	X
Total	**1,725.03**	**14,959,250.00**	**129,184,440.00**		

The Municipality of Magsaysay in Davao del Sur has far more comprehensive and updated data. Through its Municipal Agriculture Office, data collected on banana in detailed per cultivar. This can be attributed to the local government's priority on cardava production as it is the selected commodity support by the municipal and provincial LGU through the Philippine Rural Development Project (PRDP).

As the figures in the next table show, the municipality of Magsaysay has a total of 1,554.05 hectares of land planted with cardava banana as of year 2016. In the same year, the annual cardava banana production of the Municipality reached 5,833.34 metric tons with an average yield of 5.35 metric tons per hectare. A total of 3,660 farmers in the municipality are engaged in cardava banana production.

Municipality of Magsaysay, Cardava Banana Production, 2016

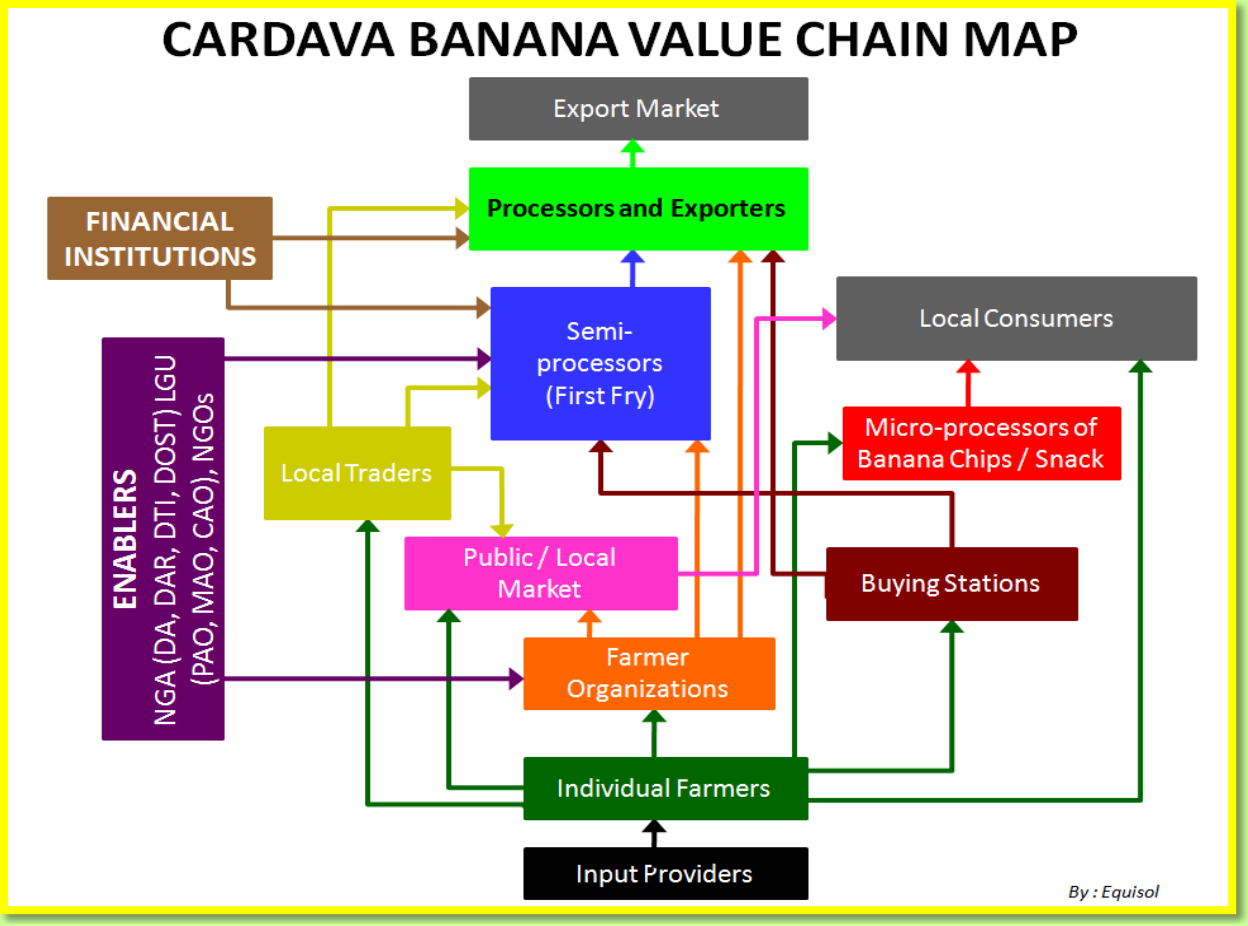
Barangay	Cardava					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
1. Bacungan	308.00	202.22	202.22	32.05	128.20	4.00
2. Balnate	186.00	24.25	24.25	19.75	118.50	6.00
3. Barayong	106.00	36.00	36.00	36.00	216.00	6.00
4. Blocon	9.00	18.63	18.63	18.63	74.52	4.00
5. Dalawinon	259.00	36.91	36.91	36.91	147.63	4.00
6. Dalumay	78.00	56.31	56.31	56.31	225.25	4.00
7. Glamang	53.00	41.00	41.00	25.00	150.00	6.00
8. Kanapolo	24.00	10.69	10.69	10.69	53.45	5.00
9. Kasuga	197.00	10.73	10.73	10.73	85.84	8.00

Barangay	Cardava					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
10. Lower Bala	164.00	34.93	34.93	34.93	279.44	8.00
11. Mabini	164.00	138.50	138.50	138.50	831.00	6.00
12. Maibo	547.00	287.13	287.13	60.48	302.41	5.00
13.Malawanit	134.00	116.88	116.88	116.88	701.28	6.00
14. Malongon	81.00	53.92	53.92	53.92	431.36	8.00
15. New Ilocos	8.00	4.25	4.25	4.25	12.75	3.00
16. New Opon	57.00	19.55	19.55	19.55	97.75	5.00
17.Poblacion	32.00	11.25	11.25	11.25	56.25	5.00
18. San Isidro	175.00	66.54	66.54	66.54	399.26	6.00
19. San Miguel	219.00	90.17	90.17	75.09	300.37	4.00
20. Tacul	97.00	121.46	121.46	121.46	485.84	4.00
21. Tagaytay	317.00	87.78	87.78	56.64	226.55	4.00
22. Upper Bala	445.00	84.95	84.95	84.95	509.69	6.00
TOTAL	3,660.00	1,554.05	1,554.05	1,090.51	5,833.34	5.35

Source : Municipal Agriculture Office of Magsaysay

NATURE AND STRUCTURE OF THE INDUSTRY

A. VALUE CHAIN MAPPING



Cardava banana from Mindanao can reach as far as Cebu and Metro Manila via local traders. Northern Mindanao is the dominant player in this chain along with Davao Region. The region ships out most of its banana to Manila and Cebu primarily via Cagayan de Oro and Ozamis. Bananas are collected weekly from farmers at their farms or these are brought at the nearest buying stations. Assemblers usually work with buying stations and agents and pick up the bananas collected weekly or twice a week. The assemblers sell the bananas to consignees based in key urban areas. The consignees sell the bananas to wholesalers who, in turn, distribute these in wet markets and supermarkets. In the wet markets, the greater percentage goes to the banana cue/turon/ and other Cardava-based snack food vendors. [19]

Farmers with limited volume bring their bananas to wholesalers in the wet market. Bananas are sold both by kilo and by "bugkus"or bundled (100 pcs. or equivalent to 13-14 kilos). In some cases, farmers sell their produce directly to households within their proximity through door-to-door marketing or via makeshift stalls and sari-sari stores.

There are also traders/shippers who sell in the local market. Bananas that are almost ripe and small are usually sold in wet markets within the region.

[19] PRDP Cardava Banana VCA

Banana processing is dominated by the banana chips industry. A greater percentage of the banana chips produced by Mindanao is intended for the export market. During the recent years, Mindanao banana chip exporters have diversified into the production of individually quick frozen (IQF) Cardava snack foods.

a. Processed Banana for Export

This chain is dominated by Davao Region. Bananas are collected weekly from farmers at designated pick-up points either by traders or directly by the banana chips exporters. An exporter would usually have an agent or local consolidator to scout and procure bananas in a particular barangay or municipality. Agents are usually paid on a commission basis.

Some exporters have set-up satellite processing plants in areas with significant Cardava banana production. Others tried to set-up or work with first fry processing plants to reduce transportation costs. Many of those who tried though felt that it was difficult to sustain for various reasons: a) inconsistent quality; b) high cost of production due to lack of economies of scale and pole vaulting of suppliers; and c) threat of recipes being passed on to competitors. As such, the general preferences among exporters are to set-up and operate their own plants in area/s with significant volume of Cardava.

In North Cotabato, two are three first-fry banana chips processors, these are:

- **Liberty Fruits** – a subsidiary of Four Seasons Fruits based in Tagum City. Liberty fruits operates with a capacity of 40 tons per day
- **Magpet Agro-Industrial Resource Multi-purpose Cooperative** (MAGIRCO) is located in Magpet, North Cotabato. The plant has an operating capacity of 25 metric tons per day

Photo : *Taken during the interview with Liberty Fruit's Plant Manager and Quality Assurance Personnel a their first-fry banana chips processing plant in Kidapawan City. Liberty Fruits plans to expand its operation and open a new processing plant in South Cotabato.*

b. Banana Chips for Local Market

Processors selling to the local market get their supply directly from farmers or their own farms local

agents, and from the wet market. Volume required by individual processors is relatively low. The banana chips are mainly sold in pasalubong outlets.

Turon, banana cue, maruya and other Cardava snacks are sold both in formal and informal food establishments with the street food vendors/stalls having the bigger market. In Davao Region, vendors buy their supply of fresh banana from processors, wet market, and from buying stations/intermediaries. Non-process grade are either undersize, or oversize and over 90 days maturity.

B. KEY PLAYERS AND FUNCTIONS

1. Input Provision

Key inputs in Cardava farming are the planting materials, fertilizer, and pesticides. For planting materials, majority of the farmers use suckers and corm bits which are sourced either from own farms or from neighboring farms. In effect, production of planting material is largely a function of crop production and agronomic practices used in the farm affect the quality of planting materials. The common practice of using suckers and corms has contributed to the spread of pests and disease. Although farmers indicated that they usually treat the suckers to ensure that these are pest free, fungal, bacterial and viral pathogens are not eradicated. Farmers generally do not recognize infested or diseased planting material nor do they fully understand the life-cycles and transfer mechanisms of pests and diseases, especially given the continual evolution of new races and pathogens. Based on interviews, the prevalent use of suckers vis-à-vis tissue cultured plantlets are due to the following reasons:[20]

- Tissue culture plantlets are not readily available.
- Conventional planting materials entail minimal cost or no cost at all except own labor. Tissue cultured plantlets are considered by farmers to be very expensive.
- Conventional planting materials require less input and can be planted immediately in the field, unlike the more fragile tissue-culture plantlets, which need to be hardened before planting. Tissue-culture plantlets also require appropriate management practices right after being transplanted to the field
- The longevity of fields planted with tissue-culture plantlets tends to be shorter than the one for fields established with conventional planting materials.
- Farmers are not aware of tissue cultured plantlets and its benefits

The Davao Region has the most number of suppliers of tissue culture plantlets. One of the biggest suppliers of tissue culture plantlets is Bio Trends (of Lapanday Corporation). In SOCCSKSARGEN, only Plantarium Biotech is known to produce tissue cultured planting materials for Cardava but company is primarily focused on the dessert banana varieties.

In recent years, an increasing number of farmers are planting the Giant Cardava. The Giant Cardava was first grown/discovered in the municipalities of Santa Maria and Malita in Davao del Sur. Sagrex Foods, Inc. was among the first to use the variety in the production of banana chips and frozen turon. It is being propagated by the company through its nominated tissue culture laboratory. However, this giant cardava banana variety is not accepted by banana chips processors as only the native cardava banana variety meets their quality requirement.

[20] PRDP Cardava Banana VCA

Farmer usage of farm inputs such as fertilizer, insecticides and pesticides is currently very low. Key reasons for not using fertilizer are the following: (1) they have no money for buying fertilizer, (2) fertilization is not necessary since they are still able to harvest every week or twice a week and cardava has always been grown without too much care and fertilizer , and (4) fertilization is not practical because their production is only small scale.

In the production of banana chips, key inputs are coconut oil and sugar. Large processors usually source the coconut oil directly from the mill and many are buying copra and have it toll-processed in Davao City oil mills. Microprocessors buy oil from supermarkets. Oftentimes, the price of coconut oil influences the procurement price of Cardava banana. When oil price is high, large processors tend to lower their buying price of banana to keep their prices competitive.

2. **Farming**

Cardava banana farms in Kidapawan, Makilala and Magsaysay are generally small scale. Cardava banana are mostly intercropped with coconut and are grown with other fruit trees including cacao. Size of farms ranges from 0.25 to 2 hectares. Farmers generally use suckers or corms from their own farms. Very minimal input goes into this system of production. In cases where farmers use inputs, they apply compost and manure. Family members share responsibilities in planting, crop maintenance, and harvesting. Some farmers visit their bananas only when it is time to harvest the fruits.

Photo : *Integrated coconut based diversified farm in Mabini, Magsaysay, Davao del Sur owned by Mabini Integrated Farmers and Workers President, Cynthia Amud. Cardava bananas are used by farmers as shade for new cacao plantings and as regular source of income and food.*
Inset – *Mrs. Cynthia Amud interviewed by Manny Quisol and Emeline Sabado at her farm.*

Good Agricultural Practices (GAP) is not widely adopted. "Bugtok or tibagnol" disease, is manifested by the discoloration and hardening of the fruit even when ripe, this dieases continues to threaten Cardava production in Mindanao. The main reason for "Bugtok" infection is the prevalent poor agronomic practices of farmers (and the prevalent use of suckers and corms from own farms. Progressive farmers prevent Bugtok infection by bagging, early debudding, and application of sodium chloride (table salt). Other diseases affecting Cardava production are Sigatoka, Panama wilt, mosaic, and bunchy top.

Banana is harvested when it is still green and requires a further 5 to 10 days to ripen. Two persons are usually needed in harvesting, namely the cutter and the helper. The cutter nicks the pseudo stem in such a way that the bunch is lowered gently. The backer then positions himself below the bunch and

takes hold the lower end of the fruit stalks as the bunch is laid on his shoulder. The cutter then cuts the peduncle of the fruit. From harvest to delivery, about 10% 20% of the banana is wasted due to bruises and scratches due to poor packing and handling.

Cardava provides a steady cash flow for farming households. Income, however, varies depending on practices and input application. Lack of nutrient replenishment and poor agronomic practices can lead to a non-sustainable situation reducing yields and productive life. Current average bunch weight is about 20 kilograms North Cotabato, and Davao del Sur (especially Malita) where a typical bunch weighs from 40 to 50 kilograms. In well-managed farms, a bunch can weigh as high as 80 kilograms. Evidently, there is good scope to increase income of farmers by increasing varietal performance, use of clean and improving production practices through appropriate use of inputs and good quality clean planting materials.

3. **Trading**

Traders perform the important tasks of negotiating, collecting, sorting, and transporting. Traders also act as financiers in the chain. The following are the different types of traders depending on their scope of operations:

Agents/Local Traders/Buying Stations: Agents scout and procure banana from farmers in a particular barangay/municipality. They are usually affiliated with processors and assemblers/shippers. In some areas, tricycle drivers also act as "agents" of farmers. They pick up the bananas from the farmers, scout for best price offer, oversee the weighing, and deliver back the payment to the farmers. Tricycle drivers charge hauling fee/fare and are also paid commission.

Photo : *Local trader en route to Sta. Cruz to deliver fresh cardava banana to GSL Foods one of the big banana chips processor/exporter in Davao Region.*

The local traders usually have buying stations along the highway. Most of those with buying stations are engaged in the trading of various commodities. There are also traders who pick up the bananas from the farms (depending on volume and accessibility. Buying stations generally do not have sorting and storage areas adequately protected from environmental hazards and pests. The lack of proper sorting and storage facilities results to damages and bruises which contribute to significant postharvest losses.

Assemblers/Consolidators: They usually collect from several local traders and take care of the delivery to processor or the shipment of the bananas to Manila or Cebu. In the case of cooperatives, they source directly from their farmer-members.

4. **Processing**

<u>Processors cum Exporters</u>

Nationwide, there are about thirty-five banana chips exporters. Twenty-five companies are located in Mindanao and, of which, twenty-one (21) have their factories in Davao Region (DTI RODG Study). About 60% of the 25 exporters have production capacity of more than 50 tons per day. Processors, especially the big companies, indicated that they are only able to utilize 60% to 80% of their capacity due to difficulties in sourcing Cardava.[21]

Banana Chips Exporters and First Fry Operators in Davao Region and SOCCSKSARGEN
Note: This is not a complete list.

Region	Company
Davao Region	Arcmen Food Industries Corporation
	CJ Uniworld Corporation
	DOLE Philippines
	Finelineasia Group of Companies
	Four Season Fruits Corporation - Also produces IQF Cardava snack food
	GSL Food Enterprise
	Koki Food International
	Pacific Fruits International
	Prime Fruits International
	Profood Corporation - Also producing IQF snack food
	Royce Food Corporation
	Sagrex Foods Incorporated - Also produces IQF Cardava snack food
	See International
	Snap Snax Ventures, Inc.
	Tagum Commodities Corporation/El Coco
	Tropical Synergy
SOCCSKSARGEN	Liberty Fruits Corp. (Kidapawan) - *FF
	Magpet Agro-Industry Resources Multi-purpose Cooperative (MAGIRCO) (Magpet) - *FF
	Greenville Agro Industrial Corp (Gensan)

Source : *PRDP Cardava Banana VCA*

Processing activities are relatively simple and technology is matured. It is the price, quality, and availability of Cardava that are critical to its operation and competitiveness. Price of coconut oil is also critical to competitiveness of the industry.

Sagrex Foods, Inc., a Davao-based corporation pioneered the production of frozen ripe boiled Cardava banana including banana fries, spring roll and other microwavable Cardava snack packs. The company

[21] PRDP Cardava Banana VCA

has already started selling to the United States, Middle East and Canada. Sagrex uses the giant Cardava variety. Another Davao-based banana chips exporter who has diversified into frozen Cardava snack food for the export market is Four Seasons. The company sources its supply from Davao and Region 12 but has plans of setting up satellite plants in various parts in Mindanao if there is a critical mass of Cardava banana supply. Four Seasons prefer to use the native Cardava variety.

First Fry Facilities/Subcontractors

Some exporters also tried supporting first fry facilities but only a few have been successful. For a first frying facility to be viable, it should have a wide base of suppliers of Cardava and a production capacity of at least 4 tons daily. Exporters are generally willing to provide some assistance (e.g., supply of coco oil, technical assistance), but only after the facility has proven its reliability and trustworthiness. Peelers comprise bulk of the workers in banana chips companies and first frying facilities.

Photo : *Interview with MAGIRCO General Manager Emmanuel E. Zamoras. MAGIRCO is a first-fry banana chips processor located at Brgy. Gubatan, Magpet, North Cotabato. MAGIRCO plans to scale-up its operation by engaging in sweetened banana chips (second-fry) processing and exporting. Its current processing capacity is 25 metric tons of green banana per day but this can increase to 40 metrics tons.*

Micro Processors

Microprocessors are mostly household-based enterprises operating with make-shift facilities. Some of the microprocessors are Agrarian Reform Communities (ARC). The ARCs have better facilities and packaging than majority of the individual micro businesses. Many of these enterprises do not have the BFAD license to operate due to non-compliance to Good Manufacturing Practices (GMP). The areas which are not usually GMP compliant are the peeling and cooking areas. Products are usually sold in the local market and pasalubong stores.

5. Production and Vending of Snack Foods

Although there is an increasing number of medium and high end restaurants serving Cardava based

snacks by giving it a twist (e.g., serving with ice cream, mixing relatively expensive ingredients), the biggest segment engaged in the preparation and retail sales of maruya, turon, and banana cue are the street food vendors. It is very common to see Cardava-based snack food in rolling carts or makeshift sidewalk stalls where there are churches, schools, recreational parks, or jeepney terminals, and outside the malls. Most construction workers, sales ladies, office workers, and other low- and medium-income groups grab a bite of this street food during the afternoon break time. Street food in the Philippines is not only a convenience and an economic phenomenon; it is a lifestyle.

A street food business is a small, fast, cash operation. Each street food enterprise is small in size, requires relatively simple skills, basic facilities and small amounts of capital, yet they are very numerous and have considerable potential for generating income and employment. The street food industry provides employment to women and migrants with low educational background. The prices of street food are low and the urban poor benefit from this. The street food vendors are important market channels particularly for matured bananas (undersize/over size). A vendor purchases from 300 to 1,000 kilos per month depending on location. Vendors source their bananas from farmers, traders, and the wet markets. In Davao region, vendors also get their supply of banana from the processing plants.

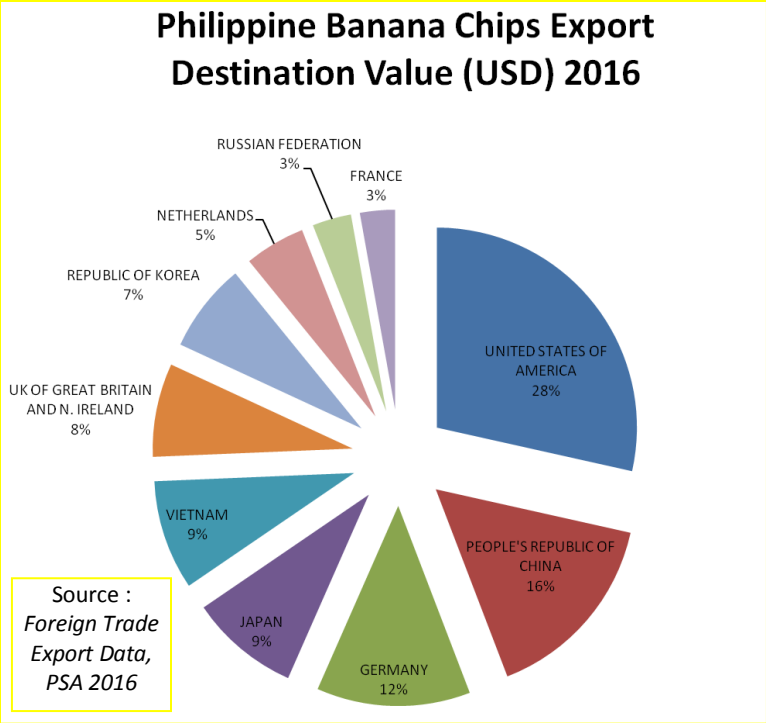
Photo : *Popular banana snack foods locally known sa maruya, turon, ginanggang and pinaypay are local favorites sold in streets, canteens and some restaurants.*

MARKETS AND MARKET OPPORTUNITIES

A. MARKETS AND MARKET TRENDS

1. Export Market

Main Cardava-based product that is currently exported is the banana chips. There are three main market segments for banana chips, namely: a) the food processing market; b) the retail market; and c) the catering market. The food processing market is by far the largest segment for the banana chips, thus putting pressure on prices. The major consumer is the breakfast cereal industry. Chips are sold in two forms: whole and broken with price differences of about US$ 0.05 to 0.10.[22] Banana chips for the retail market are mainly sold as ready-to-eat snacks. Main outlets are the health food stores or sections in supermarkets. Importers selling to retail markets require higher quality and added features such as Bio and all natural. "All natural" and organic banana chips command a premium price in the market.



The United States of America has been the major importer of Philippine banana chips accounting to 28% of the total Philippine banana chips export in 2016 based on foreign trade export data of PSA. It is valued at USD $16,103,503. It is followed China at 16% with a value of USD $8,863,015, Germany at 12% with a value of USD $7,040,221 and Japan and Vietnam at 9% with a value of USD $5,014,542 and USD $5,004,228 respectively.

Other countries which are among the top ten (10) destinations of Philippine banana chips are United Kingdom and Northern Ireland which accounts to 8%, Republic of Korea with 7%, Netherlands with 5%, Russian Federation 3% and France 3%.

Although Russian Federation only ranked number nine in terms of value of banana chips export, the government as well as the industry considers it as a very important banana chips export export growth area. The Philippines used to be the number one source of banana chips crackers in Russia. In October 13, 2017 report of Sunstar, Agriculture assistant secretary Leandro Gazmin said that the Philippines is now the 4th banana source of Russia with only about 4 percent of market share compared to it being the first banana source of Russia five years ago with more than 90 percent of market share.

[22] PRDP Cardava Banana VCA

Gazmin encouraged banana chips exporters to have better and higher-quality products if they want to come back to exporting to Russia. He said this is primarily because of the typhoon that hit Mindanao in 2012 and thus caused inconsistency with supply.

Gazmin said banana chips or crackers and fresh banana are ranked as the 3rd and 4th agricultural commodities exported to Russia by the Philippines. *"To avoid the mistakes of the past, Philippine companies must ensure that the quality and quantity of the Philippine bananas should remain stable at all times. Banana farmers and exporters should also consider planting bigger size bananas which is the demand requirement of Russia,"* said Gazmin adding the standard size for banana in Russia are 4 and 5 hands. He said the Philippines continues to push for the Russian export market as they see the huge potential it has, not mentioning that it is the biggest country in the world and the improved Philippine-Russia trade relations should be taken advantage of.[23]

Complete list of country of destination for Philippine banana chips export is shown in the table below :

FOREIGN TRADE EXPORT (PSA 2016)	
2016, Value of Banana Chips Crackers Export, By Country	
Country Destination	**Export Value $ (USD)**
UNITED STATES OF AMERICA	16,103,503.00
PEOPLE'S REPUBLIC OF CHINA	8,863,015.00
GERMANY	7,040,221.00
JAPAN	5,014,542.00
VIETNAM	5,004,228.00
UK OF GREAT BRITAIN AND N. IRELAND	4,262,765.00
REPUBLIC OF KOREA	4,082,686.00
NETHERLANDS	2,771,807.00
RUSSIAN FEDERATION	1,780,434.00
FRANCE	1,605,564.00
CANADA	1,491,948.00
AUSTRALIA	1,146,294.00
GUAM	937,383.00
SPAIN	933,499.00
POLAND	864,747.00
ITALY	712,584.00
SWEDEN	602,219.00
ARGENTINA	569,946.00
DENMARK	542,941.00
CROATIA	336,965.00
NEW ZEALAND	328,670.00
CHILE	320,386.00
LITHUANIA	316,430.00
CZECH REPUBLIC (CZECHOSLOVAKIA)	279,590.00

[23] https://www.sunstar.com.ph/article/169312

FOREIGN TRADE EXPORT (PSA 2016)	
2016, Value of Banana Chips Crackers Export, By Country	
Country Destination	**Export Value $ (USD)**
GREECE	268,375.00
MEXICO	240,414.00
SOUTH AFRICA, REP. OF	225,563.00
UNITED STATES OF AMERICA	221,668.00
VIETNAM	194,263.00
ISRAEL	167,238.00
RUSSIAN FEDERATION	137,391.00
BELGIUM	135,832.00
PORTUGAL	122,522.00
TAIWAN (REP. OF CHINA)	82,293.00
SLOVAK REPUBLIC (SLOVAKIA)	81,529.00
THAILAND	76,100.00
BULGARIA	54,208.00
UKRAINE (UKRAINIAN S.S.R.)	52,092.00
NORWAY	51,321.00
DEMOCRATIC PEOPLE'S REP. OF KOREA	44,606.00
URUGUAY	39,144.00
LATVIA (LATVIAN SOVIET SOCIALIST REP.)	39,134.00
KUWAIT	30,894.00
REPUBLIC OF KOREA	28,664.00
AFGHANISTAN	28,031.00
GREECE	26,580.00
UNITED ARAB EMIRATES, N.E.S.	26,562.00
QATAR	24,474.00
HONG KONG, CHINA	24,083.00
SERBIA	23,400.00
IRAN, ISLAMIC REP. OF	22,800.00
TRINIDAD AND TOBAGO	17,942.00
ROMANIA	17,590.00
BRAZIL	17,063.00
SWITZERLAND	16,575.00
SAUDI ARABIA	16,224.00
PEOPLE'S REPUBLIC OF CHINA	16,016.00
LEBANON	7,308.00
SAUDI ARABIA	174.00
SINGAPORE	153.00

Although the Philippines have remained the leading exporter of banana chips, competition is also intensifying from countries like Vietnam, Thailand, and Malaysia in key export markets. Markets are increasingly concerned with the specifications of both products and processes further back along the value chain in a number of different ways: a) quality and safety - based upon product and process controls: b) conformance with social and environmental standards; c) traceability and authenticity; d) reliability and guaranteed supply in order to avoid stock outs; e) just-in-time delivery; and f) product differentiation and innovation as a means of adding value and margins.

Export of frozen cooked banana (turon, boiled banana, fries, etc.) is gradually increasing. The companies are targeting the 12 million Filipinos living abroad --- the Kingdom of Saudi Arabia (KSA) has 1,019,577 Filipinos, the United States of America has four million, Malaysia 822,910, Canada 437,940, Japan 258,977 and United Arab Emirates 250,000. Other countries that have thousands of Filipinos also include Italy, Mexico, United Kingdom, Taiwan, Singapore, Hong Kong, Australia, Kuwait, South Korea and Germany. Sagrex exports annually over 12 containers of Saba to the Middle East, US, Canada and other Asian markets[24]

2. Domestic Market

System of grading and classifying Cardava type bananas is provided in the Philippine National Standard (PNS) formulated by the Bureau of Agriculture and Fisheries Product Standards (BAFPS). However, in many cases, traders and retailers follow the "all-in" procurement system but still observe the following minimum requirements as set forth in the PNS:

- *The fruit must be reasonably clean, free from diseases, insects, molds, and other contaminants.*
- *The use of chemical process for ripening is allowed provided it conforms to PNS/SAO 74.*
- *Pesticide residues shall meet the requirements of the Codex Alimentarious Commission Volume*

The above requirements are checked by buyers using visual observation *(mata-mata)*.

Size is determined according to the diameter and length of the fruit. Traders generally classify the cardaba on whether these are processed grade (for the banana chips market), for the snack food market, and for the fresh market .

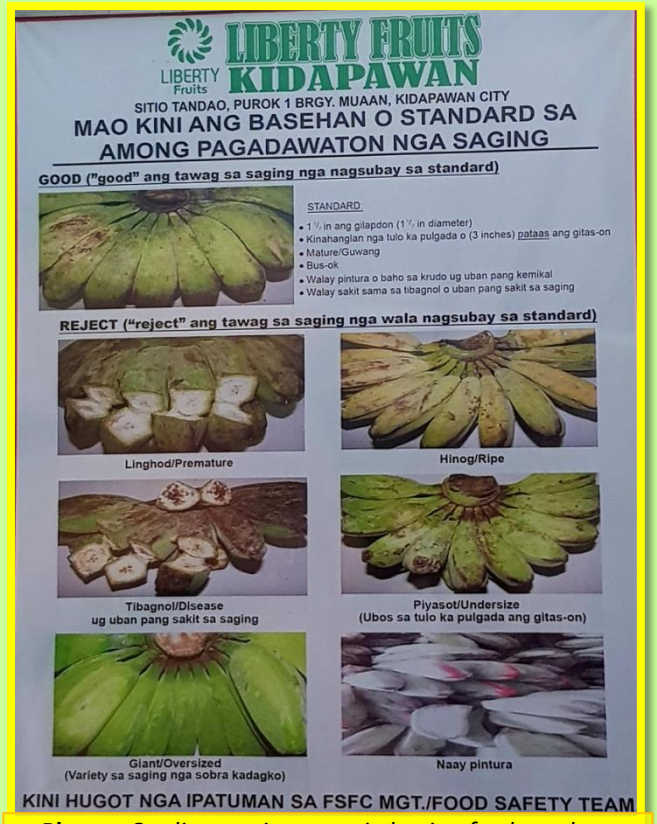


Photo : *Quality requirements in buying fresh cardava banana by Liberty Fruits in Kidapawan City if posted at the entrance gate of the company's processing plant.*

[24] PRDP Cardava Banana VCA

Size Classification of Cardava Banana		
Size	**Length (cm)**	**Diameter (cm)**
Extra Large	>14	>4.5
Large	12 - 14	4.5
Medium	10 - 12	4.0
Small	Not <8	3.5
Source: BAFPS		

Based on the PNS, the following are the three classes of Cardava banana based on general appearance, quality, and condition:

a) Extra Class: Bananas in this class are of superior quality. Hands must be matured, clean, well-formed, and well-trimmed. Likewise, the hands must be free from decay, split fingers, loose fingers, bruises, blemishes, and discoloration caused by diseases, insets, latex burn, and other deformities.

b) Class I: These are bananas classified as good quality. Hands must have the same characteristics as the Extra Class bananas.

c) Class II: Bananas in this class do not qualify for inclusion in the above 2 classes but satisfy the minimim requirements. Hands are matured, reasonably clean, fairly well formed, and well-trimmed. These are also relatively free from decay, split fingers, loose fingers, bruises, blemishes, discolorations, and other deformities.

Traders generally do not provide premium prices for Extra Class and Class 1 bananas but they do not accept bananas that do not meet the minimum requirements. In the retail market, prices are oftentimes aligned to the classification system.

Banana chips exporters prefer the native variety rather than the Giant Cardava. They are strict with quality standards. Quality of banana significantly affects the quality of banana chips. Bananas delivered to exporters should conform to the following standards: a) semi-mature (90 to 105 days); b) unripe, green color of skin; c) light yellowish color of flesh; and d) not less than 3 inches in length. With increasing demand for healthy food products, exporters prefer organically grown bananas. On average, about 25 percent of bananas delivered to processors are classified as “rejects”. Main causes of rejects are immature harvesting, late harvesting, and bruises and damage during storage and transit.

For Philippine supermarkets, the banana chips are among the slow moving products and, thus, no significant orders are made. Likewise, in many cases, presentation is poor compared to similar products in the same categories. There is a general preference for “potato chips type of products” rather than the usual presentation of banana chips.
Basic requirements for suppliers: GMP/permit to operate and bar code which many of the processors are not able to comply with. Suppliers would have to invest in the promotion of the products and in development of similar product formats such as the potato chips.

Banana chips are currently more saleable as “pasalubong”. The product can potentially be saleable if positioned as a healthy snack food. To be successful in this positioning, it is important that the chips are

produced without preservatives and artificial additives and all other ingredients are 'healthy" (e.g. low glycemic sugar, low cholesterol oil, etc.).

The biggest market for Cardava in the domestic market is the Cardava-based snack food subsector consisting primarily of street vendors, canteens, and restaurants. Street food vendors usually procure the stock of Cardava on a daily basis from the wet market, trader, or processors (in the case of Davao City). A vendor would usually buy about 10 to 50 kilos of Cardava on a daily or bi-weekly basis. Vendors generally buy ripe, oversize, and undersize bananas. Ripe bananas are generally cheaper compared to the "matured" banana.

Demand for Cardava both for banana chips and the fresh market is generally lowest during the months of April, May, and June. For the banana chips subsector, production is generally low as companies use this period as an opportunity to perform maintenance in their plants in preparation for the peak season and to finalize negotiations. In the fresh subsector, vendors purchase fewer bananas during vacation time as bulk of their customers is usually the students.

B. PRICE TRENDS

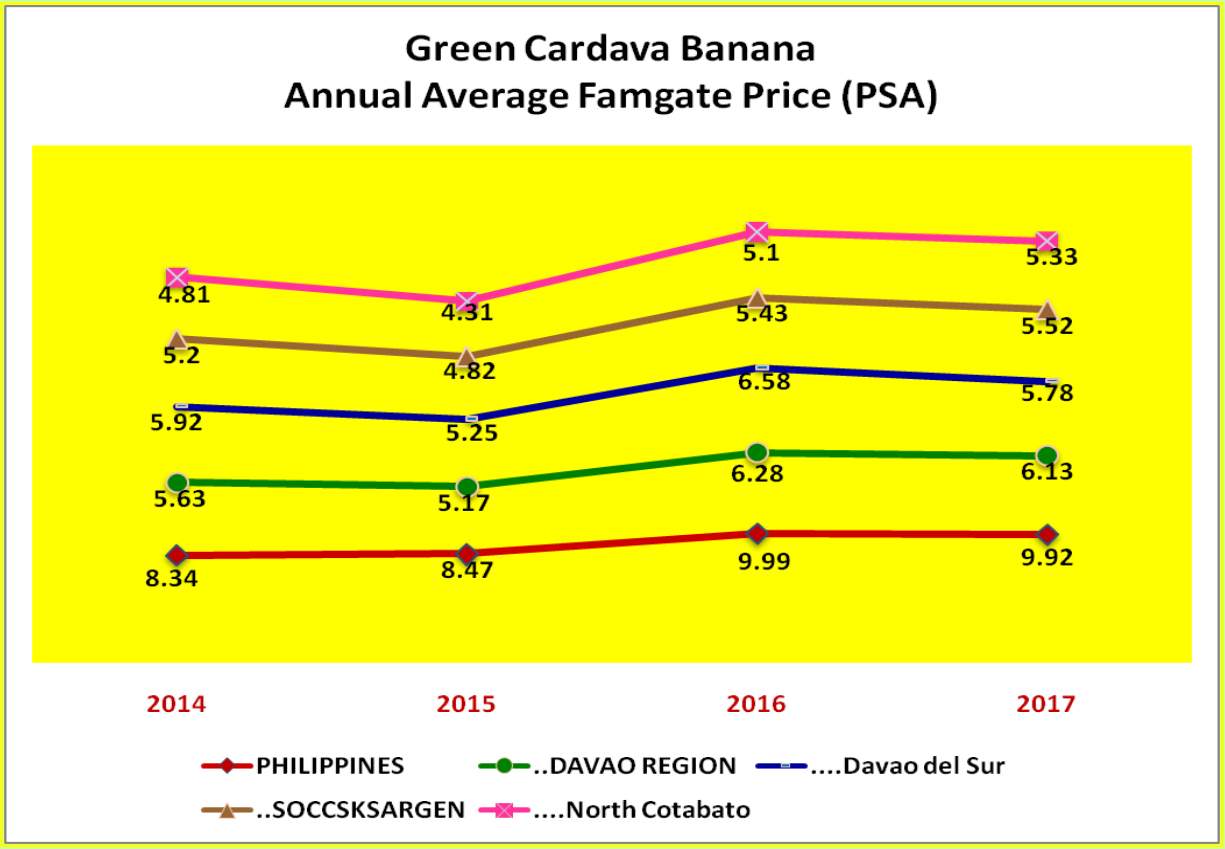
1. Export Market

Major threats to the growth of the industry are its price competitiveness and its ability to maintain quality particularly for large volume orders. Banana chips are fast becoming a commodity with price an important issue. Price fluctuations range from 1% to 5%. Importers generally switch suppliers between Philippines and Thailand from time to time primarily due to price and quality considerations. Feedbacks indicate that Thailand is fast becoming preferred supplier in terms of price, flexibility in payment terms, reliability, and their ability to offer a wider range of goods in similar categories including strong support and relations between the private sector and government.[25]

Photo : *The most popular cut and sometimes known as round or coin cut banana chips for export. Photo courtesy of Four Seasons Fruit Corp.*

[25] Cardava Banana VCA, PRDP

2. Domestic Market



Source : PSA 2017

Photo : Violy Sanusos a cardava banana farmer from Matalam observes the weighing of her banana she delivered her produce at MAGIRCO buying station in Kidapawan City.

Based on interviews, farm gate price of Cardava fluctuates between PhP 6 to 8 per kilo. At the time of interview, the farm gate price hovered between PhP 6.50 to 7.50 even in Kidapawan, Makilala, Matalam and Magpet. MAGIRCO buying station in Kidapawan City during the time of visit buys fresh cardava at Php6.50 per kilo. Liberty Fruits in Kidapawan City on the other hand buys quality fresh cardava banana from its accredited suppliers at Php8.00 per kilo.

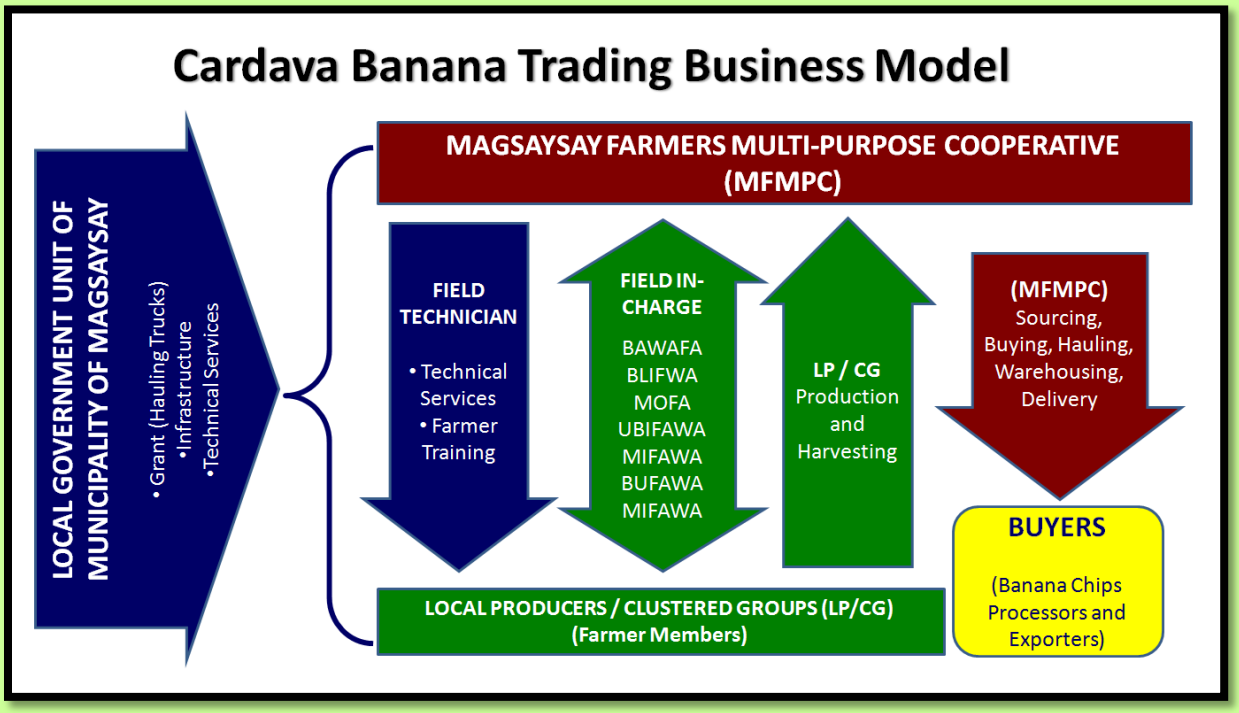
Annual average farm gate buying prices of green cardava banana in Davao Region, SOCCSKSARGEN and its provinces is shown in the table below.

Farmgate Prices by Commodity, Geolocation, Period and Year (PSA)				
Banana Saba, green	**2014**	**2015**	**2016**	**2017**
PHILIPPINES	8.34	8.47	9.99	9.92
..DAVAO REGION	5.63	5.17	6.28	6.13
....Davao del Norte	5.43	4.58	6.45	6.29
....Davao del Sur	5.92	5.25	6.58	5.78
......Davao City	6.48	5.55	6.18	6.14
....Davao Oriental	5.29	5.7	6.55	6.56
....Compostela Valley	4.99	4.7	5.7	6.68
..SOCCSKSARGEN	5.2	4.82	5.43	5.52
....North Cotabato	4.81	4.31	5.1	5.33
....Sarangani	6.07	5.49	6.17	5.98
....South Cotabato	6.4	7.32	6.03	5.36
....Sultan Kudarat	6.8	6.55	6.37	6.4

Generally, banana chips exporters and agents offer a slightly higher price if a farmer or a group of farmers is able to consistently supply more than 1 metric ton of banana per delivery. Main determinant of price is distance between pick-up point and plant location. Another factor that affects the buying price of Cardava for the banana chips industry is the price of coconut oil. Banana and coco oil comprise the largest cost in the production of banana chips. Since coco oil price is outside of their control, slight adjustments are usually made in the purchase price of Cardava as export price of banana chips is usually fixed for a specific period.

BUSINESS MODEL

There are two (2) business model proposed herein that the project can potential explore with its partner farmer organizations. It is worth noting that there are areas especially in Magsaysay, Davao del Sur where cardava banana is a priority crop that both the government and the farming sector has started some business development initiatives.



Cardava Trading Business Model - 1

It has been a project strategy from its inception to work with and/or support existing initiatives on the ground be it by done the government or the private sector. As such, it is proposed that for Magsaysay, Davao del Sur the project can plug in to its existing business model.

As the business model 1 illustrates, the Magsaysay Farmerss Multi-Purpose Cooperative (MFMPC) is a vital player in this approach. MFMPC is the lead proponent of the municipality's cardava industry development project. As the lead proponent, MFMPC is the recipient of business development support to get the cardava trading business up and running.

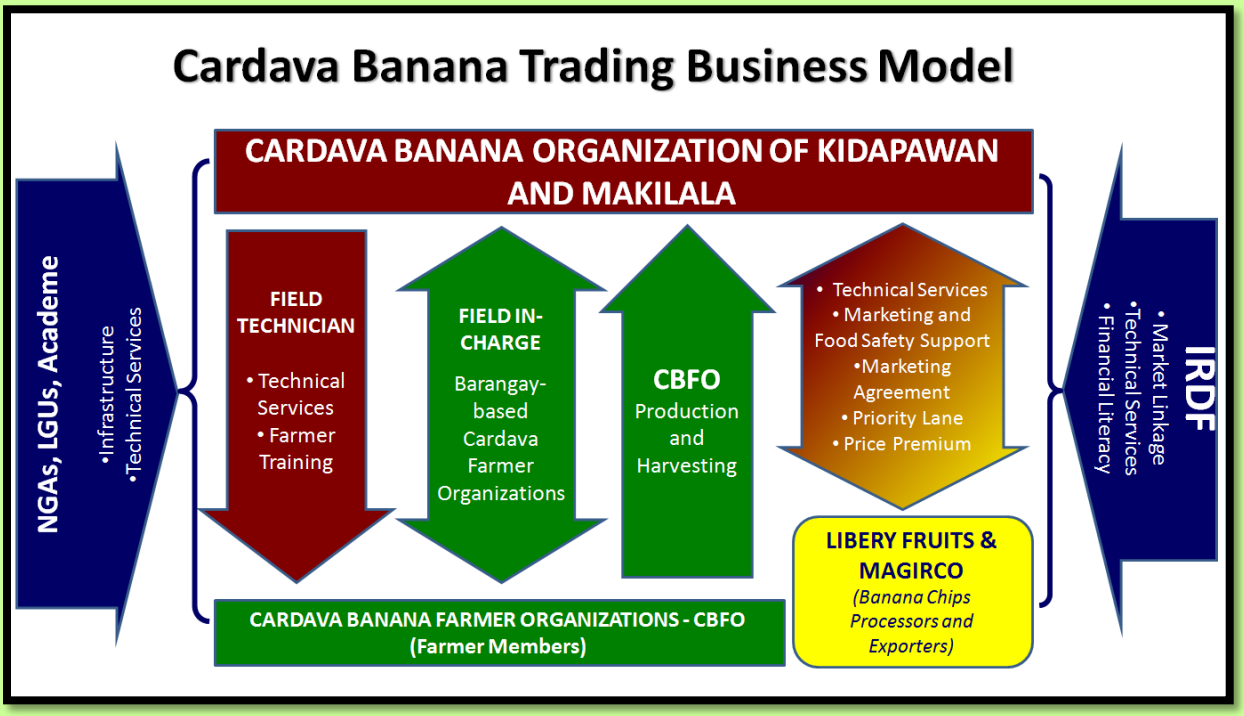
Business planning activities has been conducted to this effect and there are already organized farmer organizations on the identified as the supply source of green cardava bananas.

One of the challenge MFMPC is facing now is the market, although it has conducted pilot delivery to Sagrex in Davao City, Sagrex can only absorb small amount and the organization has a big volume that can be delivered to other buyers. The project can plug in to this group by linking it and having accredited to Liberty Fruits Corp. in Kidapawan city. Once this succeeds, the project can already enroll its existing farmers in the project so they can also receive technical services provided by the LGU. Other

organizational and business development support can also be provided by the project. This includes assisting them open a bank account in a Liberty Fruits preferred bank which is one of the company's requirement. The project can arrange a plant visit with MFMPC representatives' for a business exploration meeting.

For the proposed business model number 2, the approach is very straightforward. However, compared to model 1, this entails more preparation and intervention. For one, the project needs to identify ready taker that will have the capacity to manage the business and at least have a functional business structure and/or is already engaged in a similar business.

The project can potentially look at its existing farmer organization engaged in whole coconut trading. This can be a good business diversification for the organization as whole nut delivery may not be a daily activity. A business planning can be conducted by the project to measure and/or ensure its viability.



Cardava Trading Business Model - 2

There are other opportunities for the cardava farmers particularly getting the farmer organizations engage in first-fry banana chips processing. However, this may complicate the ground activities that the project is doing. Further, it may run counter in the long run to what the project's main goal is which is promoting coconut production and productivity and trading quality whole coconuts as a result.

Banana chips processing uses coconut oil intensively. This resulted to most of banana chips processing get engaged in copra buying which they toll-processed in Davao-based oil millers so they can get the oil in return. This scenario would likely cause farmers be diverted from whole coconut trading into copra processing and trading which may eventually defeat the project's target.

PROFITABILITY ANALYSIS

Complete data related to profitability analysis is available on a separate excel files provided to IRDF.

COCONUT - CARDAVA BANANA INVESTMENT COSTS AND RETURNS

		625	625	625	625	625	
Assumptions & Conversions	*Estimate for 1 hectare farm of 625 hills Cardava Banana intercropped with 100 Coconut Trees*						
	Planting distance						
	Yield starts Year 2 @ 95% shooting rate						
	Kilos/ bunch	*25*					
	Yield in Kilograms	*14,844*					
	Price/ kilo	*PHP 6.00*					
	Cost / kilo	*PHP 2.67*					
	Gross Profit Rate	*55.52%*					
	Cost of Investment	*59,590.76*					
		YEAR 1	***YEAR 2***	***YEAR 3***	***YEAR 4***	***YEAR 5***	***TOTAL***
I Farm Establishment		**19,973.53**					**19,973.53**
i. Planting Materials		**8,250.00**					**8,250.00**
	Price / seedling	12.00					
	Quantity (+10% for Mortality)	688					
ii. Land Preparation		**3,062.50**					**3,062.50**
	Land Clearing	1,000.00					
	Lay-outing/ Staking/ Holing (Pl	2,062.50					
iii. Planting @ Php3/hill		**1,375.00**					
iv. Fertilizer (Basal)		**3,286.03**					**3,286.03**
	Organic Fertilizer (1kg/hill)	625.00					
	Cost per Kilo	2.50					
	Sub-total	1,562.50					
	14-14-14 (50g/hill)	31.25					
	Cost per Bag	1,150.00					
	Cost per Kilo	23.00					
	Sub-total	718.75					
	Urea (52g/hill)	32.50					
	Cost per Bag	935.65					
	Cost per Kilo	18.71					
	Sub-total	608.17					
	Solophos (38g/hill)	23.75					
	Cost per Bag	834.97					
	Cost per Kilo	16.70					
	Sub-total	396.61					
v. Farm Tools & Equipment		**4,000.00**					**4,000.00**
	Knapsack Sprayer	2,500.00					2,500.00
	Scythe, Spade, etc	1,500.00					

II ANNUAL PRODUCTION COSTS		**39,617.22**	**39,617.22**	**39,617.22**	**39,617.22**	**39,617.22**	**118,851.67**
i. Fertilizer		**12,017.22**	**12,017.22**	**12,017.22**	**12,017.22**	**12,017.22**	**60,086.11**
	Urea	2,923.91	2,923.91	2,923.91	2,923.91	2,923.91	
	Application Rate (250g/hill)	156.25	156.25	156.25	156.25	156.25	
	Cost per Unit (kg or bag)	935.65	935.65	935.65	935.65	935.65	
	Muriate of Potash	3,370.82	3,370.82	3,370.82	3,370.82	3,370.82	
	Application Rate (274g/hill)	171.25	171.25	171.25	171.25	171.25	
	Cost per Unit (kg or bag)	984.18	984.18	984.18	984.18	984.18	
	Organic Fertilizer	5,722.50	5,722.50	5,722.50	5,722.50	5,722.50	
	Application Rate (1.526kg/hill)	953.75	953.75	953.75	953.75	953.75	
	Cost per Unit (kg or bag)	6.00	6.00	6.00	6.00	6.00	
iii. Weed Control		**8,400.00**	**8,400.00**	**8,400.00**	**8,400.00**	**8,400.00**	**42,000.00**
	Herbicide	8,400.00	8,400.00	8,400.00	8,400.00	8,400.00	
	Application Rate/ Hectare	2.00	2.00	2.00	2.00	2.00	
	Application Cycles/ year	12.00	12.00	12.00	12.00	12.00	
	Cost per Unit (liter)	350.00	350.00	350.00	350.00	350.00	
v. Labor: Farm Maintenance		**9,600.00**	**9,600.00**	**9,600.00**	**9,600.00**	**9,600.00**	**28,800.00**
	Fertilization	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	
	Mandays / year	8.00	8.00	8.00	8.00	8.00	
	Rate per Manday	300.00	300.00	300.00	300.00	300.00	
	Weed Control	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00	
	Mandays / year	12.00	12.00	12.00	12.00	12.00	
	Rate per Manday	300.00	300.00	300.00	300.00	300.00	
	Thinning	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00	18,000.00
		12.00	12.00	12.00	12.00	12.00	
		300.00	300.00	300.00	300.00	300.00	
vii. Labor: Harvesting		**6,600.00**	**6,600.00**	**6,600.00**	**6,600.00**	**6,600.00**	**33,000.00**
	Mandays/year	22.00	22.00	22.00	22.00	22.00	
	Rate per Manday	300.00	300.00	300.00	300.00	300.00	
viii Farm Overhead		**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	**15,000.00**
	Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	
III YIELD		**-**	**89,062.50**	**89,062.50**	**89,062.50**	**89,062.50**	**356,250.00**
i. Harvested Bunches			594	594	594	594	1,188
ii. Estimated Kilos per Bunch			25	25	25	25	25
iii. Yield in Kilograms		-	14,844	14,844	14,844	14,844	59,375
iv. Price / kilogram			6	6	6	6	6
v. Gross Revenues		-	89,062.50	89,062.50	89,062.50	89,062.50	356,250.00
IV NET INCOME		**(39,617.22)**	**49,445.28**	**49,445.28**	**49,445.28**	**49,445.28**	**237,398.33**
V. RATES OF RETURN AND COSTS							
i. Cost per Bunch			PHP 66.72	PHP 66.72	PHP 66.72	PHP 66.72	PHP 100.09
ii. Cost per kilo			PHP 2.67	PHP 2.67	PHP 2.67	PHP 2.67	PHP 2.00
iii. Gross Profit Rate			55.52%	55.52%	55.52%	55.52%	66.64%
iv. Break-even Cost							

CONSTRAINTS AND OPPORTUNITIES

Constraints and opportunities presented in this section are adapted from the result of PRDP Cardava Value Chain analysis as they also reflect those that were found out during the field interviews. Further, there are addition information presented herein which were found out during interviews specifically for Kidapawan, Makilala and Magsaysay areas.

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
INPUT PROVISION		
Use of tissue cultured planting materials can significantly improve yield of farmers Village level nurseries can potentially reduce cost of tissue cultured planting materials and provide additional income to farmers	Limited supply of good quality disease free planting materials/ Lack of tissue culture laboratories Low willingness among farmers to invest in good quality planting materials	Kidapawan Makilala Magsaysay
Proper application and management of fertilizer and pesticides together with use of quality planting materials and good agronomic practices can potentially result to yield of 50 to 80 kilos per bunch Agri-waste can be used in the production of organic fertilizer. There are also existing enterprises engaged in production of organic fertilizer but not specifically for banana	High cost of chemical inputs Limited availability and commercial distribution of organic fertilizer and inputs Lack of understanding among farmers on cost benefits of proper and efficient use of fertilizer/Only very few farmers apply fertilizer Low level of purchasing power among smallholders	Kidapawan Makilala Magsaysay
FARMING		
Upgrading of low cost indigenous technologies that have good potentials of improving farm productivity and reduce incidence of pest and disease infestation Interest among cooperatives and traders to increase volume/ yields to get premium prices (traders pay higher prices if farmers/groups deliver significant volume)	Limited outreach of existing extension services Cardava traditionally grown with minimal investments on farm maintenance Low uptake and adoption of Good Agricultural Practices	Kidapawan Makilala Magsaysay

Constraints and Opportunities		
Opportunities	**Constraints**	**Area**
PROCESSING		
Implementation and adoption of standards such as GMP can play a positive role in providing the catalyst and incentives for the modernization of the banana chips industry and the adoption of safer and more sustainable production and processing activities which can be differentiation factors that can institutionalize market competitiveness	Lack of access to skills and resources to comply with GMP (especially micro enterprises) Street food preparation not aligned with food safety protocols	Kidapawan Makilala Magsaysay
MARKETING		
The shelf-life of bananas can be prolonged by proper storage and postharvest handling	Poor postharvest handling and facilities especially among buying stations resulting to high levels of losses	Kidapawan Makilala Magsaysay
The very large population in the Philippines and increasing consciousness for healthy snack food provides opportunities to develop the local market for other processed Cardava based products Growing market for halal products	Weak demand for banana chips in local market Lack of product differentiation/ available product formats	Kidapawan Makilala Magsaysay
Availability of big processors both first-fray and second fry for exports that farmers and farmer organization in the area can potentially supply. • MAGIIRCO • Liberty Fruits • BG Fruits • GSL	Lack of business planning skills among farmers/farmer organization to take advantage to available market opportunities. Farmers are fragmented such that they cannot come up with a needed market volume	Kidapawan Makilala Magsaysay

MANGO Carabao

OVERVIEW OF THE INDUSTRY

A. PRODUCT DESCRIPTION

Philippine mango, branded by the Government as the Manila Super Mango or Carabao Mango to differentiate to that of Mexico's Manila Mango (which is a cross breed of Philippine Carabao Mango and Ataulfo Mango during the Galleon trade). Philippine Carabao Mango is one of the choicest fruits in the Philippines. The Philippine Carabao Mango gained reputation in the Guinness World Book of Records as the world's sweetest mango.

The Carabao Mango is a perennial horticulture crop. The mango trunk is coarse with spreading and shady canopy. It is grown in a well drained, deep and loamy soil with ph range of 6.0-8.0. It thrives well in areas with at least 5 months of distinct wet and at least 7 months of distinct dry seasons. Planting distance should be at least 15 meters apart.

Apart from its distinct taste and nutritional value, mango has a significant contribution to the country's export earnings. Mango has established international and local markets. It ranked as the third most important fruit crop of the country next to pineapple and banana, based on export volume and value.

As such, several areas in the country are engaged in the production of Philippine Carabao mango. This is despite the fact that many areas are not suitable for mango production in terms of climate patterns and existing farming systems. Mango thrives best in areas with prolonged dry season of at least seven months. Further, the recommended planting distance of at least 15 meters apart makes mango production not suitable for intercropping with other tall tress such as coconut.

The municipality of Magsaysay in Davao del Sur is among those areas where farmers engaged in mango production despite not meeting the suitable climate. Based on the municipalities climate data reflected in its profile, the municipality's climate is tropical where the area experiences hot and humid weather with an average annual temperature of 26.7 degrees Celsius. There is abundant rainfall due to the active vertical uplift or convection of air that takes place. Even the driest month still has a lot of rainfall with an average annual rainfall of 1,842 mm.

With an average of 27.4°C, April is the warmest month while January with an average temperature of 26.1°C is the lowest average temperature of the whole year. With a precipitation of 218 mm, May is the wettest month. Further, Magsaysay also experience more rainfall as compared to other municipalities in Davao del Sur as it is closes to the boarder of North Cotabato which has micro climate and has experienced more rainfall as big portion of North Cotabato still has a good forest cover.

As a result, mango growers in Magsaysay, Davao del Sur experience more pest and diseases infestation as compared to other mango growers in such as those who are in Digos City, Kiblawan, Malita and Sta. Maria. This resulted many mango growers to neglect their farms while some shifted to better alternatives such as cacao and bananas.

Product Forms and Uses

There are several mango cultivars grown in the Philippines but the most important are the "Philippine Carabao" and "Pico". Other varieties include "Katchamita" also known as Indian mango and Pahutan (Mangifera altissima).

Philippine Carabao or Manila Super Mango

- Originated from the Indo-Burma Region
- Oblong in shape, medium to large and weighs from 270 to 440 grams
- Has blunt apex with a rounded base, slightly flattened but with full cheeks
- Beak is indistinct and variable, sometimes coinciding with apex
- Fruit skin is smooth, yellow when ripe, thin and easily separated from the pulp
- Flesh is pillow, very tender and melting with a very delicate aromatic flavor
- Fruit's fiber is medium-coarse, short and confined almost entirely to the edge of the seed
- The seed is medium
- The variety is alternate bearer and flowers as early as October
- Fruits are available from November to June
- With artificial flower induction, fruits can also be available during the off-season

Pico

- Originated from Burma, India and Malaysia
- Smaller than the Carabao variety
- Fruit is oblong, medium to large, asymmetrical, with rounded apex and base
- Weighs an average of 240 grams
- More flattened than the Carabao mango and its beak is more distinct
- Fruit skin is smooth, light orange-yellow, thick and tough
- Flesh is orange-yellow, tender, richer, and sweeter that the Carabao but not melting. It lacks the spicy, delicate aroma of the Carabao mango. Eating quality is good
- The fruit has fine, short fibers confined entirely to the seeds' edge. The seed is small.
- This variery is seldom induce to flowers as compared to Carabao

Katchamita or Indian Mango

- Katchamita originated from India and is commonly known as Indian mango
- It is small to medium rounded and seed is large proportion to the fruit
- One of the less exported varieties; its skin is green and flesh is yellow when ripe
- The fruit is best eaten before mature stage

Other varieties

- Other less important mango cultivars include Pahutan, Dubul, Binoboy, and Seniorita
- Aside from the University of the Philippines Los Banos, Laguna which keeps 50 varieties of mango from all over the world, the National Mango Research and Development Center (BPI-NMRDC) in Guimaras, has a collection of different varieties of mango as well as strains of Carabao mango in the genebank.

Mango varieties can be grouped as follows:

- ❖ Monoembyonic – produce one seedling per seed, represented by many Indian varieties

- ❖ Polyembyonic – produce more than one seedling per seed and represented by mango varieties of the Indo-Burman region (Carabao, Pico and Pahutan)

Based on their usage, mango varieties can be classified as green, mature, (Katchamita), ripe (Carabao and Pico) or for processing.

Mango is eaten as dessert (ripe) or relish (immature) depending on fruit maturity. It can be processed into a number of unique products such as dried, puree, juice, nectar, chutney, pickle mango scoops, roll powder, halves or scoops in light syrup and used as flavoring for ice cream, bakery products and confectioneries.

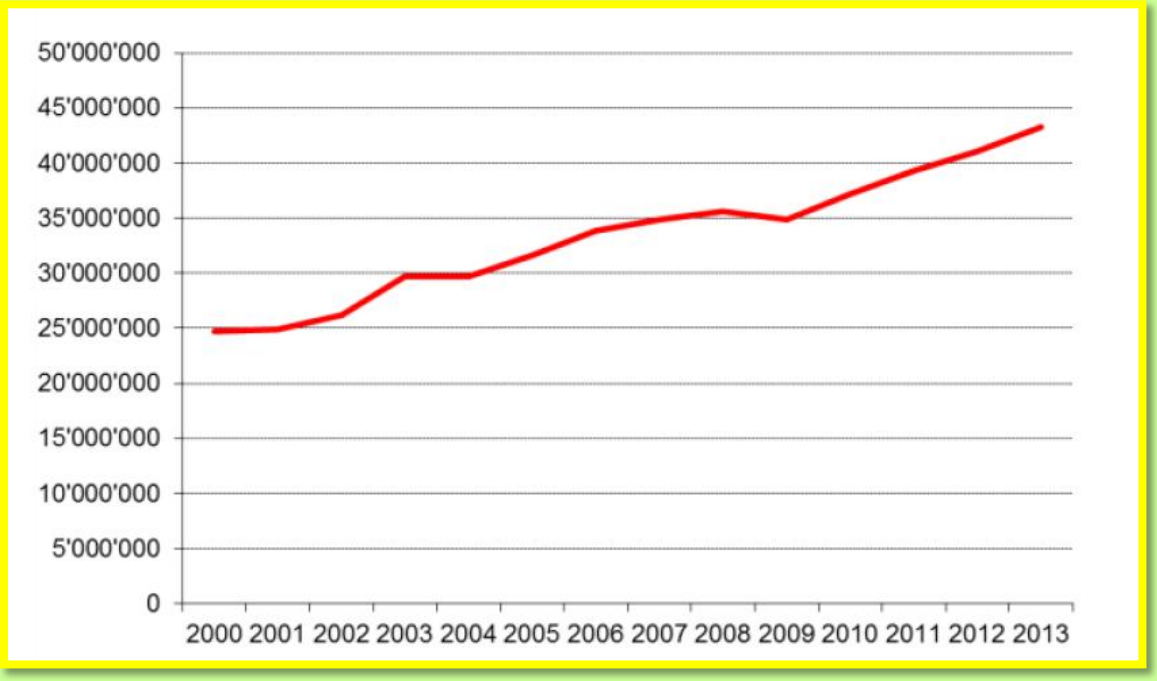
[26]Fresh mango fruit can supply 5,000 international unit (IU) of our daily requirement of Vitamin A. It contains .009 mm Vitamin B (thiamin) higher than other mangoes which only have .0035-.0065 mm. It is also a rich source of Vitamin E with an average of 51 mm per serving when ripe.

B. PRODUCTION TRENDS

1. Global Production

With just over 43 million tonnes, the mango is the eighth most produced fruit in the world. Its production saw a steep rise of 75 % between 2000 and 2013.

World's Mango Production in Tonnes, 2000 - 2013



Source : UNCTAD

[26] *DA-NAFC Mango Strategic Action Plan, Vol. 1, Philippine Generics, Inc., 2002*

While it is widespread in the intertropical zone, production is nonetheless concentrated in certain countries. The top ten producer countries produce nearly 77 % of worldwide volumes. From placing 5th in 2001 based on the Mango Rapid Market Assessment in 2003, the Philippines went down the ladder taking the 8th spot on the 2012 ranking of top mango producing countries with a 2.1 percent share. India has continuously dominated world mango production from 2008 to 2012 with 42 percent share reaching its highest mark of mango produce with 16,337 thousand metric tons in 2012. China is the second in terms of mango production volume with 11.2 percent share followed by Thailand with 6.4 percent contribution to the world output.

Based on the 2012 figures presented in the table below, Pakistan ranked fourth, followed by Mexico on the fifth. Indonesia and Brazil got the sixth and seventh spot respectively. The Philippines is on the eight spot with a production volume of 824 metric tons in year 2012 based on Food and Agriculture Organization (FAO) data. Overall, Philippines contribution to the world mango production volume is 2.1%. Complete production figures among mango producing countries worldwide are presented in the table below.

World Mango Production (MT) (Year 2008 – 2012)

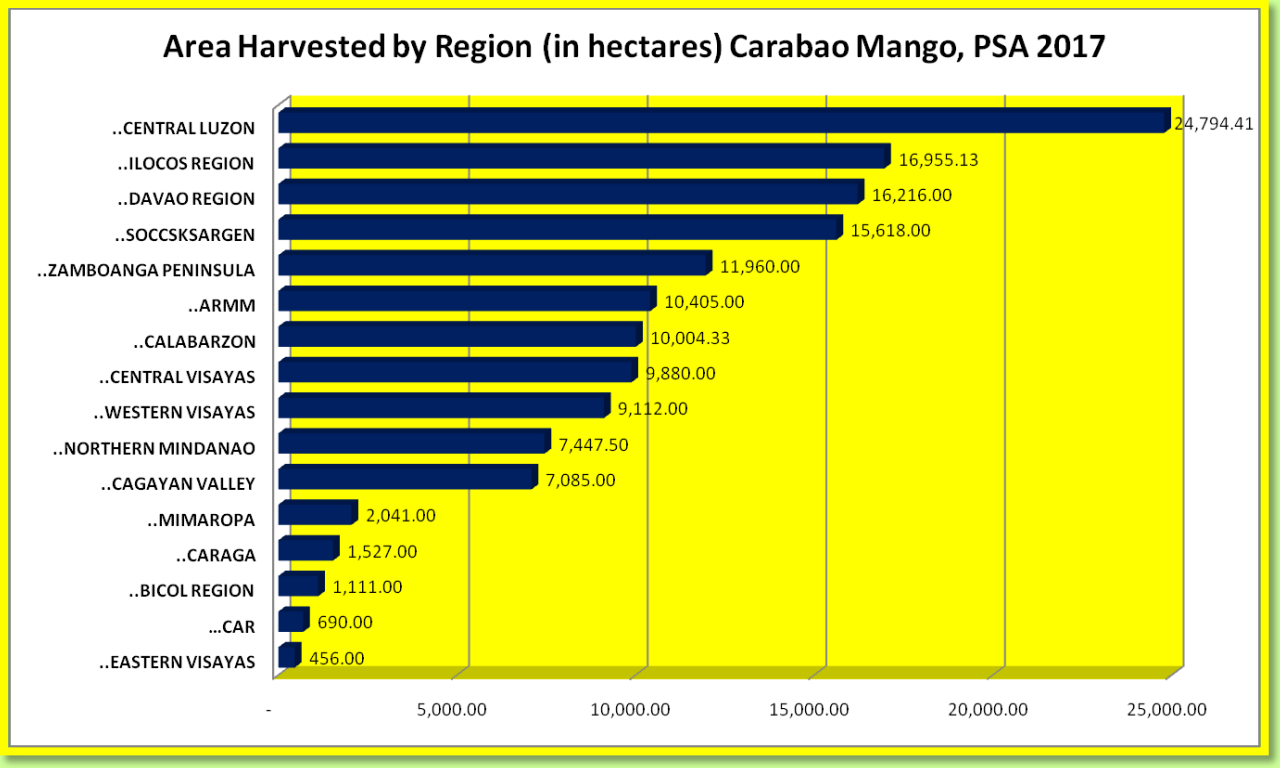
Country	2008	2009	2010	2011	2012	% Change	% Share
India	13,997	12,750	15,027	15,188	16,337	17	41.9
China	3,800	4,000	4,000	4,350	4,352	15	11.2
Thailand	2,374	2,470	2,551	2,600	2,551	7	6.5
Pakistan	1,754	1,728	1,846	1,888	1,784	2	4.6
Mexico	1,717	1,509	1,633	1,827	1,633	-5	4.2
Indonesia	2,105	2,243	1,287	2,131	1,313	-38	3.4
Brazil	1,155	1,198	1,190	1,250	1,188	3	3.1
Philippines	884	771	826	778	824	-7	2.1
Nigeria	800	835	850	850	790	-1	2
Other Countries	5,545	5,866	5,803	7,631		-100	0
World	**34,597**	**34,918**	**37,125**	**38,953**	**38,953**	13	79

Source of Data: *Food and Agriculture Organization (FAO)*

2. Domestic Production

The Philippine Fresh Carabao Mango gained a remarkable contribution to the domestic and world markets as the 3rd exported fruit crop in the country, next to pineapple and banana. The country's total output in year 2017 was over 598 thousand metric tons planted in about 145 thousand hectares mango production area.

Central Luzon is the country's lead in terms of Carabao mango production area. It accounts to a total of 24,794.41 hectares based on PSA 2017 data. It is followed by Ilocos Region with a production area of 16,955.13 hectares. Davao Region ranked third with a total Carabao mango production area of 16,261 hectares. SOCCSKSARGEN come close at fourth with a total production area of 15,618 hectares and on the fifth is Zamboanga Peninsula with a total Carabao mango production area of 11, 960 hectares.



ARMM, CALABARZON, CENTRAL VISAYAS, WESTERN VISAYAS and NORTHERN MINDANAO ranked 6th, 7th, 8th, 9th and 10th respectively as shown in the figure above. EASTERN VISAYAS has the lowest production area of only 456 hectares.

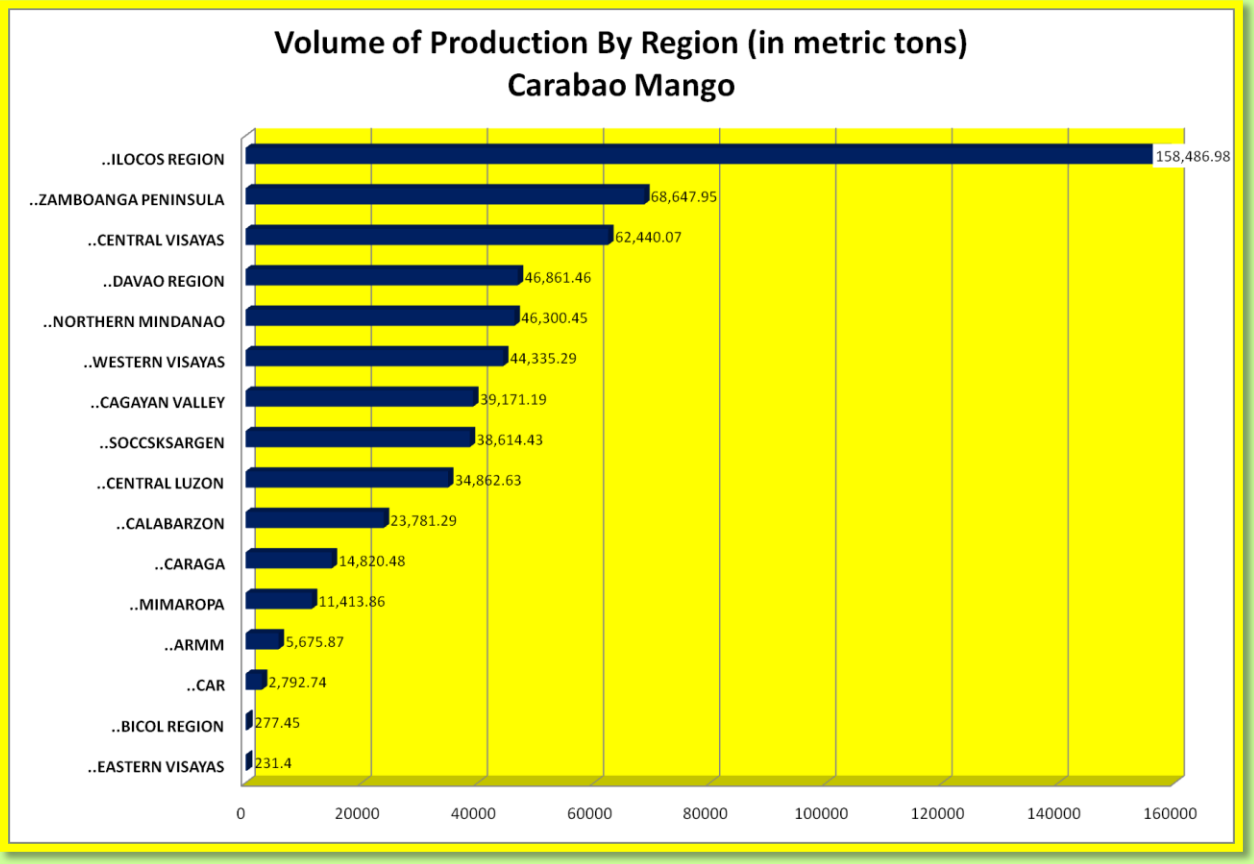
Spotlighting Mindanao, the island based on 2017 PSA data has a total of 63,173.5 hectares of land planted with mango. It contributes to about 43.48% to the country's total Carabao mango production area. Around 25.67% of Mindanao's Carabao mango production area is in Davao Region with contributes 11.16% to the country's Carabao mango production area. SOCCSKSARGEN accounts to 10.13% of Mindanao Carabao mango production area and contributes 4.40% to the country's total area planted to Carabao mango.

Davao del Sur is the number one province in Mindanao in terms of Carabao mango production area. It accounts to 20.81% of Mindanao and 9.05% to the country's area planted with Carabao mango.

REGION / PROVINCE	Area Harvested (in hectares)	% Contribution to Mindanao	% Contribution to Philippines
..ZAMBOANGA PENINSULA	11,960.00	18.93%	8.23%
..NORTHERN MINDANAO	7,447.50	11.79%	5.13%
..DAVAO REGION	16,216.00	25.67%	11.16%
....Davao del Norte	1,041.00	1.65%	0.72%
....Davao del Sur	13,144.00	20.81%	9.05%
....Davao Oriental	864.00	1.37%	0.59%
....Compostela Valley	398.00	0.63%	0.27%
.....Davao City	769.00	1.22%	0.53%

REGION / PROVINCE	Area Harvested (in hectares)	% Contribution to Mindanao	% Contribution to Philippines
..SOCCSKSARGEN	15,618.00	24.72%	10.75%
....North Cotabato	6,400.00	10.13%	4.40%
....Sarangani	3,990.00	6.32%	2.75%
....South Cotabato	3,600.00	5.70%	2.48%
....Sultan Kudarat	1,628.00	2.58%	1.12%
..CARAGA	1,527.00	2.42%	1.05%
..ARMM	10,405.00	16.47%	7.16%
TOTAL MINDANAO	**63,173.50**	**100.00%**	**43.48%**
TOTAL PHILIPPINES	**145,302.37**		**100.00%**
Source : PSA 2017			

Ranking among regions has dramatically changed when it comes to volume of production. Ilocos Region which only ranked second in terms of production area in the country's number one in terms of volume of production. Based on 2017 PSA Data, the region produced a total of 158,486.98 metric tons. This can be attributed to the massive effort of the government especially the provincial government of Ilocos Norte which invested in Carabao mango rehabilitation and fertilization programs in the recent years.



Source : PSA 2017

Zamboanga Peninsula which ranked fifth in terms of area planted is the country's second in terms of volume of Carabao mango production. In 2017, the region produced a total of 68,647.95 metric tons which is 31.07% of the total Carabao mango production volume of Mindanao and contributes 11.47% to the Philippines. This can be attributed to the region's farming system where mango farmers practices 15 x 15 to 20 x 20 planting distance in monocropped mango orchards. In addition, the region's climate is generally classified as type 3 and 4. It has no pronounced rainy seasons, but has relatively dry season from December to May. The annual average rainfall is 2,372 millimeters which is highly suitable for agricultural production.

REGION / PROVINCE	Production Volume (in metric tons)	% Contribution to Mindanao	% Contribution to Philippines
..ZAMBOANGA PENINSULA	68,647.95	31.07%	11.47%
..NORTHERN MINDANAO	46,300.45	20.96%	7.73%
..DAVAO REGION	46,861.46	21.21%	7.83%
....Davao del Norte	2,216.09	1.00%	0.37%
....Davao del Sur	38,974.94	17.64%	6.51%
....Davao Oriental	1,631.61	0.74%	0.27%
....Compostela Valley	258.61	0.12%	0.04%
.....Davao City	3,780.21	1.71%	0.63%
..SOCCSKSARGEN	38,614.43	17.48%	6.45%
....North Cotabato	17,362.67	7.86%	2.90%
....Sarangani	8,382.00	3.79%	1.40%
....South Cotabato	11,089.12	5.02%	1.85%
....Sultan Kudarat	1,780.64	0.81%	0.30%
..CARAGA	14,820.48	6.71%	2.48%
..ARMM	5,675.87	2.57%	0.95%
TOTAL MINDANAO	**220,920.64**	**100.00%**	**36.90%**
TOTAL PHILIPPINES	**598,713.54**		**100.00%**

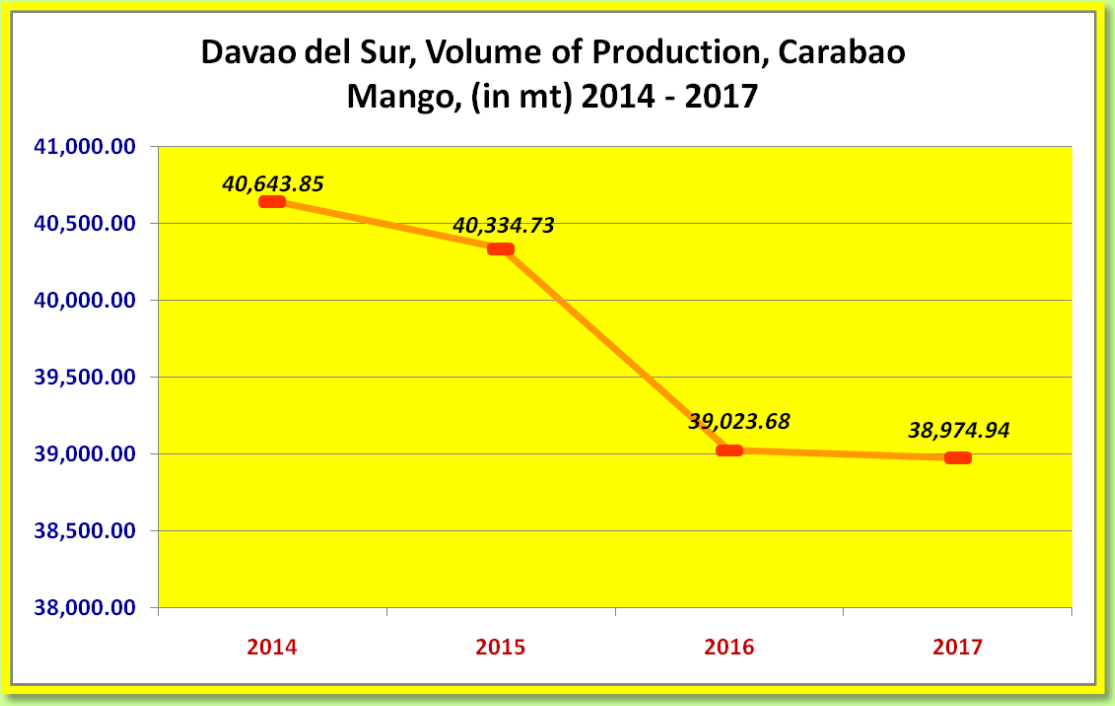
Source : PSA 2017

Davao Region on the other hand which ranked third in terms of Carabao mango production area only ranked fourth in terms of production volume. Davao in 2017 produced a total of 46,861.46 metric tons of Carabao mango. This accounts to 21.21% of Mindanao Carabao mango production and 7.83% contribution to the Philippines.

The province of Davao del Sur produced a total of 38,974.94 metric tons of Carabao mango in 2017. This account to 17.64% of Mindanao Carabao mango production and contributes 6.51% to the Philippines.

Since 2014, there has been a decline of 4% of Carabao mango production in Davao del Sur. Hundreds of hectares of the biggest Carabao mango plantation in Guihing, Hagonoy, Davao del Sur, has been cut down due to poor productivity. Infestation of pests and diseases in mango producing municipalities of Matan-ao and Magsaysay has severely affected production. As such, mango contractors intensified use of chemical based pest control methods which not only is harmful to the environment but to the health of the communities near mango orchards. Mango contractors/sprayer also have observed the decline of pollinators such as the honey bees which according to one mango contractor/sprayer is now rarely seen. Honey bees are major pollinator of other crops including coconut.

Shown in the figure below is the decline of mango production in Davao del Sur from 2014-1017 based on PSA data. From 40,643.85 metric tons in 2014, Carabao mango production is 2017 has declined to only 38,974.94 metric tons.



Source : PSA

Presented in the next table is the Carabao mango production data of the Municipality of Magsaysay per Barangay as of 2016. As the table shows, Barangay Balnate is number one in terms of production producing a total of 850.82 metric tons. Barangay Balnate has a total of 84.26 hectares of Carabao mango production area. Barangays San Isidro, Dalawinon, Dalumay and San Miguel ranked 2nd, 3rd, 4th and 5th respectively. Complete figures are shown in the next table.

Barangay	CARABAO MANGO PRODUCTION, MUNICIPALITY OF MAGSAYSAY (As of 2016)					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
1. Bacungan	184.00	46.68	46.68	46.68	376.29	8.00
2. Balnate	93.00	84.26	84.26	84.26	850.82	10.00
3. Barayong	29.00	17.51	17.51	17.51	141.16	8.00
4. Blocon	45.00	22.67	22.67	22.67	228.08	10.00
5. Dalawinon	220.00	53.20	53.20	53.20	535.27	10.00
6. Dalumay	48.00	55.44	55.44	55.44	502.35	9.00
7. Glamang	32.00	46.75	46.75	46.75	329.15	7.00
8. Kanapolo	28.00	14.21	14.21	14.21	100.05	7.00
9. Kasuga	134.00	5.46	5.46	5.46	43.79	8.00
10. Lower Bala	88.00	14.29	14.29	14.29	143.77	10.00
11. Mabini	68.00	27.97	27.97	27.97	281.41	10.00
12. Maibo	177.00	0.24	0.24	0.24	1.70	7.00

Barangay	CARABAO MANGO PRODUCTION, MUNICIPALITY OF MAGSAYSAY (As of 2016)					
	No. of Farmers	Physical Area (has.)	Area Planted (has.)	Area Harvested (has.)	Prod'n. (MT)	Ave. Yield/Ha. (MT)
13.Malawanit	56.00	25.69	25.69	25.69	258.46	10.00
14. Malongon	9.00	5.45	5.45	5.45	65.84	12.00
15. New Ilocos	6.00	1.76	1.76	1.76	15.92	9.00
16. New Opon	12.00	4.50	4.50	4.50	31.68	7.00
17.Poblacion	67.00	9.63	9.63	9.63	97.30	10.00
18. San Isidro	112.00	58.73	58.73	58.73	709.56	12.00
19. San Miguel	183.00	117.61	117.61	49.90	501.04	10.00
20. Tacul	33.00	27.49	27.49	27.49	193.55	7.00
21. Tagaytay	64.00	7.76	7.76	7.76	54.64	7.00
22. Upper Bala	44.00	4.35	4.35	4.35	43.86	10.00
TOTAL	**1,732.00**	**651.65**	**651.65**	**583.94**	**5,505.69**	**9.43**
Source : *LGU Magsaysay, Municipal Agriculture Office*						

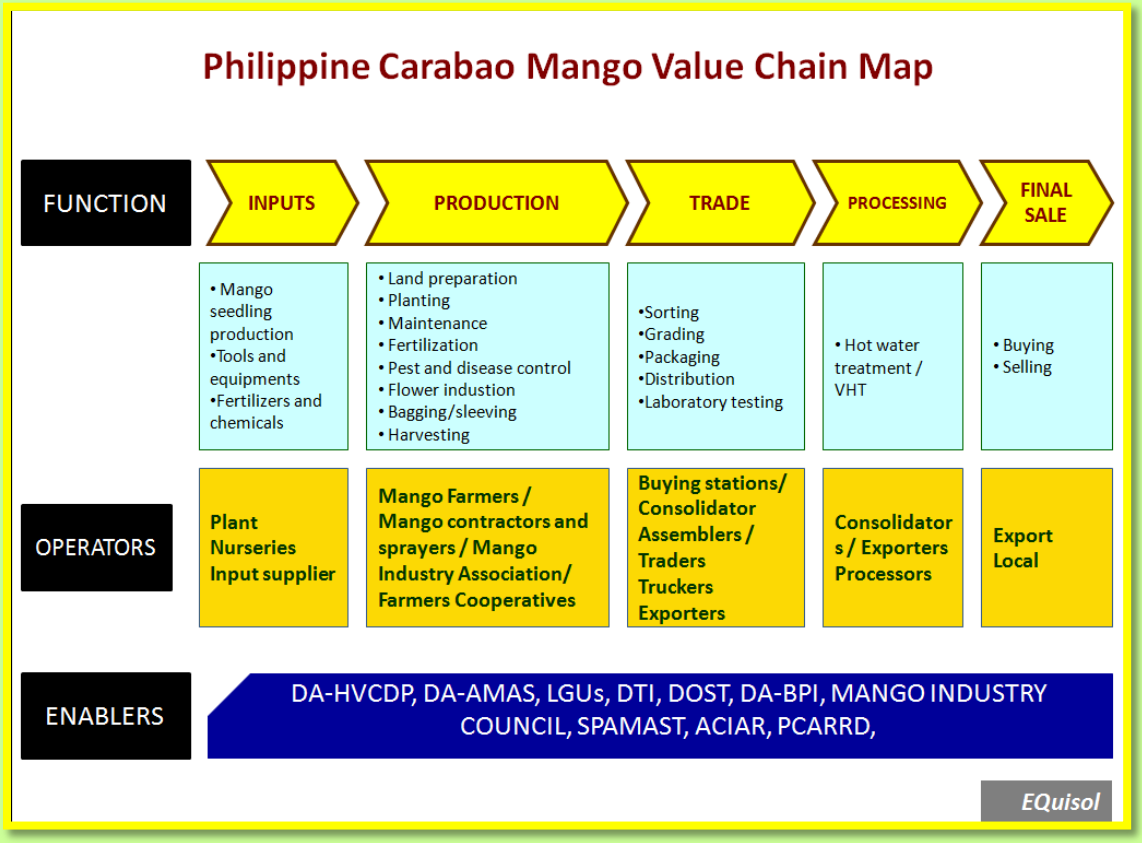
Photo: *Mango farm in Davao del Sur where coconut and mango is intercropped resulting to poor productivity of both crops due to competition both is space, sunlight and nutrient.*

NATURE AND STRUCTURE OF THE IINDUSTRY

A. VALUE CHAIN MAPPING

The Philippine Carabao Mango industry sector is composed of nursery operators and farmers, farmworkers, industry association, farmer groups, mango contractors and sprayers, consolidators, assemblers, traders, truckers, exporters and processors. Municipality of Magsaysay's mango industry value chain is characterized by production-marketing arrangements between the growers and the key marketing players.

In terms of mango industry development and promotion, the local government of Magsaysay is very lukewarm. Both the local municipal planning and agriculture offices openly expressed that mango is not in the priority list of the local government unit of Magsaysay. According to them, mango industry in the area is dominated by outsiders particularly mango contractors who come from different areas outside of the municipality and bring in their own work team to perform mango mango all activities related to mango contracting.



Carabao Mango Value Chain Map

Further, majority of mango farmers in the area have experienced huge losses as a result of pest and diseases infestation and unfavorable weather condition. These resulted to mango farmers leaving their farms at the hand of mango contractors who practically took control of their mango farm management. To combat pest and disease infestation, mango contractors intensified use of chemical based fertilizers and pesticides with application frequency of every fifteen (15) days until harvest.

The local government unit is not seeing this as beneficial both at the social, environment and economic aspect.

The Municipality of Magsaysay is known as the source of the famous MagRice. MagRice is an Organic Rice from Magsaysay, Davao del Sur, Philippines Cited as 2nd Best OTOP Product in Food Category at the "Yamang Mindanao 2007" and awarded as Best OTOP Product 2007 in Davao del Sur. Organic agriculture is promoted in the municipality which has its own organic produce center in its trade center in Poblacion, Magsaysay.

Technology Development thru Partnership MagRice is nurtured organically by community of farmer-partners of Diversified Organic Farming System (DOFS) Program of LGU A sustainable agriculture initiative in partnership with the civil society organization (CSO) with an Integrated Programs and Initiatives for Sustainable Agriculture and modified methods of System of Rice Intensification (SRI).

Mango production, especially its heavy reliance on chemical based pest and disease management threatens this LGU effort to promote responsible agriculture through lesser reliance to chemical based inputs and organic agricultural practice.

B. KEY PLAYERS AND FUNCTIONS

a) Mango Grower

There are three types of mango growers in Magsaysay, namely: the Growers, Contractor-sprayers and Contractor-growers.

a. A *Mango Grower* shoulders all the expenses of inputs and labor for farm activities such as tree maintenance, pest management, fertilization, flower induction, bagging harvesting. This is now rarely being practice in the Municipality of Magsaysay as mango growers now relies heavily to mango contractors as they cannot handle the risks associated in mango production.
b. A *Contractor-Sprayer* do not own the trees but mainly sprays and shoulders material and labor expenses for flower induction, bagging and harvesting with a sharing scheme of 70-30 percent. Seventy percent of the total volume produced will be the share of the Contractor-Sprayer. This is the most common scheme used in the Municipality of Magsaysay
c. The *Contractor-Grower* owns the trees contracted to be sprayed by Contractor-Sprayer. He takes responsibility of the maintenance of the trees such as weeding, fertilization, pruning, etc. prior flower induction. He gets a share of 30 percent from the total volume produced.

b) Traders

Mango producing municipalities in Davao del Sur have the similar marketing system which is dominated by big traders, such as the Interregional/regional/provincial assemblers, who act as the procurement arm of processors and exporters.

Volume of mango produced by growers in Magsaysay is traded to various key players in the marketing system such as the Assembler-Distributors (AD), Wholesaler-Retailers (WR) and Retailers (R) which are stationed in Digos City.

There are existing buying stations stationed in Digos City that serve as the procurement arms of exporters and processors. Quality mangoes sold to these buying stations find its way to international markets while those that do not conform to the set standards for export are treated as rejects and sold to local markets in Davao City and other regions as well as to mango processors in Davao City and Cebu. Fruits of best qualities are delivered to exporters in Metro Manila and finally sold to global markets.

c) Exporters

Mango exporters are engaged in buying of quality fresh Philippine Carabao mangoes from their regular suppliers which are the regional traders and consolidators. Exporters impose strict quality requirements and sorts and grade fresh mangoes for export using standards of importing countries. Depending on destination, standard and grading varies. Japan is said to have the strictest requirements among importing countries.

Exporters of fresh Philippine Carabao mangoes operate post-harvest facilities such as Vapor-heat treatment of hot-water treatment facilities. Exporters also provide for packaging materials for fresh mango products for export.

d) Processors

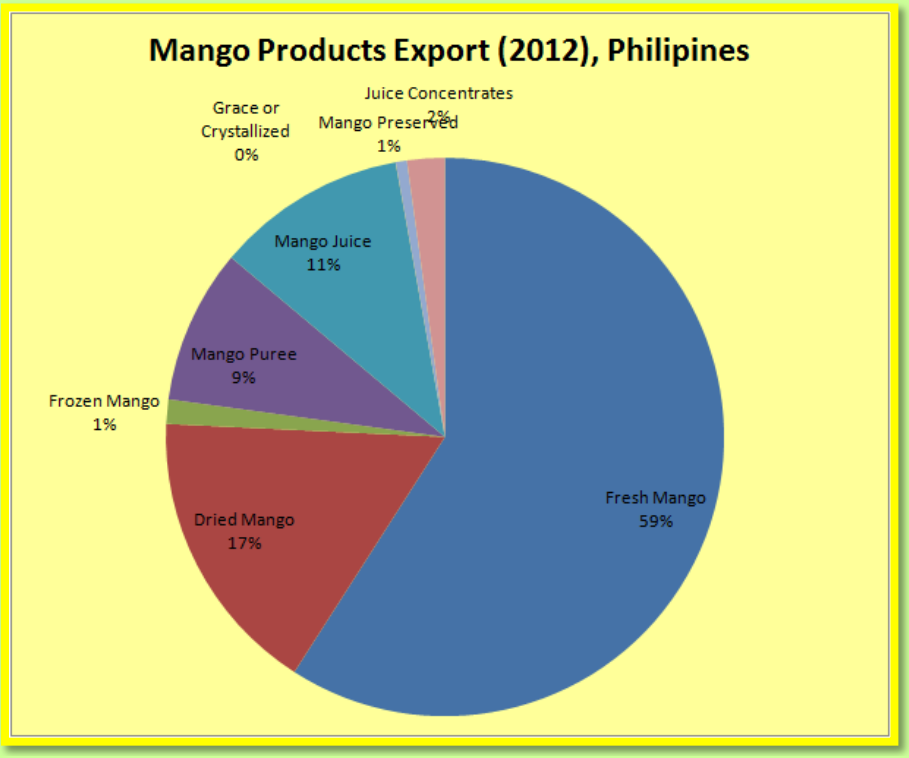
Mango processors are engaged in the processing of various mango products such as dried mangoes, mango puree, mango juice, mango jam and other preserved mango products. These processors get supply of fresh mangoes from regional traders, consolidators and assemblers. Processors are lesser strict in terms of quality of fresh mangoes that they get from their suppliers. Most of the mangoes that do not make to export market are absorbed by the processors. Fresh mango supplies from Magsaysay which are process grade make its way to big mango processors operating in Davao City and Cebu. Davao City has a mango processor the Philippine Fruits located in Toril, Davao City which is engaged in the production of dried mango, mango puree and mango preserves.

MARKETS AND MARKET OPPORTUNITIES

A. MARKETS AND MARKET TRENDS

1. Export Markets

Among the mango products exported from the country, Fresh Carabao Mango is still the leading which accounts for 59% of the total mango export in 2012. Other mango products exported accounts for 41% of mango products export. These includes dried mangoes, mango puree, mango juice, juice concentrates and other preparations such as frozen mango, and mango preserves. For the period 2008 2012, export of these products grew by 7.52%.



Philippines Mango Product Export (2012)

Presented in the table below is the complete list of mango products exported from the Philippines for the period 2008 – 2012.

Philippine mango products export (2008-2012)

Product Form	Volume (kgs.)					Average
	2008	2009	2010	2011	2012	
Fresh Mango	20,844,519	20,380,862	20,114,956	21,150,895	18,440,137	20,186,274
Dried Mango	1,027,235	1,049,919	3,619,962	9,463,639	5,203,310	4,072,813
Mango, Frozen	728,376	667,619	744,733	860,046	440,590	688,273
Puree	6,771,930	4,986,705	5,160,572	6,090,355	2,795,761	5,161,065

Product Form	Volume (kgs.)					Average
	2008	2009	2010	2011	2012	
Juice	3,593,850	5,628,393	3,687,742	5,069,095	3,447,849	4,285,386
Mango, Preserve (vinegar)	86	420	180	2,677	2,470	1,167
Grace or Crystallized					4,100	4,100
Preserved (sugar)	92,109	367,102	52,184	144,813	198,341	170,910
Juice Concentrates	147,303	282,230	487,676	607,021	681,208	441,088
Sweetened	752	123,336				62,044
Total Exports (F&P)	33,206,160	33,486,584	33,868,004	43,388,546	31,213,753	35,032,609
Total Processed	12,360,889	12,982,386	13,753,048	22,237,651	12,773,616	14,821,518
% Change		5.03	5.94	61.69	(42.56)	7.52

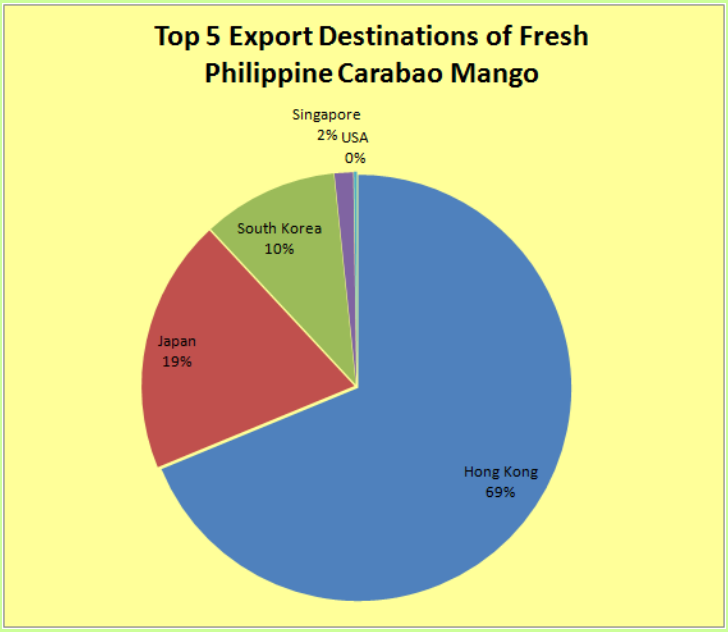
Fresh Carabao Mango Export

The Philippines has established credibility in supplying high quality mango to important markets such as Hong Kong, Japan, Singapore, United Kingdom, United States of America, Switzerland, and South Korea, among others.

For the period 2008-2012 Hong Kong had been Philippine's number one importer of fresh mangoes with its highest imported volume of 12,473,778 kilograms in year 2012. Next important export market for fresh Philippine Carabao mango is Japan with 3,496,247 kilograms in the same year. Other importing countries include USA, South Korea, Taiwan, United Kingdom, Singapore, China, Thailand and Canada.

Volume of mango exported to Hong Kong and Japan over the past five years has been fluctuating. This can be attributed to market forces and availability of fresh Carabao mango supply of the country that meets the export requirements.

As presented in the table below, are figures on fresh Carabao mango exported from the Philippines for the period 2008-2012. Overall, the country experienced a negative growth rate of 2.80 percent.



Fresh Carabao Mango: Volume of Export (kilograms), Philippines 2008-2012

IMPORTER	2008	2009	2010	2011	2012	% Change
Japan (excludes Okinawa)	4,596,213	4,310,744	3,770,259	3,694,961	3,496,247	-6.33
Hong Kong	13,369,871	13,966,610	15,338,612	15,686,472	12,473,778	-0.98
USA	164,310	42,824	11,553	114,426	42,490	-30.2
South Korea	1,180,640	528,808	427,425	1,347,449	1,866,494	44.85
Taiwan	-	-	-	11,430	636	-94.43
United Kingdom	-	-	574	2051	1,210	108.15
Singapore	352,804	277,271	115,103	141,186	258,202	6.41
China	993,785	1,090,216	369,054	13,008	20,150	-24.5
Thailand	550	-	-	-	-	
Canada	8,521	10,120	11,965	1300	19,507	336.96
Others	177,825	154,269	70,411	138,612	261,423	29.46
Total	20,844,519	20,380,862	20,114,956	21,150,895	18,440,137	-2.8

B. PRICE TRENDS

1. Export Markets

The price of exported Fresh Carabao Mangoes had an annual decreasing rate of 2.64 over the last five years (2008-2012). However, the price per kilogram of other forms of exported mango products soared in 2012.

Mangoes prepared or preserved by vinegar or acetic acid which has a quite stable price per kilogram ranging from US$2 to US$4 skyrocketed to US$17 per kilogram in 2012. Buying price per kilogram increased by more than 500 percent. Same is true with the cases of Frozen Mangoes and Preserved Mangoes with added sugar, which respective prices increased to more than US$8 per kilogram in 2012 from US$2 to US$3 in 2008 to 2011. The latter exported mango products prices' increase is around 350 percent.

MANGO (Fresh Carabao): Price Trend, by Product Form, Philippines, 2008-2012

Product Form	Price US$)					Ave.
	2008	2009	2010	2011	2012	
Fresh Mango	0.94	0.78	0.76	0.79	0.83	0.82
Dried Mango	7.28	8.40	7.91	8.40	9.23	8.24
Mango, Frozen	2.98	3.34	3.16	3.20	8.38	4.21
Puree	1.20	1.14	1.08	1.24	1.28	1.19
Juice	0.86	0.69	0.95	1.09	1.06	0.93
Mango, Preserved by Vinegar	3.85	4.00	2.39	3.03	17.89	6.23
Crystallized					8.50	8.50
Preserved (Added sugar)	1.95	1.23	1.81	2.65	8.59	3.25
Juice Concentrates	0.78	1.13	1.15	1.45	2.97	1.50
Sweetened	2.28	2.63				2.46

Value of Exports

Fresh mangoes have the highest number in terms of exported mango volume from 2008 to 2012. However, it does not dictate the fluctuations of the total value of exported mangoes as can be seen on Table 13. Other mango forms show higher values per kilogram, like dried mangoes and mangoes prepared by vinegar or acetic acid. For example, the 2011 value surge of exported mangoes to $113,344,965 which is the highest value in five years is caused by the increase in the volume of exported dried mangoes by almost 200 percent from 2010 onwards. Consequently, the 4 million kilogram decrease in the volume of exported dried mangoes decreased the 2012 value to $77,980,154.

MANGO (Fresh Carabao): Value of Export, by Product Form, Philippines, 2008-2012

Product Form	Value (US$)				
	2008	2009	2010	2011	2012
Fresh Mango	19,575,719	15,983,905	15,187,758	16,721,387	15,239,937
% Change		-18	-5	10	-9
Dried Mango	7,478,246	8,824,338	28,617,472	79,505,662	48,004,929
Mango, Frozen	2,171,087	2,227,464	2,353,538	2,752,938	3,691,242
Puree	8,137,982	5,681,782	5,576,008	7,560,489	3,569,776
Juice	3,082,018	3,889,281	3,496,173	5,534,595	3,667,455
Preserved by Vinegar	331	1,681	430	8,119	44,176
Crystallized					34,850
Preserved (Added sugar)	179,271	452,236	94,574	383,888	1,703,638
Juice Concentrates	114,166	319,645	561,555	877,887	2,024,151
Sweetened	1,715	324,041			
Total Exports (F&P)	40,740,535	37,704,373	55,887,508	113,344,965	77,980,154
Total Processed	21,164,816	21,720,468	40,699,750	96,623,578	62,740,217

C. MARKET STANDARDS AND REQUIREMENTS

a. Product Specifications

Product grades and standards are sets of product quality specifications and classifications developed by national and private industry to ensure minimum standards of quality for domestically produced crops. Grades and standards facilitate disposal, as there is a common language for whole trading.

In the country, the Philippine National Standard (PNS 168) for mango was developed by the Bureau of Product Standards (BPS) in 1991. Only few producers, however, are aware of the existence of such standards because its implementation is voluntary. Exporters follow the standards of importing countries, both for quality and size requirements. Table 14 shows the 5-size classification of Carabao mango based on PNS 168:1991 and the corresponding number of fruits in a carton.

Philippine National Standard for Fresh Carabao Mango (PNS 168:1991

Size Classification	Weight (grams per fruit)	Pieces per Carton			
		2.5 kg.	5 kg.	10 kg.	12 kg.
Extra Large (XL)	357 or more	6-7	12-14	24-28	30-32
Large (L)	290-356	8	16	32	41-43
Medium (M)	241-289	10	20	40	44-50
Small (S)	190-240	12	24	48	51-63
Super Small (SS)	160-189	14-16	28-32	56-64	64-75
"Bioco"	maximum of 85 grams per piece				

Source: *Bureau of Agriculture Fisher and Product Standards (BAFPS)*

Comparatively, the national standard vis-à-vis industry standard (Table 15) shows the slight variations in weight specifications for a particular size category. This further diminished the applicability of PNS 168:1991 in the trading of fresh mango in the country. Further, in comparison with an international standard like CODEX, this has only three (3) size codes points to wide discrepancy in size requirements. Apparently, CODEX is based on varieties that dominate international trade that are larger ("Kensington" weighs 350 to 750 grams; Florida types such as "Kent", "Haden" and "Tommy Atkins" weigh 400 to 700 grams and the Thai variety, "Nam doc Mai" weighs 350 to 580 grams).

MANGO (Carabao Fresh): Comparison of Different Size Standard Classification

Philippines				Code Standard		USDA	
Category	PNS 168:1991	Industry		Size Code	Weight (grams)	Category	Diameter (mm)
		Japan	HK				
Super Small	160-189	150-202	120-199	A	200-350	Small	< 6.35
Small	190-240	205-237	200-249	B	351-550	Medium	6.35-7.62
Medium	241-289	238-277	250-299	C	551-800	Large	> 7.62
Large	290-356	278-370	200-249				
Extra Large	> 357	> 371	> 350				

Source: DA Strategic Action Plan for Mango, Phil. Genetic, Inc., April 2002

b. Quality Requirements of Fresh Mango of Importing Countries and other market information

Japan and Korea

Mangoes being exported to Japan and Korea are being graded and classified according to the following export standard:

1. It must be fully matured (110-125 days from flower induction)
2. Free from defective quality and well clean and properly trimmed
3. Maximum of 5% on surface area for latex burn
4. No physical and mechanical defects
5. Free from pest disease (insect/worm damage)
6. Purely Philippine variety of typical shape

The Japanese government has specified a protocol for the control of fruit fly and imposed conditions before Philippine mangoes are allowed entry to Japan. The fruits should be subjected to vapor heat

treatment (VHT), packed in cartons in an enclosed packaging area, and inspected before shipment by personnel from the Japanese Ministry of Agriculture, Fisheries and Forestry (MAFF). The salary, transportation and accommodation of these quarantine officers are shouldered by the exporters

Hong Kong

There are 2 Hongkong market distribution center, one in Kowloon (yau MaTei) and in Hongkong side (western Wholesale and Food market).

Importation requirements and protocol are simple and easy to comply through basic documentation which is a tariff free market. Product packaging is in 12kgs. Each box contains specific size (XL,L,M,S). Fresh mango should be mature, green, clean, well-formed, smooth, well, and free from diseases, insect infestation and any damage that materially affects the appearance of the fruit. Wind scar, latex stain, latex burn and peel discoloration is acceptable only if it is not more than 2mm in diameter.

China

The China market for mango can be segregated into two, namely Southern China (areas in old canton and neighboring provinces) & Northern China (areas where Shanghai, Beijing, Tianjin, etc. are located). The border city and the gateway to China from HK is Shenzhen. This is assessment for taxes & tariffs (HK$ 30/12 kg. box) are done. As generally practiced, Philippine exporters access China market thru Hongkong not only because of logistical convenience but for credit and banking facilities. It is estimated that about 30 to 40 percent of Philippine mango shipped to Hong Kong are transshipped to Nan Hai Li Shui. Fruit trading in Nan Hai Li Shui is one credit term arrangement

France

France is the third largest mango market in Europe. Mangoes are available all year round and are mostly sourced from Ivory Coast, South Africa, Peru, Ecuador, Brazil and Mali. The Kent variety is the most popular in France because of its taste, reddish coloration and lack of fiber, but in the southern part of the country consumer prefer Tommy Atkins.

Supermarket distributes 30% of mangoes, the remainder being distributed through traditional halles, open markets and other retailers. The majority of French fruit importers are based in Rungis which houses 1,375 companies involved in the importation, distribution and sale of fresh flowers and ornamental plants, fruits and vegetables, seafood and milk products.

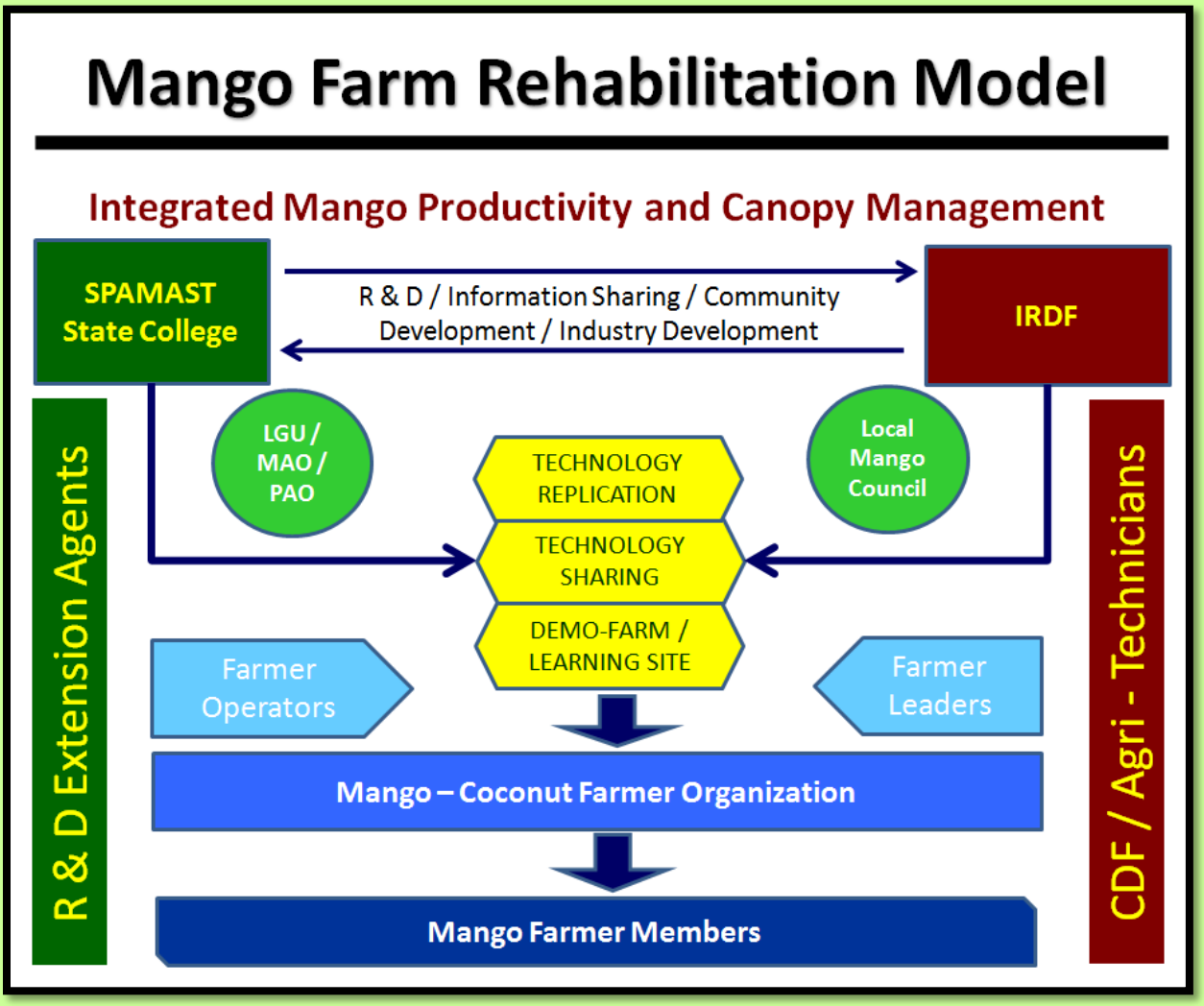
USA

USA allows importation of mangoes only if these are sourced in Guimaras Island, which they inspected and found free of mango seed weevil and pulp weevil. Also, they allow importation of Philippine mangoes to Hawaii and Guam only from fruits grown anywhere in the Philippines except Palawan.

US will also require VHT. The fruits should be subjected to vapor heat treatment (VHT), packed in cartons in an enclosed packaging area, and inspected before shipment by personnel from the USDA-APHIS. The salary, transportation and accommodation of these quarantine officers are shouldered by the exporters.

INTERVENTION MODEL

Given the constraints associated with growing mango in between coconut trees cited in the previous section, it is wise not to work and/or promote coconut-mango intercropping. However, if the project still intends to support mango industry, the model below describes the support intervention.



This model describes the existing mango farms intercropped with coconut to be rehabilitated through canopy management project. This project is undertaken by SPAMAST State College in Digos City, Davao del Sur in collaboration with Australian Center for International Agricultural Research (ACIAR) in collaboration with the provincial agriculture office of Davao del Sur and Department of Science and Technology (DOST). The project team can meet with SPAMAST to explore this potential collaboration.

PROFITABILITY ANALYSIS

Complete data related to profitability analysis is available on a separate excel files provided to IRDF.

COCONUT & MANGO PRODUCTION INVESTMENT COSTS AND RETURNS

Hills per hectare 50

Estimate for a 1 hectare farm with 100 coconut trees intercropped w/ 50 cacao trees		
	Coconut	Mango
Planting distan	10 x 10 meters	
Age of trees	32 years	over 10 years
Variety	Tagnanan Tall	
Harvest	Once / quarter	
Yield	1 bunch per month or 3 bunches per quarter/harvest	
	8 nuts per bunch per harvest	
	9,600 nuts per year	
	1 nut = 1 kilo	

Variable Input

	PRODUCTIVE AGE	MANGO	COCONUT	TOTAL
I	Annual Production Costs	68,193.75	26,717.50	94,911.25
a.	Farm Maintenance	36,100.00	12,917.50	49,017.50
	Fertilization	13,000.00	5,717.50	
	16-16-16	7,750.00		
	Application Rate / Tree (kg)	5.000		
	Price / Kg	31		
	Organic Fertilizer	1,500.00		
	Application Rate / Tree (kg)	5		
	Price / Kg	6.00		
	Ammonium Sulphate		517.50	
	Application Rate (grams/tree)		50.00	
	Cost per Unit (50kg bag)		517.50	
	Sodium Chloride		1,200.00	
	Application Rate (KG)		200.00	
	Cost per Unit (50kg bag)		300.00	
	Labor: Fertilization	3,750.00	4,000.00	
	Required Mandays	13		
	Cost per Manday	300.00		
	Weed Control	3,600.00	7,200.00	
	Piece Rate	72.00		
	Pest Control	12,000.00		
	Fungicide/ Insecticide	11,250.00		
	Application Rate / Tree (liters)	7.5		
	Price / Liter	1500		
	Labor: Pest Control	750.00		
	Required Mandays	2.5		
	Cost per Manday	300.00		
	Irrigation	2,250.00		
	Required Mandays	8		
	Cost per Manday	300.00		
	Overhead	4,500.00		
	Gas & Oil	2,500.00		
	Others	2,000.00		

b.	**Farm Tools & Equipment**	**-**		**-**
	Knapsack Sprayer			
	Scythe, Spade, etc			
	Plastic Crates			
II. FRUIT CARE & HARVESTING		**32,093.75**	**13,800.00**	**45,893.75**
a.	**Foliar and fruit/Flowering Fertilization**	**26,093.75**	**-**	**26,093.75**
	0-0-60	2,750.00		
	Application Rate / Tree (kg)	1.000		
	Price / Kg	55		
	Foliar	1,718.75		
	Application Rate / Tree (liters)	6.25		
	Price / liters	275		
	Labor	1,125.00		
	Required Mandays	3.75		
	Cost per Manday	300		
	Potassium Nitrate	6,750.00		
	Application Rate	1.875		
	Price / bag	3,600.00		
	Bagging	13,750.00		
	Piece Rate	275		
b.	**Harvesting**	6,000.00	13,800.00	**19,800.00**
	Required Mandays	20		
	Cost per Manday	300		
III. YIELD & SALES		**156,250.00**	**62,400.00**	**218,650.00**
a.	Yield in Kg	6,250.00	9,600.00	
b.	Selling Price	25	6.5	
c.	SALES	156,250	62,400	
d.	Net Income	55,962.50	21,882.50	
e.	Cost Per kg	10.91	2.78	

CONSTRAINTS AND OPPORTUNITIES

Constraints and Opportunities

Increased production and improved farm productivity through coconut-based farm diversification. This is the main goal of the project.

This in itself highlights the constraints associated with promotion of coconut-mango intercropping particularly in Magsaysay, Davao del Sur. Among them are the following:

1. The Local Government Unit is not supportive / does not promote mango production in the municipality
    - From 1994-1996, the LGU conducted a massive promotion of mango production thinking that it will provide income and job opportunities of the locals. Five (5) years later, the industry is dominated by contractors which are not from the locality. This discouraged the LGU in promoting mango production further
2. Coconut-mango intercropping is a mismatch
    - Both crops are a direct competition in terms of space and nutrition
    - Coconut is planted at 10 x 10 meters so terminals would not meet and good sunlight penetration is attained. Recommended minimum planting distance for mango is 15 x 15. Intercropping this two crops would create not only competition but it messes up the whole farm
    - As a result, productivity of both crops will drastically drop and farmer has to choose either to cut the coconut or the mango
3. Mango is not good in environmental, social and economical aspect
    - Mango production is practices chemical intensive farming. From the day flower induction is conducted, regularly, 15 days thereafter until harvest contractors will conduct chemical spraying to ward-off insect pests and diseases
    - This resulted to killing good insects such as honey bees which are pollinators of other plants such as coconuts.
    - Chemicals used in mango spraying are highly toxic and produces foul odor which are spread throughout nearby communities which are detrimental to the health of the locals
    - Income associated in mango production is unpredictable as production is highly influenced by weather condition, pests and diseases and demand and supply.
4. Climatic condition of Magsaysay is not suitable for mango
    - Magsaysay experiences more rainfall as compared to other areas in Davao del Sur. This is because the municipality is located in the boarder of North Cotabato which has a micro climate because the provinces still has a good forest cover
    - Mango is best planted in areas with prolonged dry season and too much rain and heavily overcast areas will cause more pest and disease infestation which is the experience of farmers in Magsasay, Davao del Sur.
5. Highly perishable
    - Mango is highly perishable and during peak months where market is flooded with mango price drops too low that farmers just leave the fruits in the trees to rot.

ANNEXES

List of Respondents and agencies visited / interviewed:

Agency / Respondent Visited / Interviewed	Organization / Address / Contact
Processors	
Mr. Emmannuel E. Zamoras General Manager	Magpet Agro-Industrial Resources Multi-Purpose Cooperative Brgy. Gubatan, Magpet, North, Cotabato Phone : 0917-1098026 Email : BotZamoras@yahoo.com.ph
Mr. Jun Relods Manager	Liberty Fruits Corp. Sitio Tandao, Purok 1, Muaan, Kidapawan City Phone : 0932-6016615
Ms. Analiza Mostrales Manager Mango Puree, Mango Jam Processor	Midsayap Mango Growers Association Purok Duranta, Lower Kiwanan, Midsayap, North Cotabato Phone : 0948-8258061
Emeline Sabado Proprietor Tablea / Chocolate Processor	Tablea Superyor Catalunan Grande, Davao City, Philippines Phone : 0917-5404000
Ms. Mary Jucyl Buenaflor Banana Chips Processor / Farmer	Brgy. Tawan-tawan, M'lang, North Cotabato Phone : 0919-3253938
Ms. Fe C. Flores Manager	Pasig Agrarian Reform Beneficiaries and Upland Multi-Purpose Cooperative Brgy. Pasig, Kiblawan, Davao del Sur Phone : 0910-4683827
Farmers / Farmer Organization / Traders	
Ms. Teodorica V. Serafica Manager	Magsaysay Farmers Multi-Purpose Cooperative Magsaysay, Davao del Sur Phone : 0949-7630024
Enrique V. Evangelista V-Chair Cardava PRDP Point Person	Magsaysay Farmers Multi-Purpose Cooperative Magsaysay, Davao del Sur Phone : 0908-5080845
Ms. Josephine L. Barsalote Chaiperson	Pasig Agrarian Reform Beneficiaries and Upland Multi-Purpose Cooperative Brgy. Pasig, Kiblawan, Davao del Sur Phone : 0930-3340979
Mr. Arthur Yarte Farmer Entrepreneur / Trainer Nursery Operator (cacao, coconut) Cacao Buyer Tablea Processor	Sitio San Isidro, Brgy. Malasila, Makilala, North Cotabato Phone : 0928-6520804
Mr. Leon Ratilla Farmer Association President	Brgy. New Bohol, Kidapawan City Phone : 0912-5084674
Mr. Roy Onez	Brgy. Biangan, Makilala, North Cotabato

Agency / Respondent Visited / Interviewed	Organization / Address / Contact
Cacao Farmer Trainer Nursery Operator Cacao Buyer	
Ma. Cynthia Amod Chairperson	Mabini Integrated Farmers and Workers Association Brgy. Mabini, Magsaysay, Davao del Sur Phone : 0921-6324742
Nelita Mait Farmer	Purok 1-B, Brgy. Manongol, Kidapawan City
Mrs. Violy Sarusos Farmer	Purok 4, Brgy. Estado, Matalam, North Cotabato
Elmer Palma Senior Technician Cardava Banana Plantation USPD	USPD Credit Cooperative, San Jose Highway, Digos City, Davao del Sur, Philippines Phone : (082) 553-3818
Ms. Margie Aguilo Mango Grower	Tres de Mayo, Digos City Phone : 0950-6373956
Maritess Buhawe Banana Cardava Farmer Intercropped Coconut	Paco, Km. 15, Kidapawan city
Evangeline Regular Farmer Coconut, banana cardava, fruit trees	Kidapawan City
Service Providers / Enablers	
Dr. Auggie Fuentes Director for Extension	SPAMAST State College Brgy. Matti, Digos City, Davao del Sur Email : rde@spamast.edu.ph
Ms. Graciela L. Caballero Researcher / Professor	SPAMAST State College Brgy. Matti, Digos City, Davao del Sur
Ms. Socorro Canonigo Manager	BCS Credit Cooperative Ramon delos Cientos Street, Poblacion Uno, Banslan, Davao del Sur Phone : (082) 286-3036 Email: bcscreditcoop@gmail.com Tel: (082)286 3036
Bernadette Avila Manager	Bansalan Cooperative Society MPC Ramon delos Cientos St., Pob. Bansalan, Davao del Sur Phone : 0977-1824364
Ms. Lucita M. Daval Senior Agriculturist Farmer Associations Coordinator	Provincial Agriculture Office Province of North Cotabato Phone : 0918-7176006
Mr. Reynato Cana Agriculture Technician	Municipal Agriculture Office Municipality of Makilala, North, Cotabato Phone : 0912-5042902
Ms. Jenepher A. Bade Agriculture Technician	Municipal Agriculture Office Municipality of Makilala, North, Cotabato

Agency / Respondent Visited / Interviewed	Organization / Address / Contact
	Phone : 0910-0216811
Delia Roldan Agriculture Technician	City Agriculture Office Kidapawan City, North Cotabato Phone : 0950-5810482
Helen Carampatana, RA Municipal Agriculturist Magsayaysay, Davao del Sur	Municipal Agriculture Office Municipality of Magsayasay, Davao del Sur Phone : 0947-1754636
Mr. Joseph V. Penonia Municipal Planning Offier	Municipal Planning Office Municipality of Magsayasay, Davao del Sur
Isabelito Zosas Agriculture Technician Magsaysay, Davao del Sur	Municipal Agriculture Office Municipality of Magsayasay, Davao del Sur Phone : 0946-0036644
Ms. Julie Sagolili Mango In-charge	Provincial Agriculture Office Digos City, Davao del Sur
Christian Sanchez Trade Specialist	Department of Trade and Industry Davao del Sur Field Office Digos City, Davao del Sur Email : christian121692@gmail.com
Jovelyn M. Paradillo Trade and Industry Development Specialist	Department of Trade and Industry North Cotabato Field Office Kidapawan City, North Cotabato Phone : 0909-8708622
Vic Dagangan	DOST – Davao del Sur Phone : 0929-2490828

For additional cost and return data of copra vs whole coconut, please refer to attached excel files.

MANGO PUREE & MANGO JAM PROCESSING

Operation

Manufacturing will be 15 days per month on the 1st and 2nd year. It will increase by 30% from 3rd to 5th year. Other direct costs and volume of production adjusted accordingly

Selling Price

Puree @Php150/liter

Jam @ Php100/600grams

Conversion Rate

180kg og Green Mangos = 160kg of Ripe Mangos

160kg Ripe Mangos, 60% will be manufactured as Mango Puree, 40% will be cooked as Mango Jam

Daily Production:

Puree: 62 liters

Jam: 69 pcs of 200g Jars

Inventory

90% of Production will be sold on the same year

Inventory Loss will be provided at 5% of ending inventory

PROJECTED NET INCOME

MANGO PUREE & MANGO JAM PROCESSING

Selling Price Mango Jam	100	100.00	100.00	100.00	100.00
Price Selling Price Mango Puree	150	150	150	150	150
	Y1	***Y2***	***Y3***	***Y4***	***Y5***
SALES	2,639,520.00	2,639,520.00	4,236,429.60	5,083,715.52	5,667,801.98
Mango Puree	1,516,320.00	1,516,320.00	2,433,693.60	2,920,432.32	3,504,518.78
Jam	1,123,200.00	1,123,200.00	1,802,736.00	2,163,283.20	2,163,283.20
Beg. Inventory	-	198,973.73	431,764.83	652,280.15	898,156.11
Direct Materials	1,641,737.28	1,723,824.14	2,382,048.94	2,501,151.39	2,626,208.96
Direct Labor	348,000.00	435,000.00	522,000.00	626,400.00	751,680.00
Cost of Goods Available for Sale	*1,641,737.28*	*1,922,797.87*	*2,813,813.77*	*3,153,431.54*	*3,524,365.08*
Less: Ending Inventory	*198,973.73*	*431,764.83*	*652,280.15*	*898,156.11*	*1,146,161.34*
COST OF SALES	1,442,763.55	1,491,033.04	2,161,533.62	2,255,275.43	2,378,203.74
GROSS PROFIT	***1,196,756.45***	***1,148,486.96***	***2,074,895.98***	***2,828,440.09***	***3,289,598.25***
OPERATING EXPENSES					
Salaries & Wages	240,000.00	240,000.00	360,000.00	420,000.00	480,000.00
Gas, Oil & Lubricants			36,000.00	48,000.00	60,000.00
Promotion & Marketing Expenses			5,000.00	10,000.00	15,000.00
Rent Expense		24,000.00	36,000.00	48,000.00	60,000.00
Repair & Maintenance	6,000.00	6,000.00	12,000.00	12,600.00	13,230.00
Power, Light & Water	72,000.00	72,000.00	75,600.00	79,380.00	83,349.00
Office Supplies	12,000.00	12,000.00	12,600.00	13,230.00	13,891.50
Depreciation Expense	100,000.00	100,000.00	105,000.00	110,250.00	115,762.50
Taxes & Licenses	2,000.00	2,000.00	2,500.00	2,500.00	2,500.00
Miscellaneous Expenses	5,000.00	5,000.00	7,500.00	10,000.00	12,500.00
Communication Expense	6,000.00	6,000.00	6,300.00	6,615.00	6,945.75
Inventory Loss	9,948.69	21,588.24	32,614.01	44,907.81	57,308.07
TOTAL OPERATING EXPENSES	**452,948.69**	**488,588.24**	**691,114.01**	**805,482.81**	**920,486.82**
NET INCOME	***743,807.76***	***659,898.72***	***1,383,781.97***	***2,022,957.28***	***2,369,111.43***

MANGO PUREE & MANGO JAM PROCESSING

GOOD PRODUCED

90% of Inventory Sold

PUREE ***90%***

150	***YEAR 1***	***YEAR 2***	***YEAR 3***	***YEAR 4***	***YEAR 5***
Goods Produced	11,232	11,232	18,027	21,633	25,959
Beg Inventory	-	1,123	2,246	4,049	6,212
Items Sold	10,109	10,109	16,225	19,470	23,363
Ending Inventory	1,123	2,246	4,049	6,212	8,808

JAM ***90%***

100	***YEAR 1***	***YEAR 2***	***YEAR 3***	***YEAR 4***	***YEAR 5***
Goods Produced	12,480	12,480	20,030	24,036	28,844
Beg Inventory	-	1,248	2,496	4,499	6,903
Items Sold	11,232	11,232	18,027	21,633	25,959
Ending Inventory	1,248	2,496	4,499	6,903	9,787

PROFITABILITY ANALYSIS

BREAK-EVEN

	Y1	Y2	Y3	Y4	Y5
Selling Price - Puree	150.00	150.00	150.00	150.00	150.00
Direct Cost	90.87	99.13	82.49	67.23	67.23
Contribution Margin	59.13	50.87	67.51	82.77	82.77
Selling Price - Jam	100.00	100.00	100.00	100.00	100.00
Direct Cost	77.65	83.76	70.74	63.20	56.60
Contribution Margin	22.35	16.24	29.26	36.80	43.40
Indirect Cost (Puree@60%)	271,769.21	293,152.94	414,668.40	483,289.68	552,292.09
Indirect Cost (Jam@40%)	181,179.47	195,435.30	276,445.60	322,193.12	368,194.73
BREAK-EVEN UNITS	***4,596***	***5,763***	***6,142***	***5,839***	***6,672***
BREAK-EVEN UNITS	***8,106***	***12,036***	***9,448***	***8,756***	***8,485***

PROFITABILITY

Profit Margin Ratio	**28%**	**25%**	**33%**	**40%**	**42%**
Net Income	743,807.76	659,898.72	1,383,781.97	2,022,957.28	2,369,111.43
Net Sales	2,639,520.00	2,639,520.00	4,236,429.60	5,083,715.52	5,667,801.98
Gross Profit Rate	**45%**	**44%**	**49%**	**56%**	**58%**
Gross Margin	1,196,756.45	1,148,486.96	2,074,895.98	2,828,440.09	3,289,598.25
Sales	2,639,520.00	2,639,520.00	4,236,429.60	5,083,715.52	5,667,801.98

EFFICIENCY RATIO

Inventory Turn-over	**14.50**	**4.73**	**3.99**	**2.91**	**2.33**
Cost of Sales	1,442,763.55	1,491,033.04	2,161,533.62	2,255,275.43	2,378,203.74
Average Inventory	99,486.86	315,369.28	542,022.49	775,218.13	1,022,158.73

Banana Chip - First Fry
PROFIT & LOSS STATEMENT
Assumptions and Conversions

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Kilograms / batch (daily)	500	600	667	767	833
Capacity per Day (kg)	125	150	167	192	208
Production Days/ month	15	18	20	23	25
Direct Labor	5	5	5	5	5
Labor / Manday	300	300	325	350	350
Recovery Rate	25%	25%	25%	25%	25%
Cooking oil	17	18	20	22	24.20
Buying price of oil	60	66	70	70	70.00
Packaging (g)	6	6	7	7	8
Packagin Materials/75g	5	5	5	5	5
Buying Price of Green Banana	7	7.5	8	8	9
Selling Price /75g pack	12	12	15	15	15
Daily Volume (75g pack)	1667	2000	2222	2556	2778

PRODUCTION per month (75g pac	25,000	36,000	44,444	58,778	69,444
Inventory (I month supply)	1,875	2,700	3,333	4,408	5,208
PURCHASES - Green Banana	630,000	972,000	1,280,000	1,692,800	2,250,000
Cooking Oil	15,300	21,384	28,000	35,420	42,350
Packaging Materials	125,000	180,000	222,222	293,889	347,222
Direct Materials	770,300	1,173,384	1,530,222	2,022,109	2,639,572
Direct Labor	270,000	324,000	390,000	483,000	570,652
TOTAL DIRECT COST	1,040,300	1,497,384	1,920,222	2,505,109	3,210,224
Direct Cost/75g pack	41.61	41.59	43.21	42.62	46.23
SALES	300,000.00	432,000.00	666,666.67	881,666.67	1,041,666.67
Gross Profit/ 75g pack	(29.61)	(29.59)	(28.21)	(27.62)	(31.23)

PROJECTED PROFIT & LOSS

BANANA CHIPS PROCESSING

Price	18	18	18	18	18
	Y1	***Y2***	***Y3***	***Y4***	***Y5***
SALES	300,000.00	432,000.00	666,666.67	881,666.67	1,041,666.67
Beg. Inventory	-	78,022.50	112,303.80	144,016.67	187,883.17
Direct Materials	755,000.00	1,152,000.00	1,502,222.22	1,986,688.89	2,597,222.22
Direct Labor	*270,000.00*	*324,000.00*	*390,000.00*	*483,000.00*	*570,652.17*
Cost of Goods Available for Sale	*1,025,000.00*	*1,476,000.00*	*1,892,222.22*	*2,469,688.89*	*3,167,874.40*
Less; Ending Inventory	78,022.50	112,303.80	144,016.67	187,883.17	240,766.83
Cost of Goods Available for Sale	946,977.50	1,363,696.20	1,748,205.56	2,281,805.72	2,927,107.57
GROSS PROFIT	***(646,977.50)***	***(931,696.20)***	***(1,081,538.89)***	***(1,400,139.06)***	***(1,885,440.90)***
OPERATING EXPENSES					
Salaries & Wages			96,000.00	96,000.00	96,000.00
Transportation	12,000.00	13,200.00	14,520.00	15,972.00	17,569.20
Water	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Light	18,000.00	19,800.00	21,780.00	23,958.00	26,353.80
Communication	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Depreciation	-	-	-	-	-
TOTAL OPERATING EXPENSES	42,000.00	46,200.00	146,820.00	151,902.00	157,492.20
OTHER INCOME					
Project Subsidy	-	-	-	-	
NET INCOME	***(688,977.50)***	***(977,896.20)***	***(1,228,358.89)***	***(1,552,041.06)***	***(2,042,933.10)***

Property & Equipment			
Pugon	20,000.00	5	800.00
Kawa	15,000.00	5	600.00
Other tools	10,000.00	3	1,111.11

PROFITABILITY ANALYSIS

BREAK-EVEN

	Y1	Y2	Y3	Y4	Y5
Selling Price	12.00	12.00	12.00	12.00	12.00
Direct Cost	41.61	41.59	43.21	42.62	46.23
Contribution Margin	(29.61)	(29.59)	(31.21)	(30.62)	(34.23)
Indirect Cost/OPEX	42,000.00	46,200.00	146,820.00	151,902.00	157,492.20
BREAK-EVEN UNITS	***(1,418)***	***(1,561)***	***(4,705)***	***(4,961)***	***(4,601)***

PROFITABILITY

Profit Margin Ratio	**-229.66%**	**-226.36%**	**-184.25%**	**-176.03%**	**-196.12%**
Net Income	(688,977.50)	(977,896.20)	(1,228,358.89)	(1,552,041.06)	(2,042,933.10)
Net Sales	300,000.00	432,000.00	666,666.67	881,666.67	1,041,666.67
Gross Profit Rate	**-215.66%**	**-215.67%**	**-162.23%**	**-158.81%**	**-181.00%**
Gross Margin	(646,977.50)	(931,696.20)	(1,081,538.89)	(1,400,139.06)	(1,885,440.90)
Sales	300,000.00	432,000.00	666,666.67	881,666.67	1,041,666.67

EFFICIENCY RATIO

Inventory Turn-over	**1.85**	**1.76**	**1.74**	**1.75**	**1.74**
Cost of Sales	946,977.50	1,363,696.20	1,748,205.56	2,281,805.72	2,927,107.57
Average Inventory	512,500.00	777,011.25	1,002,263.01	1,306,852.78	1,677,878.78
Days Sales of Inventory	**197.54**	**207.97**	**209.26**	**209.05**	**209.23**

COCONUT COSTS AND RETURNS

100 100 100 100

Assumptions & Conversions	***Estimate for 1 hectare farm 100 Coconut Trees***					
	Planting distance	*10 x 10 meters*				
	Age of trees	*32 years*				
	Variety	*Tagnanan Tall*		***Copra***		***Whole Nut***
	Harvest	*once every quarter*		***Price***	***25***	***6.4***
	Yield	*1 bunch per month or 3 bunches per quarter/harvest*		***Estimated Cos***	***PHP 22.65***	***PHP 5.25***
		8 nuts per bunch per harvest		***Gross Profit Ra***	***9.41%***	***17.94%***
		9,600 nuts per year				
		1 nut = 1 kilo				
		3.5 nuts = 1 kg of copra	*1 coco shell = 15% of whole nut weight*			

		WHOLENUT				
		Q1	Q2	Q3	Q4	YEARLY
I. ANNUAL PRODUCTION COSTS		**13,708.75**	**11,950.00**	**12,808.75**	**11,950.00**	**50,417.50**
i. Fertilizer		**858.75**	**-**	**858.75**	**-**	**1,717.50**
	Ammonium Sulphate	**258.75**	**-**	**258.75**	**-**	**517.50**
	Application Rate (grams/tre	25.00		25.00		50.00
	Cost per Unit (50kg bag)	517.50		517.50		517.50
	Sodium Chloride	**600.00**	**-**	**600.00**	**-**	**1,200.00**
	Application Rate (KG)	100.00		100.00		200.00
	Cost per Unit (50kg bag)	300.00		300.00		300.00
iii. Weed Control		**1,800.00**	**1,800.00**	**1,800.00**	**1,800.00**	**7,200.00**
	Mandays / Quarter	6	6	6	6	
	Cost per Manday	300.00	300.00	300.00	300.00	
iv. Labor: Farm Maintenance		**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	**4,000.00**
	Fertilization	1,000.00	1,000.00	1,000.00	1,000.00	
	Piece Rate	10.00	10.00	10.00	10.00	
	No of Trees	100.00	100.00	100.00	100.00	
v. HARVESTING		**2,100.00**	**2,100.00**	**2,100.00**	**2,100.00**	**8,400.00**
	Harvesting	1,500.00	1,500.00	1,500.00	1,500.00	
	Piece Rate/ Tree	15.00	15.00	15.00	15.00	
	No of Trees	100.00	100.00	100.00	100.00	
	Hauling	600.00	600.00	600.00	600.00	
	Piece Rate	0.25	0.25	0.25	0.25	
vi. PROCESSING		**2,250.00**	**1,350.00**	**1,350.00**	**1,350.00**	**6,300.00**
	Dehusking	1,350.00	1,350.00	1,350.00	1,350.00	
	Piece Rate: Dehusking	0.30	0.30	0.30	0.30	
	No. of Trees	100.00	100.00	100.00	100.00	
	Bunch/ tree/ quarter	3.00	3.00	3.00	3.00	
	Nuts/Bunch/ Quarter	15.00	15.00	15.00	15.00	
	Nut Breaking & Drying					
	Piece Rate					
	Demeating					
	Piece Rate					
	Bagging & Hauling of Copra					
	Piece Rate (sack)					
	Kilos of Copra					
vii. Marketing	Transportation	**2,700.00**	**2,700.00**	**2,700.00**	**2,700.00**	**10,800.00**
	Cost/Nut	0.60	0.60	0.60	0.60	
	Nuts/ Quarter	4,500.00	4,500.00	4,500.00	4,500.00	
vii. Farm Overhead		**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	**12,000.00**
	Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	
III YIELD		**15,360.00**	**15,360.00**	**15,360.00**	**15,360.00**	**61,440.00**
i. No. of trees		100	100	100	100	
ii. Bunches/ tree		3	3	3	3	12
iii. Nuts / Bunch		8	8	8	8	32
iv. Yield in Kilograms/ quarter		2,400	2,400	2,400	2,400	9,600
v. Kilograms of Copra						
vi. Price / kilogram Copra						
vii. Price / kilogram Wholenut		6.40	6.40	6.40	6.40	6.40
viii. Cocoshell						
ix. Price/ kg Coco shell						
x. Gross Revenues / quarter		15,360.00	15,360.00	15,360.00	15,360.00	61,440.00
IV NET INCOME		**1,651.25**	**3,410.00**	**2,551.25**	**3,410.00**	**11,022.50**
V. RATES OF RETURN AND COSTS						
ii. Cost per kilo		PHP 5.71	PHP 4.98	PHP 5.34	PHP 4.98	PHP 5.25
iii. Gross Profit Rate		10.75%	22.20%	16.61%	22.20%	17.94%

			Q1	Q2	Q3	Q4	YEARLY
COPRA							
I.	**ANNUAL PRODUCTION COSTS**		**15,958.75**	**15,100.00**	**15,958.75**	**15,100.00**	**62,117.50**
i.	**Fertilizer**		**858.75**	**-**	**858.75**	**-**	**1,717.50**
		Ammonium Sulphate	**258.75**	**-**	**258.75**	**-**	**517.50**
		Application Rate (grams/tre	25.00		25.00		50.00
		Cost per Unit (50kg bag)	517.50		517.50		517.50
		Sodium Chloride	**600.00**	**-**	**600.00**	**-**	**1,200.00**
		Application Rate (KG)	100.00		100.00		200.00
		Cost per Unit (50kg bag)	300.00		300.00		300.00
iii.	**Weed Control**		**1,800.00**	**1,800.00**	**1,800.00**	**1,800.00**	**7,200.00**
		Mandays / Quarter	6	6	6	6	
		Cost per Manday	300.00	300.00	300.00	300.00	
iv.	**Labor: Farm Maintenance**		**1,000.00**	**1,000.00**	**1,000.00**	**1,000.00**	**4,000.00**
		Fertilization	1,000.00	1,000.00	1,000.00	1,000.00	
		Piece Rate	10.00	10.00	10.00	10.00	
		No of Trees	100.00	100.00	100.00	100.00	
v.	**HARVESTING**		**2,100.00**	**2,100.00**	**2,100.00**	**2,100.00**	**8,400.00**
		Harvesting	1,500.00	1,500.00	1,500.00	1,500.00	
		Piece Rate/ Tree	15.00	15.00	15.00	15.00	
		No of Trees	100.00	100.00	100.00	100.00	
		Hauling	600.00	600.00	600.00	600.00	
		Piece Rate	0.25	0.25	0.25	0.25	
vi.	**PROCESSING**		**4,500.00**	**4,500.00**	**4,500.00**	**4,500.00**	**18,000.00**
		Dehusking	1,350.00	1,350.00	1,350.00	1,350.00	
		Piece Rate: Dehusking	0.30	0.30	0.30	0.30	
		No. of Trees	100.00	100.00	100.00	100.00	
		Bunch/ tree/ quarter	3.00	3.00	3.00	3.00	
		Nuts/Bunch/ Quarter	15.00	15.00	15.00	15.00	
		Nut Breaking & Drying	900.00	900.00	900.00	900.00	
		Piece Rate	0.20	0.20	0.20	0.20	
		Demeating	1,350.00	1,350.00	1,350.00	1,350.00	
		Piece Rate	0.30	0.30	0.30	0.30	
		Bagging & Hauling of Copra	900.00	900.00	900.00	900.00	
		Piece Rate (sack)	35.00	35.00	35.00	35.00	
		Kilos of Copra	1,285.71	1,285.71	1,285.71	1,285.71	
vii.	**Marketing**	Transportation	**2,700.00**	**2,700.00**	**2,700.00**	**2,700.00**	**10,800.00**
		Cost/Nut	0.60	0.60	0.60	0.60	
		Nuts/ Quarter	4,500.00	4,500.00	4,500.00	4,500.00	
vii.	**Farm Overhead**		**3,000.00**	**3,000.00**	**3,000.00**	**3,000.00**	**12,000.00**
		Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	
III	**YIELD**		**18,402.86**	**18,402.86**	**18,402.86**	**18,402.86**	**73,611.43**
i.	No. of trees		100	100	100	100	100
ii.	Bunches/ tree		3	3	3	3	12
iii.	Nuts / Bunch		8	8	8	8	32
iv.	Yield in Kilograms/ quarter		2,400	2,400	2,400	2,400	9,600
v.	Kilograms of Copra		686	686	686	686	2,743
vi.	Price / kilogram Copra		25	25	25	25	25
vii.	Price / kilogram Wholenut						0
viii.	Cocoshell		360.00	360.00	360.00	360.00	1,440
ix.	Price/ kg Coco shell		3.50	3.50	3.50	3.50	3.50
x.	Gross Revenues / quarter		18,402.86	18,402.86	18,402.86	18,402.86	73,611.43
IV	**NET INCOME**		**2,444.11**	**3,302.86**	**2,444.11**	**3,302.86**	**11,493.93**
V.	**RATES OF RETURN AND COSTS**						
ii.	Cost per kilo		PHP 23.27	PHP 22.02	PHP 23.27	PHP 22.02	PHP 22.65
iii.	Gross Profit Rate		6.91%	11.92%	6.91%	11.92%	9.41%