BUTUAN CITY COMMODITY INVESTMENT PLAN

2016

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ACRONYMS	
BCCIP	Butuan City Commodity Investment Plan
PRDP	Philippine Rural Development Program
CPMIU	City Project Management and Implementing Unit
DA	Department of Agriculture
OCA	Office of the City Agriculturist
LGU	Local Government Units
NGAs	National Government Agencies
CDC	City Development Council
SP	Sangguniang Panlungsod
PCA	Philippine Coconut Authority
DOLE	Department of Labor and Employment
BAS	Bureau of Agricultural Statistics
PSA	Philippine Statistical Authority
NIA	National Irrigation Administration
DPWH	Department of Public Works and Highways
PhilFIDA	Philippine Fiber Development Authority
DTI	Department of Trade and Industry
DILG	Department of Interior and Local Government
DENR	Department of Environment and Natural Resources
DOST	Department of Science and Technology
TESDA	Technical Education and Skills Development Authority
PAG-ASA	Philippine Atmospheric Astronomical
SOCCSKSARGEN	refers to the Provinces of South Cotabato, Sultan Kudarat, Sarangani and General Santos
VCA	Value Chain Analysis
VCD	Value Chain Development
VSA	Vulnerability and Suitability Assessment
E-VSA	Expanded Vulnerability and Suitability Assessment
PCCR	Philippine Coco Coir Roadmap
PCCIDC	Philippine Coco Coir Industry Development Council
CISPPA	Coconut Industry Strategic Plan for Philippine Agriculture
MPC	Multi-Purpose Cooperative
GMP	Good Manufacturing Practices
GAP	Good Agricultural Practices
HACAP	Hazard Analysis and Critical Control Points

RCFI	Retail Countryside Fund
CPC	Credit Program for Cooperatives
CLP	Cooperative Lending Program
APL	Agricultural Product Loan
WCL	Working Capital Loan
RI	Rediscounting Line
PNs	Promissory Notes
ACCESS	Accelerating Change in the Countryside thru Equity Sharing Strategy
EPPA	Easy Pondong Pang-asenso
SULONG	SME Unified Lending Opportunities for National Growth
UCAP	United Coconut Associations of the Philippines
FSSI	Foundation for a Sustainable Society
COCOBIND	Coconut Business Integration and Development Program
SBL	Small Business Loan

BUTUAN CITY COMMODITY INVESTMENT PLAN

INTRODUCTION

The challenge for the officialdom of Butuan City is how to further the welfare of its people and the communities by creating convenient, equitable, healthful, efficient and attractive environment for the present and future generation. As the population of Butuan City grows competing for food and fiber sourcesin a shrinking land resources, it may change the look and feel of the landscpes and the communities which may result to conflicts. These conflicts may threaten the security in the areas of food, social, environmental, economic and even political. It is becoming more widely understood that any sector of land has a certain capacity for supporting human, animal and vegetative life in harmony, and that upsetting this balance has dire consequences on the environment.

The formulation of the Butuan City Commodity Investment Plan takes cognizance of rationalizing the utilization of its fixed land resources, balancing investment and development opportunities with responsible environmental management, conservation and community aspirations. Being an agricultural area, the planning process involved will help create certainties for if, where, when and how agricultural development can take place. This will also involve the orderly disposition of its land reources with a view of securing the physical, economic and social efficiency, health and well being of the rural communities directly and indirectly theurban communities. It will also engage the citizens and policy makers to plan for development with more intention, foresight and community focus.

Butuan City has adopted the Value chain Development approach in its planning process towards the promotion and development of the agricultural sector. It has localized the value chain analysis initially of the four agricultural commodities namely; 1. Rubber, 2. Cacao, 3. Banana and 4. Coconut. Enterprises would be created from these commodities which will be collectively owned and operated by individual farmers' organizations. This would be the vehicle of empowering these organizations and the strategy of drawing in the support of the local government of Butuan City.

The Butuan City Commodity Investment Plan is undertaken taking into account the elements of the following:

1. Clarity – it is a guide to the City Government of Butuan what are the activities to be undertaken relative to the development of certain commodities and the areas that contributes to economic development
2. Ownership – it is clear that the project will create social enterprises that are designed to be collectively owned and promote the interests of the farmers and fisherfolks as well as the marginalized people and all other stakeholders
3. Transparency – the operations of the social enterprises should be transparent in nature to generate the trust and confidence of members of the proponent group to ensure

sustainability beyond the program and the continued support of the local government units

4. Accountability – the promotion and development of the local industry should be the responsibility of all stakeholders who have the interests in achieving the goal and vision of Butuan City (Over-all) and the agriculture sector.

CHAPTER 1: DEVELOPMENT BACKGROUND/CONTEXT

The development of Butuan City is drawn from the potentials and opportunities of agriculture and fisheries. The City was once famous for its Timber Resources decades ago and was the prime mover of its economic development. The over exploitation of its timber resources at a rapid pace without establishing complementary industries to offset the lost economic opportunities has brought the economic growth of Butuan City to a standstill. This is also aggravated by the issuance of E.O. 23 which as per record increases job displacements.

Agriculture features prominently in Butuan City's economy and contributes a modest percentage to its income. As per record from the Office of the City Agriculturist , more or less 19,870 hectares are devoted to agricultural crops (staple : rice and corn , plantation crops : oil palm, rubber and coffee , root crops : cassava, sweet potato, fruit trees : mango, durian , pineapple and others). The promotion and development of these commodities have in a way contributed to the local economy.

There are initiatives by some multinational corporations to establish large scale plantations in Butuan City ranging from 10,000 hectares cassava plantation by a Malaysian Firm and San Mguel Foods Incorporated, Cacao Plantations by Kennemer Foods International, and Oil Palm by a Malaysian Firm and the Filipinas Palm Oil Plantations Incorporated. Financial Services are to be provided by Land Bank of the Philippines through loans and guaranteed by these firms. The oil palm initiative in Barangay Florida and the Cassava inititive in Barangay Manila de Bugabus were jumpstarted but owing to a variety of reasons, performed dismally.

Despite some gains, several calls and challenges have to be addressed for longer term development. One of them is to develop and adopt technologies (farming systems) which can increase the over-all productivity and profitability. Another is to ensure that whatever are produced, the surplus will be marketed taking into consideration the factors/variables such as transportation, processing and marketing costs. Another challenge is the preservation of the integrity of the environment and the resiliency of the farms to climate change. What we failed to integrate in the planning process is the development of the value chains in a given commodity and bringing out the risks assumptions and its management.

Butuan City has still more or less 21,000 hectares of lands available for agricultural development. That is exclusive of disaster prone areas (flooding) which can still be utilized subject to some mitigation measures. The Butuan City Commodity Investment Plan is formulated and designed to bring out the best options in developing the fixed but shrinking land resources in Butuan City adopting the Value Chain Development Approach. The Plan is also the guide of the City Government of Butuan in providing the food requirements and

human security to its citizenry in the years to come. The Butuan City Commodity Investment Plan for 2017-2020 is designed along the following components namely :

1. Professionalization of the producers
2. Intensified and sustainable development of the production systems
3. Developed commodity chains and promotion of agri-business
4. Developed sector institutionally

The Butuan City Commodity Investment Plan aims to achieve the following:

1. Removal of obstacles to investments
2. Provision of visibility and technical assistance to investment projects
3. Making smarter use of new and existing financial resources
4. Mobilize investments of at least P 949.400 M in four (4) years
5. Creation of an environment friendly environment
6. Overcome current market failures by addressing market gaps and mobilising private investments.
7. Identify strategic investments in key areas such as infrastructure, education, research and innovation as well as risk finance for small businesses (social enterprises).

The plan initially covers the development of four (4) agricultural commodities namely:

1. Rubber
2. Cacao
3. Banana
4. Coconut

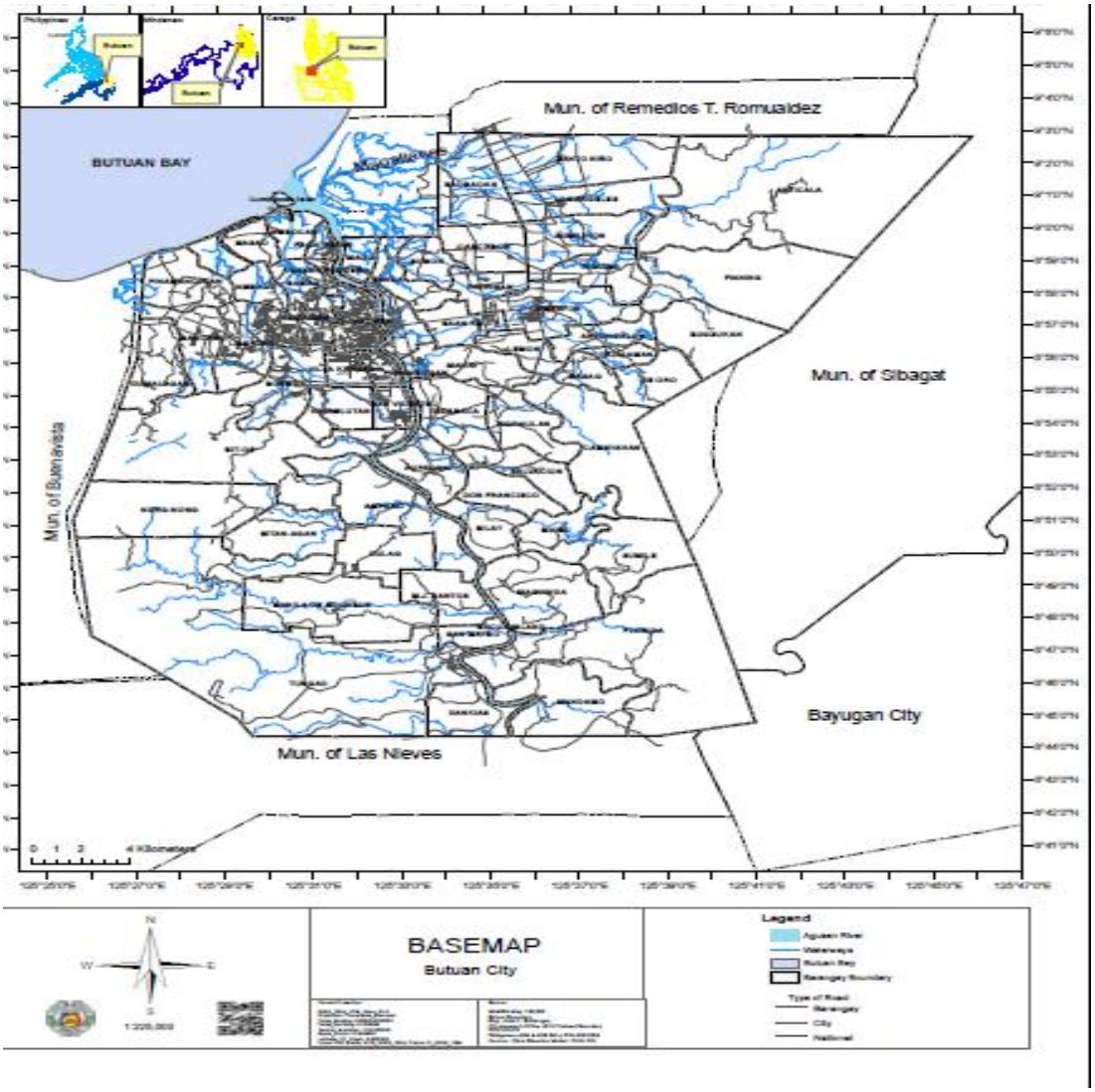
It will be expanded later to include swine, bangus, organic rice, dairy cattle and other crops that are equally important to the development of the local economy of Butuan City. This will be also the master plan of the Office of the City Agriculturist in transforming the agriculture sector of Butuan City.

Butuan City's Geographic Profile

The City of Butuan is geographically located on the central part of the Province of Agusan del Norte. It lies between 125 degrees27'23" to 125 degrees 43'13" east longitude and between 8 degrees 44' 27" to 9 degrees 0.2' 53 north latitude. It is bounded in the west by the Municipality of Buenavista, in the east by the Municipality of Sibagat, in the south by the Municipality of Las Nieves and in the north by the Municipality of Magallanes, Cabadbaran and Butuan Bay forming the natural boundary and drainage of Agusan River toward the body of water.

A. Geo-physical Maps

MAP 1: BASE MAP OF BUTUAN CITY



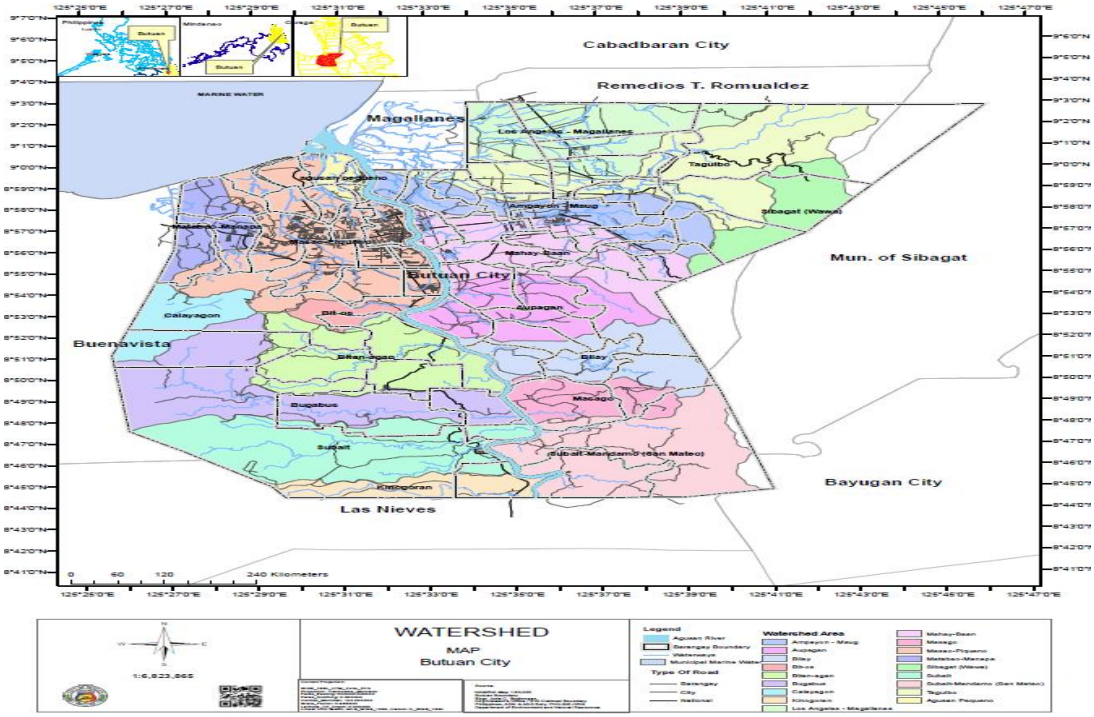
The City of Butuan is made up of a wide coastal plain connecting the Las Nieves-Bayugan-San Luis alluvial plain which is part of the Agusan –Davao trough. A mountain range straddles in the southeast boundary with the 675 meter high Mount Mayapay dominating the area. To the east of the area is the Agusan River which flows northward into the Butuan Bay. Said river is the biggest in Agusan and is one of the seven major rivers in the country. The river is moderately deep and navigable by small water vessels reaching as far as Agusan Del Sur.

MAP 2: WATERSHED MAP

Below is the watershed map of Butuan City. A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. It is very important that in planning and locating investment projects, the location of the water bodies that supply the drinking water, the irrigation water for production areas and manufacturing and the natural habitat to numerous plants and animals are considered. Also protection measures can be adequately planned to protect the quality of Butuan City's watershed.

Based from the Map, there are 18 watershed areas in Butuan City that all drains in Lumbucan . These watersheds are necessary to the life of the City and are very important also to the development of the upland areas. Adopting the Ridge to Ridge development approach, it is

very necessary to consider these watersheds in the preparation of the Butuan City Commodity Investment Plan.

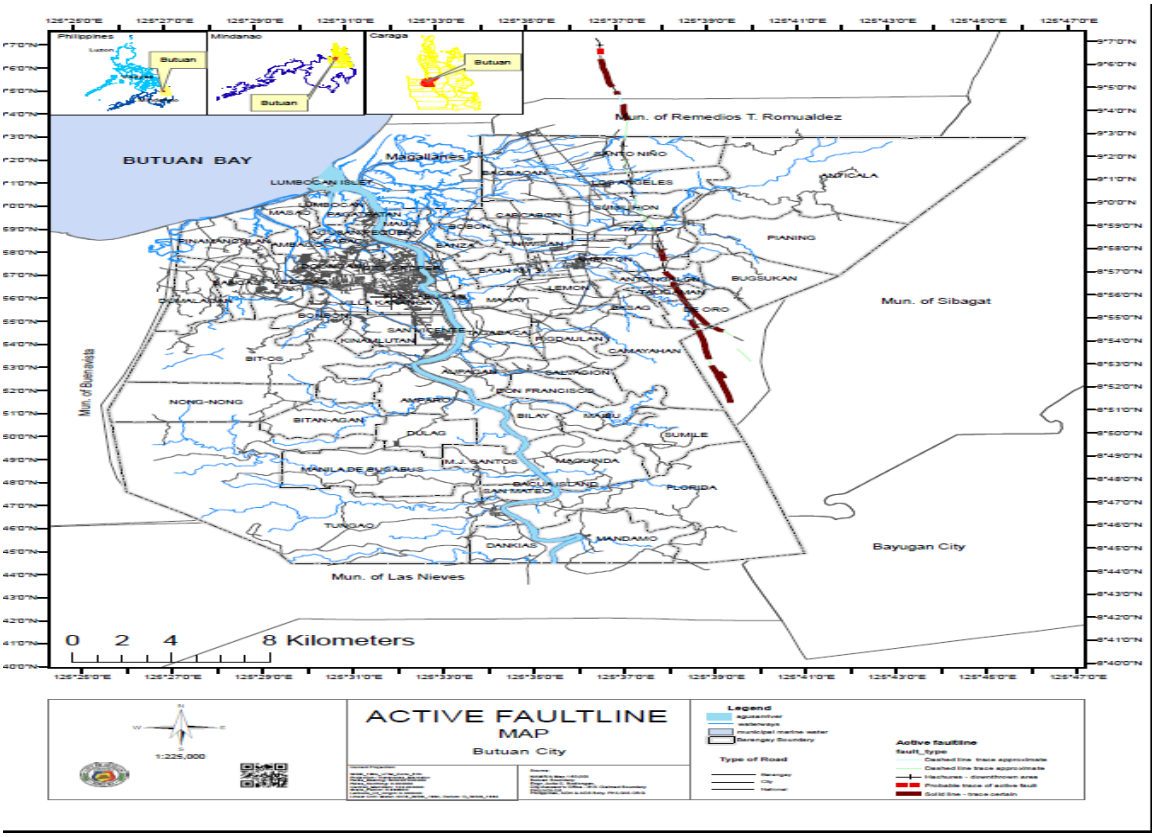


MAP 3: ACTIVE FAULT LINE

The City of Butuan also lies above a fault zone. One of the major faults found in the area is an extension of the Philippine Master Fault which trends on a south easterly direction from the Dingalan Bay in Northern Luzon passing through the Bondoc Peninsula, Camarines to Masbate, through Leyte, Surigao, Agusan and ends in the Davao Gulf. This fault runs parallel of Agusan River north of Butuan following the river's upstream route southward to Agusan del Sur. Other minor faults trend northeast and northwest and are generally perpendicular to the master fault.

The active fault line running in Butuan City as shown in the map below runs through the Barangays of Mandamo, Dankias, San Mateo, MJ Santos, Bilay, amparo, Aupagan, San Vicente, Pangabugan, City Proper, Agusan Pequeno, Maug, Pagatpatan and Lumbocan along the Agusan River. One significance of the fault line map is the assurance that the proposed commodity enterprises to be funded by the Philippine Rural Development Program are not located in these risk areas.

The consideration of active fault line map in the preparation of the Butuan City Commodity Investment Plan is necessary to reduce the risk of damages to properties and loss of lives. Investment projects have to be located in risk free areas.



Butuan City's Geology and Geomorphology

The Bureau of Soils and Water Management study of the area reveal eight geological formations in Butuan. The oldest rock formation belongs to methamorphic rocks. It constitutes the basement complex unit found on a small horst structure in between the boundaries of Magallanes and Butuan City. On the other hand, ultra basic rocks made up of peridotite and gabbo rocks manifest in the Mount Mayapay and surrounding vicinities. In the northeastern portion of Butuan, Bislig volcanic rocks emerge in close contact with extensive Taguibo Limestone. The most extensive geological formation in Butuan is that of sedimentary rock. This rock formation includes classic materials of sandstone and extensive quaternary alluvium which occur on valley floors, coastal and littoral zones including the mangrove / swampy areas. The four types of sedimentary rocks present in the area are: sandstone, siltstone and shale; nestone formation; clay and conglomerate formation; andalluvium which dominate a large part of the area especially the western and eastern sections of the City.

The Geologic Map below represent the distribution of different types of rock and surficial deposits, as well as locations of geologic structures such as faults and folds in Butuan City. Its importance to the Butuan City Commodity Investment Plan is that it provides information relative to the siting of infrastructures needed in the development of commodity enterprises. Also, it is a tool to identify ground-water aquifers and aid in locating water-supply wells, and assist in locating potential polluting operations, such as landfills, safely away from the aquifers'.

MAP 4: GEOLOGIC MAP

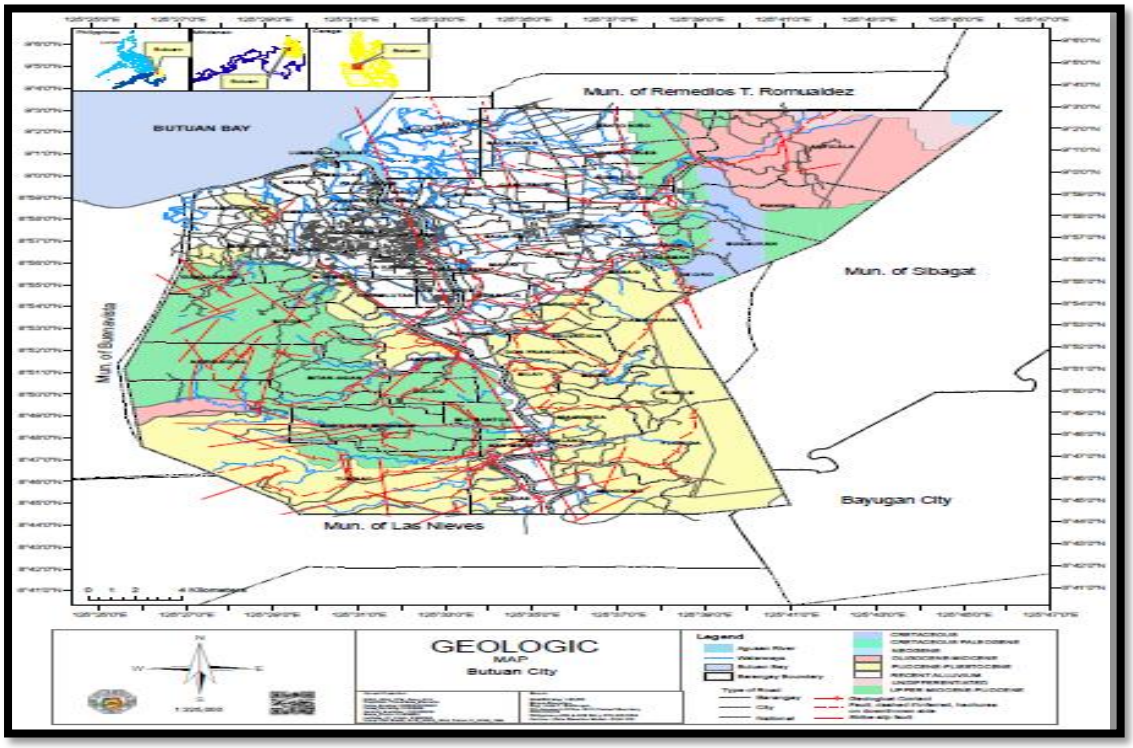


TABLE 1. EXISTING GENERAL LAND USES AS OF 2014
Source: Comprehensive Land Use Plan
Butuan City Ecological Statistics Profile 2014/Geo-Physical Profile

Land Use Classification	Area in Has.	% distribution
Built-up Areas	3,232.63	3.96
Agricultural Areas	42,566.00	52.08
Forest Areas	26,800.00	32.79
Mangrove Areas	13.11	0.02
Fishpond Areas	1,392.58	1.70
Waterways	2,418.00	2.96
Others	5, 305.68	6.49
Total	81,728.00	

Socio-Economic and Demographic Profile

TABLE 2. POPULATION OF RURAL BARANGAYS DISAGGREGATED BY FARMING AND NON-FARMING HOUSEHOLDS

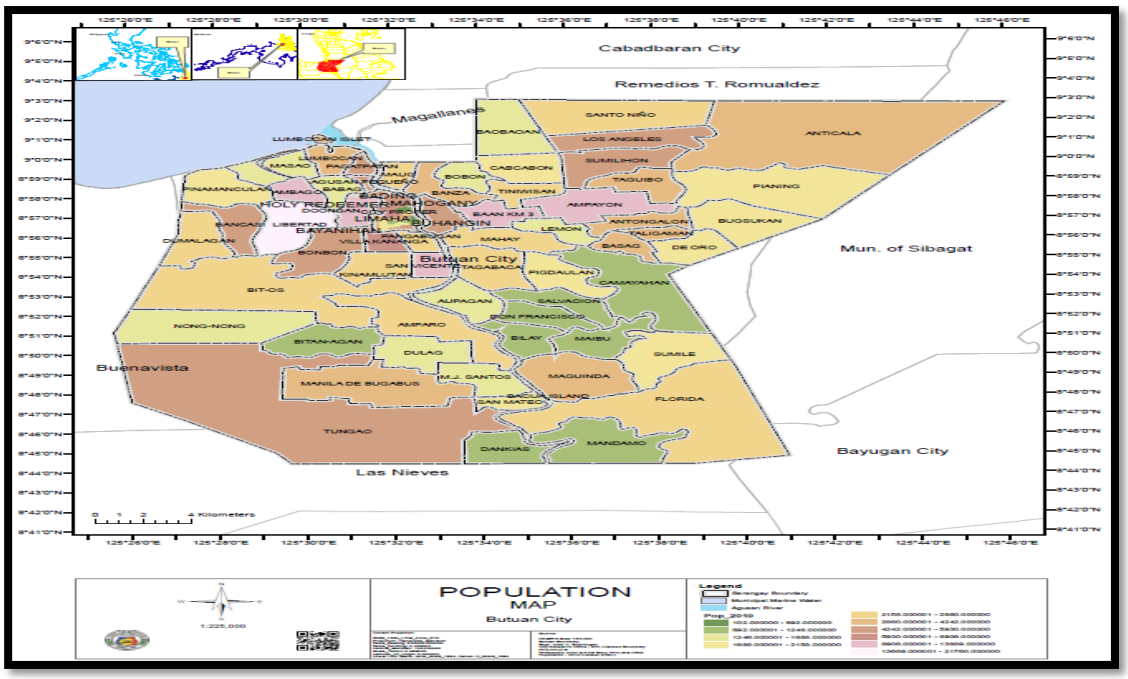
Actual Census Count 2010 PSA-Butuan City
Butuan City Ecological Statistics Profile 2014/Demographic Profile
3/Distance by Barangay Reference Point = Rizal Park
4/total Population = as of 2014

Name Barangays	1/Land Area has.	2/Density Pop/Area	3/Distance	4/Total Population	5/Household Population	6/Number of Households	7/Non –Farmi Households	8/Farming Households
1. Agus Pequeño	104.7632	48	4.8	5,077	4,8	9	9	0
2. Ambago	552.20		4	12,9	7,9	1,6	1,5	
3. Amparo	1,754	1		2,9	1,7	3	1	2
4. Ampayon	712.24		8	12,0	10,4	2,1	19	1
5. Anticala	1,297	2	16	3,2	3,3	6	2	4
6. Antongalon	1,346		10	4,1	3,3	6	1	5
7. Aupagan	992.96		10	1,6	1,7	3		3
8. Baan Km. 3	528.34			12,7	7,8	1,6	1,4	2
9. Babag	598.98		7	1,7	1,9	3	3	0
10. Bancasi	762.23		6	4,8	3,7	7	3	4
11. Banza	513.15			3,5	3,3	6	6	
12. Baobaoan	795.57		17	1,6	1,3	2	1	1
13. Basag	1,678		17.16	4,0	2,9	5	1	4
14. Bilay	595.02		16	1,2	1,4	2	1	1
15. Bitan-agan	1,297		15	1,3	1,4	3		2
16. Bit-os	16,262	0	6	2,7	2,6	5	4	
17.Bobon	61		1	1,9	1,4	3	2	
18. Bonbon	1,748		4	4,8	4,1	8	3	5
19. Bugsukan	991.9		15	1,9	1,5	3		2
20. Cabcabon	628.83			1,9	1,7	3		3
21. Camayahan	1,010		13	1,2	1,1	2		242
22. Dankias	629.32		29	1,1	1,1	2		2
23. De Oro	977.34		15	1,9	1,6	3	1	2
24. Don Francis	1,008	0	11	1,0	1,1	2	1	
25. Doongan	937.82		2	16,3	9,7	1,9	1,8	
26. Dulag	1,008		17	1,6	1,5	3	1	2
27. Dumalagan	839.09		9	2,8	2,0	4	3	
28. Florida	12,048		27	2,4	2,7	5		5
29. Kinamlutan	1,950		7	2,9	2,1	4		3

30. Lemon	469.58			1,9	1,3	2		2
31. Libertad	984.0		6	23,8	19,0	3,9	2,7	1,1
32. Los Angeles	1,908		14	5,1	4,2	8		8
33. Lumbocan	465		4	4,2	4,7	9	5	4
34. Maguinda	1,338		21	3,3	3,6	7	2	4
35. Mahay	754.10		4	3,5	1,8	3	1	2
36. Maibu	1,179		17	1,4	9	1		1
37. Mandamo	1,423	0	31	9	8	1		1
38. Mla. Bugabus	1,012		20	3,5	3,9	8	1	6
39. MJ Santos	793.48		20	1,4	1,5	3	1	2
40. Masao	53		9	1,6	1,6	3		2
41. Maug	326.83		9	2,5	2,6	5	4	
42. Nongnong	514.45		18	1,3	1,4	2		2
43. Pagatpatan	209.10			6,5	1,8	3	3	0
44. Pangabugan	156.21			3,6	2,8	5	5	0
45. Pianing	1,731		14	1,9	1,7	3		3
46. Pigdaulan	591.32		7	2,1	1,8	3	1	2
47. Pinamancula	530		7	2,0	2,3	4	1	3
48. Salvacion	613.11		13	1,3	1,1	2		2
49. San Mateo	467.07		23	2,2	3,0	6	2	3
50. San Vicente	438.97			16,2	9,0	1,8	12	6
51. Sto. Nino	1,001		17	2,6	2,9	6	1	4
52. Sumile	1,311		2	1,8	2,1	4		3
53. Sumilihon	572.6		12	4,9	3,8	7		7
54. Tagabaca	1,637		8	3,0	2,6	5		4
55. Taguibo	1,080		11	4,0	3,4	6	4	2
56. Taligaman	574.12		12	3,9	3,3	6	2	4
57. Tiniwisan	872.76			3,0	2,4	5	1	3
58. Tungao	15,461	0.3	27	6,0	6,2	1,2	5	6
59. Villa Kanang	293.61			6,4	4,1	8	7	1
Total					177,0	39,9	216	175

MAP 5: POPULATION MAP

The population map of Butuan City below shows the location and pattern of settlement of the city's population, its composition and reproduction, its migration and its socio-economic characteristics. Population Map plays an important role in the economic, geographical evaluation of territory and provides information on the density of rural population. This is very relevant to the planning process in terms of production areas development.



Labor Productivity

TABLE 3. GAINFUL WORKERS 15 YEARS AND OVER BY MAJOR OCCUPATION, AGE GROUP AND SEX
Butuan City 2007
Source: Philippine Statistical Authority, Planning & Devt. Office, Butuan City
Butuan City Ecological Statistics Profile 2014/Economic Profile

Major Occupation Group and Sex	Gainful Workers 1 Years O and Over	15-29	30-39	40-54	55-69	70 Over
Both Sexes	96,092	29,807	25,223	28,824	10,420	1,818
Officials of Govt. & Special Intere Organization, Corporate Executive Managers, Managing Proprietors Supervisors	8,776	1,139	2,257	3,492	1,571	317
Professionals	5,348	895	1,802	1,708	509	23
Technicians and Associa Professionals	3,036	895	950	879	284	27
Clerks	4,025	1,899	1,115	834	160	17
Service Workers and Shop ar Market Sales Workers	9,271	4,498	2,413	1,909	409	42
Farmers, Forestry Workers ar Fishermen	**13,466**	**2,791**	**2,946**	**4,509**	**2,494**	**726**
Trade and Related Workers	7,686	1,673	2,111	2,779	1,001	122
Plant & Machine Operators Assemblers	10,784	2,988	3,344	3,459	855	50
Laborers & Unskilled Workers	17,928	8,105	4,044	4,344	1,283	152
Special Occupations	80	15	32	28	5	

Other Occupations	4,544	1,053	1,299	1,658	478	56
Occupation Not Stated	11,149	3,445	2,910	3,225	1,283	286
Male	65,781					
Officials of Govt. & Special Intere Organization, Corporate Executive Managers, Managing Proprietors Supervisors	3,986	492	1,056	1,601	699	138
Professionals	1,978	443	674	648	196	17
Technicians and Associat Professionals	1,775	501	638	480	148	8
Clerks	1,430	635	416	416	148	8
Service Workers and Shop ar Market Sales Workers	5,088	2,139	1,550	1,135	236	28
Farmers, Forestry Workers ar Fishermen	**12,261**	**2,677**	**2,770**	**3,028**	**817**	**92**
Trade and Related Workers	7,003	1,579	1,999	2,516	817	92
Plant & Machine Operators Assemblers	10,491	2,835	3,271	6,677	931	48
Laborers & Unskilled Workers	10,441	4,832	2,510	2,407	627	65
Special Occupations	74	13	29	27	5	
Other Occupations	2,610	592	773	934	278	33
Occupation Not Stated	8,644	2,712	2,197	2,497	1,012	226
Female	30,311	10,357	7,340	8,766	3,302	546
Officials of Govt. & Special Intere Organization, Corporate Executive Managers, Managing Proprietors Supervisors	4,790	647	1,201	1,891	872	179
Professionals	3,370	863	1,128	1,060	313	6
Technicians and Associat Professionals	1,260	394	312	399	141	19
Clerks	2,595	1,264	699	533	93	6
Service Workers and Shop ar Market Sales Workers	4,183	2,452	863	774	173	14
Farmers, Forestry Workers ar Fishermen	**1,205**	**114**	**216**	**403**	**392**	**120**
Trade and Related Workers	683	94	112	263	184	30
Plant & Machine Operators Assemblers	293	153	73	53	12	2
Laborers & Unskilled Workers	7,487	3,273	1,534	1,937	656	87
Special Occupations	6	2	3	1		
Other Occupations	1,934	461	526	724	150	23
Occupation Not Stated	2,505	733	713	728	271	60

Among the major occupation groups in Butuan City, farmers, forestry workers and fishermen ranks second to the laborers and unskilled workers. However, in the age bracket 55 and over, those earning from farming, forestry and fishery are more than that of the laborers and

unskilled workers. One probable reason for this, is that retiring employees are going back to the farms either for income purposes or just idling their time.

TABLE 4. TOTAL NUMBER OF FAMILIES BY MAIN SOURCE OF INCOME AND INCOME CLASS

	Total Number of Families By Main Source of Income and Income Class									
	Butuan City, 2000									
Main Source of Income and	Total Number of Families	Under 20,000	20,000 - 29,999	30,000 39,999	40,000 49,999	50,000 59,999	60,000 79,999	80,000 99,000	100,000 149,000	250,000 and over
TOTAL	51,969	1,329	4,035	3,991	5,735	4,465	5,982	5,738	16,410	4,284
Wages and Salaries	25,823		798	258	3,391	2,397	3,739	3,976	9,292	1,971
Agricultural	3,207		258	258	1,518	424		297	452	
Non-Agricultural	22,616		540		1,873	1,974	3,739	3,679	8,840	1,971
Entrepenurial Activities	14,702	400	2,116	2,890	1,510	1,641	1,383	684	3,283	795
Agricultural	7,129	400	1,858	917	807	1,499	411	426	669	142
Crop Farming and Garden	5,541	258	1,600	400	807	1,241	411	155	669	
Livestock and Poultry Rais	774		258	258		258				
Fishing										
Forestry and Hunting	813	142		258				271		142
Non-Agricultural	7,573		258	1,974	702	142	972	258	2,614	653
Wholesale and Retail	4,334		258	1,458	142	142	310	258	1,766	
Manufacturing	1,062								142	516
Community, Social, Recreational and Personal Services	443								306	137
Transportation, Storage and Communication Service	1,735			516	560				400	
Mining and Quarrying										
Construction										
Entrepreneurial Activities										
Other Sources of Income	11,445	929	1,121	842	834	427	861	1,078	3,835	1,510
Net Share of Crops, Fruits and Vegetables, Livestock and Poultry from other households	810		271					258		282
Cash receipts, gifts & other forms of assistance from abroad	1,670								1,109	561
Cash receipts, support, assistance and relief from domestic	3,187	929	284	842	297	142	290		401	
Rental from non-agricultural lands, buildings, spaces & other	148								148	
Interests from deposits & loans , pensions & retirement, workmen's compensation & social security benefits	2,483		142		537	284	400	413	432	274
Inputed Rental Value of owner-occupied dwelling units	2,267		142					258	1,466	401
Net receipts from family sustenance actitivties										
Dividends from investments										
Goods and services receive	880		282				171	148	249	
Other sources of income										

The above table indicates that almost 2% out of the total number of families in Butuan City are salaries and wage earners from the agriculture sector although the number of entrepreneurial activities being conducted are almost the same. This is probably due to the practice of "Pakyawan Systems" employed in the agricultural sector.

TABLE 5. STATE OF BUTUAN CITY POVERTY INCIDENCE LEVEL
Source: City Planning and Development Office

No.	Barangays	Total Households	Magnitude	Proportion
Rural Barangays				
1.	AMPARO	422	141	33.4
2.	ANTICALA	422	225	53.3
3.	ANTONGALON	813	213	26.2
4.	AUPAGAN	123	28	22.8
5.	BABAG	270	61	22.6
6.	BANCASI	645	116	18
7.	BANZA	613	147	24
8.	BAOBAOAN	150	67	44.7
9.	BASAG	605	156	25.8
10.	BILAY	72	22	30.6
11.	BITAN-AGAN	160	97	60.6
12.	BIT-OS	293	160	54.6
13.	BOBON	240	53	22.1
14.	BONBON	769	134	17.4
15.	BUGSUKAN	132	88	66.7
16.	CABCABON	408	83	20.3
17.	CAMAYAHAN	134	57	42.5
18.	DANKIAS	150	103	68.7
19.	DE ORO	375	126	33.6
20.	DON FRANCISCO	67	35	52.2
21.	DULAG	259	120	46.3
22.	DUMALAGAN	323	98	30.3
23.	FLORIDA	173	86	49.7
24.	KINAMLUTAN	203	103	50.7
25.	LEMON	227	69	30.4
26.	LOS ANGELES	549	218	39.7
27.	LUMBOCAN	769	185	24.1
28.	MJ. SANTOS	132	94	71.2
29.	MAGUINDA	148	52	35.1
30.	MAHAY	49	18	36.7
31.	MAIBU	34	16	47.1
32.	MANDAMO	52	21	40.4
33.	MLA. DE BUGABUS	351	215	61.3
34.	MASAO	237	65	27.4
35.	MAUG	447	118	26.4
36.	NONGNONG	226	141	62.4
37.	PIANING	396	164	41.4
38.	PIGDAULAN	67	17	25.4

39.	PINAMANCULAN	410	120	29.3
40.	SALVACION	42	16	38.1
41.	SAN MATEO	157	108	68.8
42.	SAN VICENTE	2609	691	26.5
43.	STO. NINO	311	136	43.7
44.	SUMILE	121	64	52.9
45.	SUMILIHON	450	153	34
46.	TAGABACA	92	26	28.3
47	TAGUIBO	656	150	22.9
48.	TALIGAMAN	649	149	23
49.	TINIWISAN	322	79	24.5
50.	TUNGAO	542	267	49.3
51.	VILLA KANANGA	580	55	9.5
Urban/Urbanizing Barangays				
52.	AGAO	183	34	18.6
53.	AGUSAN PEQUENO	689	91	13.2
54.	AMBAGO	1205	182	15.1
55.	AMPAYON	2726	467	17.1
56.	BAAN	194	17	8.8
57.	BAAN RIVERSIDE	923	211	22.9
58.	BADING	884	197	22.3
59.	BAYANIHAN	389	40	10.3
60.	BUHANGIN	986	322	32.7
61.	DAGOHOY	324	39	12
62.	DIEGO SILANG	242	13	5.4
63.	DOONGAN	2902	742	25.6
64.	GOLDEN RIBBON	836	165	19.7
65.	HOLY REDEEMER	1537	341	22.2
66.	HUMABON	70	9	12.9
67.	IMADEJAS	211	27	12.8
68.	JOSE P. RIZAL	964	244	25.3
69.	LAPU-LAPU	197	18	9.1
70.	LEON KILAT	37	4	10.8
71.	LIBERTAD	3069	1032	33.6
72.	LIMAHA	812	233	28.7
73.	MAHOGANY	813	204	25.1
74.	MAON	1007	242	24
75.	NEW SOCIETY VILLAGE	149	9	6
76.	OBRERO	1478	466	31.5
77.	ONG YIU DISTRICT	862	139	16.1
78.	PAGATPATAN	700	173	24.7
79.	PANGABUGAN	375	75	20
80.	PORT POYOHON	790	273	34.6
81.	RAJAH SOLIMAN	91	11	12.1
82.	SAN IGNACIO	709	143	20.2

83.	SIKATUNA	86	9	10.5
84.	SILONGAN	224	26	11.6
85.	TANDANG SORA	465	34	7.3
86.	URDUJA	19	3	15.8
	TOTAL	45594	12161	26.7

The above table has indicated the 10 most depressed rural barangays in Butuaan City to wit with its corresponding Poverty Incidence Level:

Barangays	Level
1. MJ Santos	71.2
2. San Mateo	68.8
3. Dankias	68.7
4. Bugsukan	66.7
5. Nongnong	62.4
6. Mla.d e Bugabus	61.3
7. Bitan-agan	60.6
8. Bit-os	54.6
9. Anticala	53.3
10. Sumile	52.9

These Barangays will be prioritized in the provision of focused interventions to bring about an economic development .

Agriculture and Agri-Business Profile

Source: Office of the City Agriculturist
As of Dec. 2015

TABLE 6. AGRICULTURAL COMMODITY PROFILES

Commodity	Area in has.	No. of Farmers	Total Prodtn.	Ave. Prodtn./ha in mt
Rice	7,733.00	4,558	32,091.95	4.15
Corn	972.00	324	354,780.00	3.65
Coconut	3,904.70	2,004	117,142.50	30 (n/t)
Banana	2,228.20	1,671	21,725.44	9.75
Coffee	204.00	111	178,500.00	875(b)
Durian	333.00	194	15,817.50	47.5
Pineapple	56.00	65	870.80	15.55
Mango	770.00	144	2,412.00	16.75
Rootcrops	860.70	160	16,138.12	18.75
Vegetables	351.70	135	2,691.04	7. 65
Rubber	1,506.70	929	929.30	.6168
Cacao	572.50	892		
Oil Palm	212.00	28	482.90	2.27
Abaca	165.00	133	36.30	.273
Total	19,870.00	11,283	743,617.88	

The data and information contained in Table 6.0 is also indicated in the Vegetative Cover Map below. Data indicates that 14 agricultural crops are being promoted and developed in Butuan City totaling more or less 19,870 hectares. The table also indicates that in Butuan city, there are more or less 11,283 farmers partnering with the City Government of Butuan in developing and transforming the agricultural sector.

The Vegetative Cover Map of Butuan City below is a depiction of the remaining vegetation in Butuan City be it of agricultural crops or of forest species described in hectarage. It is a useful information that increases the planning perspectives in the development of agricultural commodities relative to the implementation of the Department of Agriculture-Philippine Rural Development Project.
The expansion of production areas of a given commodity can be facilitated by the visualization of the vegetative cover map.

MAP 6: VEGETATIVE MAP

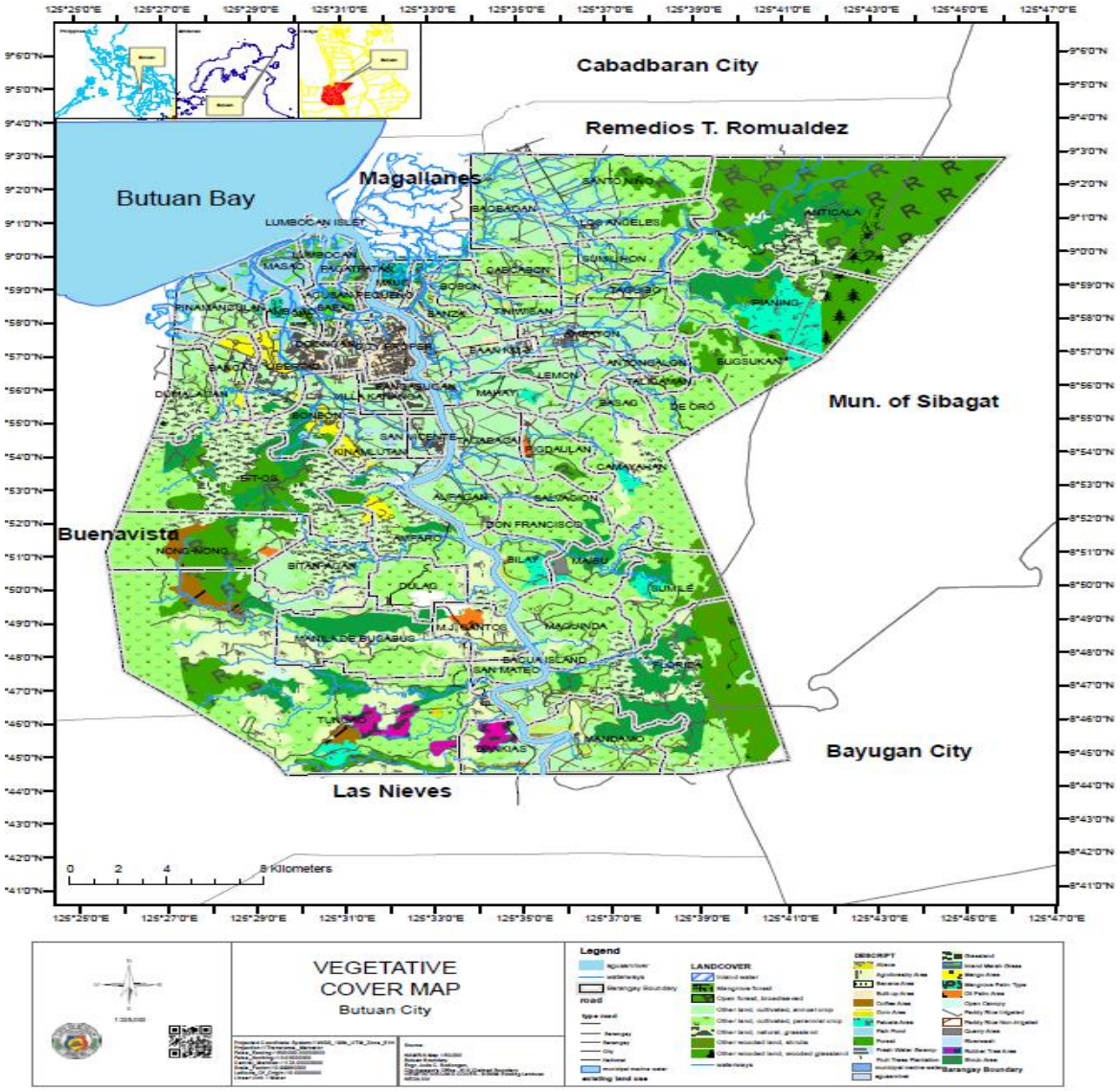


TABLE 7. LIVESTOCK AND POULTRY INVENTORY

As of 2014

Butuan City Ecological Statistical Profile 2014/Agriculture & Natural Resources

City Planning and Development Office

Kinds of Animals	Population (in heads)	
	Commercial	Backyard
Carabao		4,757
Cattle	421	2,497
Swine	2,042	19,738
Goats		3,497
Chicken		
• Broiler	67,300	1,807
• Layer	18,500	2,644

• Fighting Cocks • Native	591	26,882
Ducks	3,000	5,970
Turkey		434
Geese		250

The data and information as indicated above suggests we had still a long way to go in satisfying the meat requirements of Butuan City from all types of livestock and poultry.

TABLE 8. FISH PRODUCTION

1. Aquaculture	
No. of fish corals/Filter Net Fishing	45
No. of Fish Cages	104
No. of Artificial Reef Projects	1
Fish Sanctuary (has.)	57.5
Mangrove Development Project (has.)	22,664
2. Marine Projects	
No. of fishermen	
No. of fishing bancas a.) Motorized b.) Non-Motorized	 45 300
No. of fisher folk associations	4
Daily Production/fisher folk	3 kgs.
3. Inland Fisheries	
Total Production Bangus (Extensive)	 400 kgs./has.
Bangus in Cages	4.9 tons/cage/year
White shrimps/Vannamie (semi-intensive)	
4. Fishpond Areas	
No. of Barangays	7
Area (in has.)	1,359.77
No. of Operators Male : = 82 Female = 69	

The data as contained in the Table above does not suggest that Butuan City is sufficient in its fish supply. There is a need for the conduct of a value chain study adapted to the local situation to determine the sufficiency level of bangus and other fishery products.

TABLE 9. INVENTORY OF AGRICULTURAL MACHINERIES AND EQUIPMENT

Total No. of Tractors: a.) 4 Wheel	20
b.) Hand Tractors	577
c.) Turtle Power Tillers	74

Irrigation Systems	
a) Shallow Tube Wells	92
b) PISOS	31
c) Diversion Dams	1
d) SWIP	7
e) Communal Irrigation Systems	43
Rice Mills	86
Corn Mills	20
Coffee Mill	1
Dryers	
a.) Solar Dryer/MPDP	220
b.) Mechanical Dryer	30
Threshers	
a.) Manual	278
b.) Mechanical	180
Corn Sheller	14
Reaper	2
Moisture Meters	22

Table 9 is an indication of a rice and corn based development interventions in Butuan City. Majority of these farm equipments are provided by the Department of Agrciulture aimed at establishing the Rice and Corn Sufficiency and Security Program of Butuan City. Further studies are needed to determine the gaps in the level of farm equipment and machineries towards the development of other commodities.

TABLE 10. RURAL ACCESS INFRASTRUCTURE

Classified Barangays with corresponding Road Networks			
Upland Barangays :	Length in kms.	DA/FMRDP (2013-2016), PAMANA	Total Road Requirements
Amparo	12.96		12.96
Bancasi	20.834		20.834
Anticala	17.3		17.3
Bilay	10.47		10.47
Bitan-agan	9.43	1.5	7.93
Bit-os	29.39		
Bonbon	24.881		
Bugsukan	17.17	2.13653	
Camayahan	10.73		
De Oro	1.91		
Don Francisco	6.69		
Dulag	15.42	1.0	14.42
Dumalagan	13.39		
Florida	24.11		
Maguinda	15.32		
Maibu	15.09		

Manila de Bugabus	23.75		
MJ Santos	9.19		
Nongnong	30.4		
Pianing	7.87	2.98	4.89
Salvacion	8.54	1.0	
San Mateo	29.22		
Sumile	8.61	1.0	7.61
Taligaman	5.86	1.0	4.86
Tungao	51.9	4.457	
Sub-Total	420.43		
Rice Producing Barangays			
Aupagan	13.19		
Antongalon	13.88		
Baan Km3	16.73	.67	16.06
Banza	14.71		
Baobaoan	10.95		
Basag	9.3		
Bobon	29.98		
Dankias	6.79		
Kinamlutan	4.68		
Lemon	8.34	.5	7.84
Mandamo	5.74		
Pigdaulan	7.98	1.0	6.98
Pinamanculan	25.28		
San Vicente	23.09	1.0	22.09
Santo Nino	16.37		
Sumilihon	22.16		
Tagabaca	10.91	1.0	9.91
Taguibo	19.17		
Tiniwisan	4.06	.5	3.56
Los Angeles	17.453		
	280.763		
Fish Production Barangays			
Lumbocan	5.94		
Masao	7.3		
Babag	7.64		
Maug	11.49		
Sub-Total	32.37		
Urbanizing Barangays			
Ampayon	23.74		
LIBERTAD	12.45		
Pagatpatan Ambago Villa Kananga Agusan Pequeno	4.698 11.174 10.66 6.08		

Sub-Total	68.802		
Mixed Uses			
Cabcabon	15.87		
Mahay	13.53		
	29.4		
Grand Total	831.77	19.74353	812.02647

There is a very huge financial requirement to develop the rural access infrastructure support towards the development of the agricultural sector in Butuan City. The table indicates that a measly 2.5 % or less of the total road requirements is achieved.

Status of Road Requirements

TABLE 11. BUTUAN CITY ROAD DENSITY

Region/Provinces	Highway Road Length in km	Area (sq.km)	Road Density	City/Urban Road Length in Km	Rural Barangay Road Length in Km	Total Road Network	Overall Road Density
	a	b	a/b				
BUTUAN CITY	98.019	817.28	0.120	97.454	831.77	929.224	1.137

Total Road Networks totalled 423.429 kms. broken down as follows:

1. Rural Barangay Roads = 831.77 kms.
2. City Roads = 97.454 kms.
3. National Roads = 98.019

Total Bridge Networks totalled to 2,196.65 linear meters broken down as follows:

1. Barangay Bridges = 373.00 linear meter
2. City Bridges = 222.0 linear meter
3. National Bridges = 1,601.05 linear meters

MAP 7. ROADS AND BRIDGES MAP

The Road and Bridges Map of Butuan City below indicates the road links and road networks connecting the different Barangays in Butuan City. Its significance in its inclusion to the preparation of the Butuan City Commodity Investment Plan is that it provides data and information on the length of the road requirements and its corresponding value. It is also significant to the planning process so that in the construction of the needed access infrastructure support to the different enterprises, ways on how to effectively and efficiently link them will be attained.

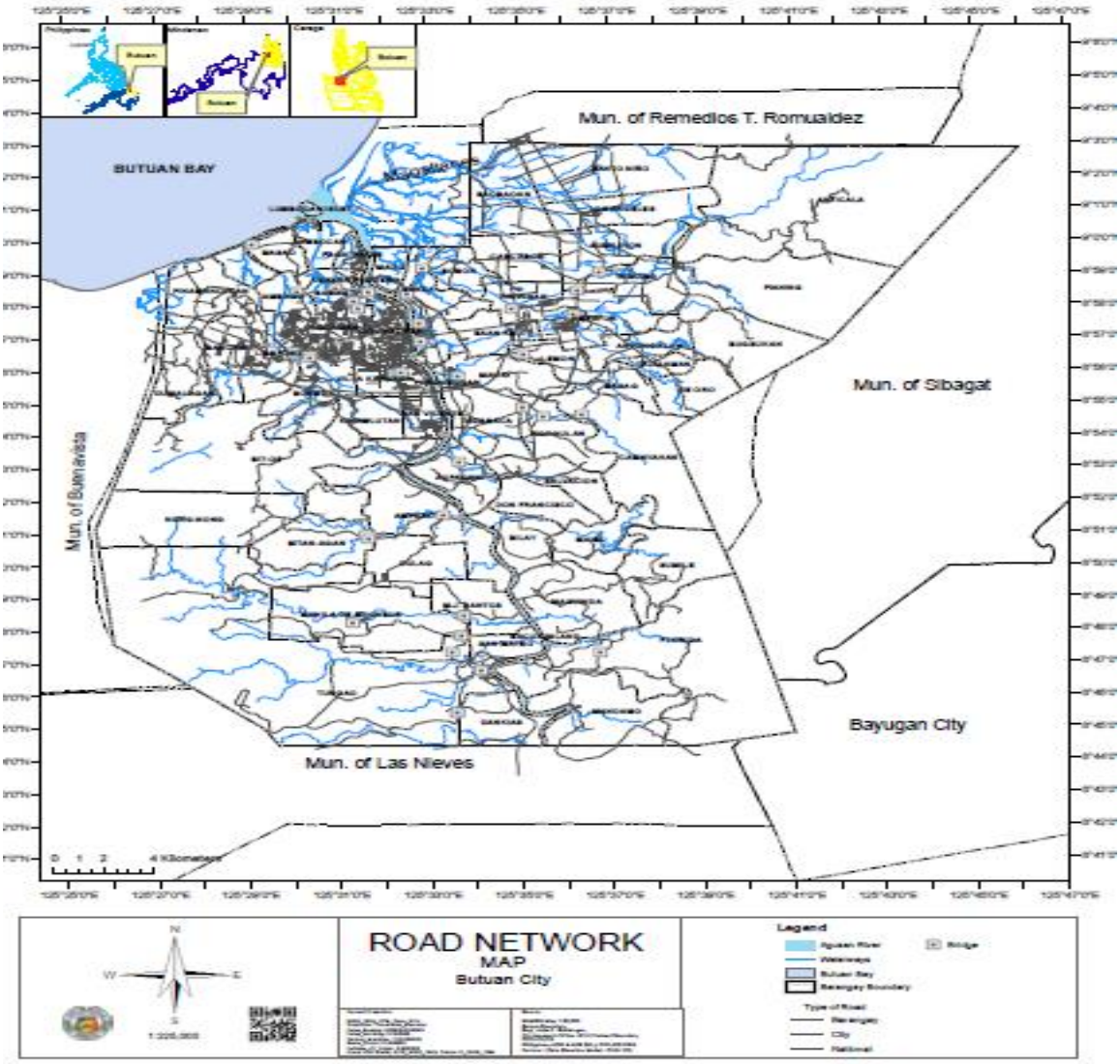


TABLE 12. STATE OF BUTUAN CITY'S LAND RESOURCES

Barangays	Total Agri Lands (has.)	Total Land Uses	Avail. Lands for Agri. Purposes	Less: Vulnerable Areas	Potential Availab Lands for Agri. Devt.
AMBAGO	24	2			24
AMPARO	1,065.60	403	662	402.35	259.75
AMPAYON	360	28	7		79
ANTICALA	704.10	51	186		186.10
ANTONGALON	720.40	311	408		408.90
AUPAGAN	720	35	36		369

BAAN KM. 3	226.4	226			0
BADING	28		2		26
BANCASI	286.4	155.1	131.2	131.25	0
BANZA	323.1	269.7	53.3		53.35
BAOBAOAN	610.1	391	218		218.60
BASAG	701.60	701			0
BAYANIHAN	20	2			0
BILAY	398.4	292	105		105.90
BITAN-AGAN	714.40	308.2	406.1	74.84	331.30
BIT-OS	4,735.20	79	3937	87.60	3,849.60
BOBON	408	33	7		72
BONBON	396.80	258	138	138.30	0
BUGSUKAN	607.9	357.7	250.1		250.15
BUHANGIN	103	47.2	56.1	56.16	0
CABCABON	436	42	1	436	0
CAMAYAHAN	779.00	242.0	536.9	2.56	534.39
DANKIAS	506.5	31	194	506.5	0
DE ORO	408	400	7	67.16	0
DOONGAN	100	6	3		32
DON FRANCISCO	631.20	21	419	31.63	387.57
DULAG	752.30	525.8	226.4	19.32	207.13
DUMALAGAN	527.5	197.7	329.7	94.05	235.70
FLORIDA	5,754.00	476.8	5277.1		5,277.15
KINAMLUTAN	780.10	510.5	269.5		269.55
LEMON	357.3	357			0
LIBERTAD	722	41	30		306
LOS ANGELES	960	766	193		193.70
LUMBOCAN	179.9	14	165		165.40
MAIBU	456	45			0
MAGUINDA	494.4	33	155		155.40
MAHAY	323.2	14	182		182.20
MAHOGANY	44	3			0
MJ. SANTOS	731.6	42	304	124.71	179.89
MLA. DE BUGABUS	954.9	56	387		387.90
MANDAMO	872.8	449	423		423.40
MASAO	396.1		391		391.10
MAUG	152.4	9	62		62.40
NONGNONG	514.4559	21	295.455		295.45
PIANING	720	219	500		500.50
PIGDAULAN	433.2	373.9	59.2		59.29
PINAMANCULAN	530.47	26	267.4	530.47	0
SALVACION	320	231.7	88.2	193.01	0
SAN MATEO	340	30	3	41.57	0
SAN VICENTE	160	16			0
SUMILE	632	26	36		369

SUMILIHON	**364.3**	**19**	**172**		**172.30**
STO. NINO	**724**	**71**			**5**
TAGABACA	**854.4**	**591.4**	**262.9**		**262.95**
TAGUIBO	**407.2**	**407**			**0**
TALIGAMAN	**232.8**	**232**		**66.46**	**0**
TINIWISAN	**536**	**41**	**11**		**118**
TUNGAO	**4,968**	**1725.2**	**3242.7**	**42.93**	**3,199.82**
VILLA KANANGA	**56**	**5**			**0**
TOTAL	**42265.83**	**19869.3**	**22396.45**	**3,288.92**	**20,612.85**

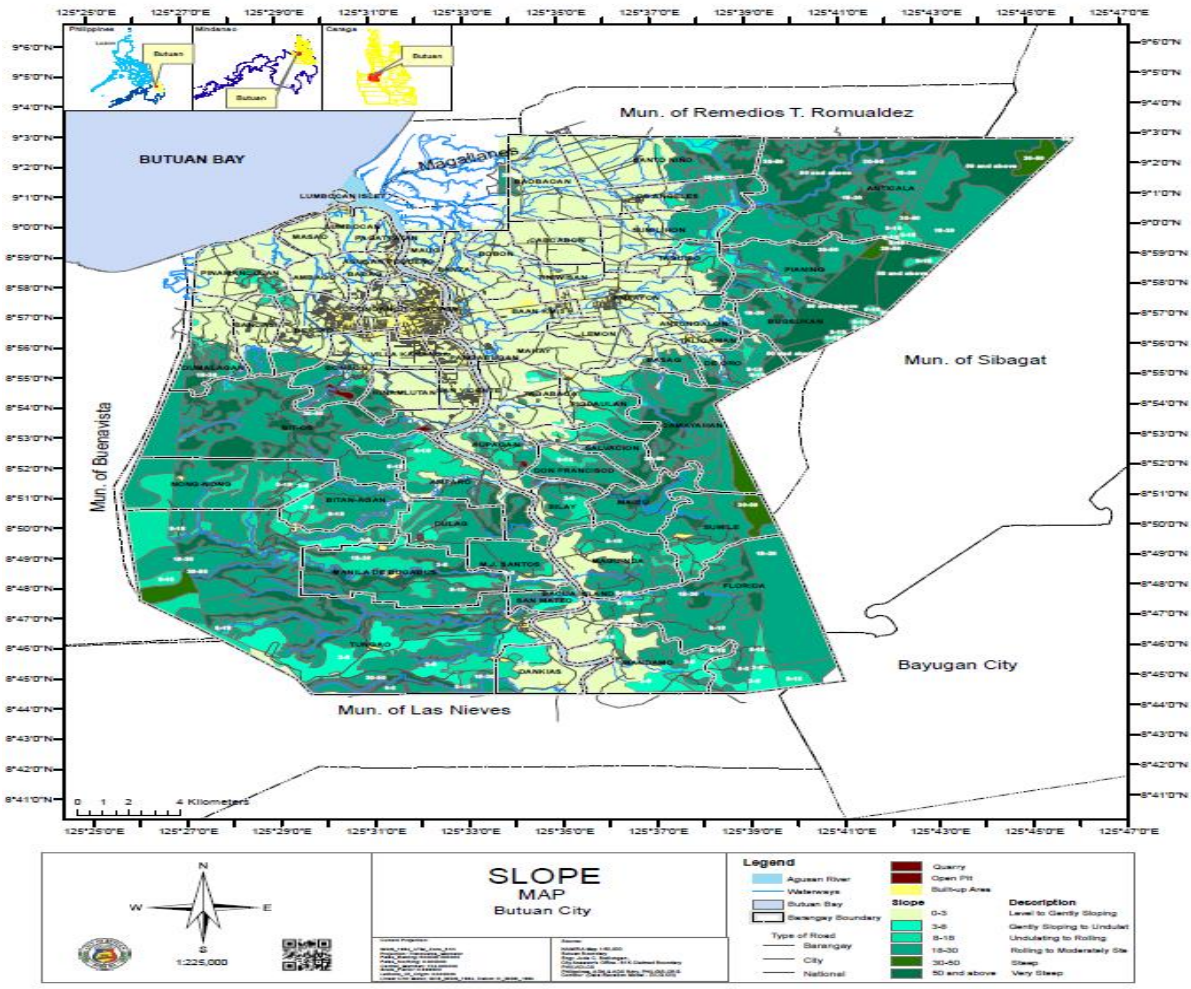
Generally, the City Government of Butuan has at most 21,000 hectares more or less of free and available areas that can be used for agricultural development. The significance of the table above is its information suggesting that the promotion and development of the identified commodities can still be chieved in some upland areas in Butuan City, notably in Barangays Tungao and Florida.

TABLE 13. SLOPE CLASSIFICATION (1997-2010)

City Planning and Devt. Office

Areas of Concern	Slope Area in has.	% Distribution	Observations
00-08	30,880.00	37.78	60,032.00 has. of the city's total land area has slope of 18% and below considered as potential for settlements and agro-industrial development .
08-18	29,152	35.67	
18-25	16,329.00	19.98	
25-40	4,426.00	5.42	
>45	941.00	1.15	
Total	81,728.00	100	

MAP 8: SLOPE MAP OF BUTUAN CITY



The Slope Map indicates that in Butuan City, more or less 60,000 hectares are suitable to Agro-forestry development. There are more production areas in Butuan City than its protection areas. Slope Map is the description of the shapes of lands in Butuan City derived from the percent change in that elevation over a certain distance. Its relevance to the Butuan City Commodity Investment Plan is that it is a guide and a tool to reduce the costs in project constructions, minimizing the risks from natural hazards such as flooding and landslides and the minimization of the impacts of proposed development on natural resources such as oils, vegetation and water systems.

TABLE 14. PEDO-ECOLOGICAL CHARACTERISTICS OF BUTUAN CITY'S LAND RESOURCES

Pedo Ecological	Slope in %	Soil Type	Flood Hazard				Erosion Hazard				Area in Has.	Brgy. Covered
			No Apparent	Slight	Moderate	Severe	No apparent	Slight	Moderate	Severe		
Warm Lowland, < 8 % Slope, < 100 masl elevation, > 25 *C	0-3	Masao Loam			X		X				1954	
						X	X				348	Lumbocan, Masao
		Banza		X			X				359	Ambago, Banza, Bonbon
					X		X				1175	Ambago, Banza
						X	X				842	Ambago, Banza
		Butuan	X				X				1315	Aupagan,Salvacion, Camayahan, Tagabaca
				X			X				4,644	Basag, Salvacion, Aupagan, Tagabaca, Mahay, Lemon, Ampayon, Antongalon, Los Angeles, Baobaoan, and Sitio Panaytayon and Humilog
					X		X				243	Buhangin, Baan
		Doongan	X				X				4,431	Kinamlutan, Bonbon,
				X			X				3740	Doongan, Libertad, Amparo, Tungao, Dankias, Mandamo, San Mateo, and Maguinda
		Agustin		X			X				4341	Tagabaca, Lemon, Baan Km.3, Ampayon, Taguibo, Sumilihon, Los Angeles, and Baobaon
		San Manuel			X		X				1759	Bit-os, Aupagan, Mahay, Lemon, San Vicente, Bonbon, Antongalon, Tiniwisan and Los Angeles
					X		X				140	Kinamlutan and Sitio Calot
		SUBTOTAL									25291	
	3-8	Umingan			X		X				336	Setion Kahayag, Balangbalang
		Camansa		X					X		2973	Bancasi, Nongnong, Dankias,
				X					X		556	Tagabaca, Salvacion, ,Mla de Bugabos,Dulag, Tungao, and Bilay
		Alimodian clay		X					X		634	Pianing
		SUBTOTAL									4499	
Warm Cool Upland, < 18 % Slope, < 500 masl elevation, > 22.5 *C	8-18	Cabangan		X					X		61	
		Camansa		X					X		3852	Bancasi, Dulag, Tungao, Bilay
		Alimodian clay		X					X		2832	Dumalagan,Kinamlutan, Bitan-agan
		SUBTOTAL									6745	
Warm Coo Hilly Land, >18% slope, < 500 masl elevation, >22.5°C	18-30	Camansa		X				X			425	Pinamanculan, Salvacion, Taligaman and Camayahan
				X					X		8813	Pinamanculan, Salvacion, Taligaman,Camayahan,Bugabos, Bitan-agan, Tungao, Masao, Sumilihon, Bonbon, Kinamlutan, Bit-os, and Maguinda
		Alimodian clay		X				X			313	Bonbon, Dulag, Taligaman, Upper Basag, and San Agustin
				X					X		1567	Bonbon, Mahay, Dulag, Taligaman, Upper basag, Sitio Tagulahi, San Agustin, and Imelda
Cool highlands>500 masl elevation, < 22.5°C		Bolinao			X				X		74	Camp Atega
					X					X	539	Camp Atega
		Cabangan			X			X			61	Dulag and Los Angeles
		Magsaysay			X			X			16	Anticala
					X				X		40	Anticala
		SUBTOTAL									11848	

Warm-cool hilly land , >18% slope, < 500 masl elevation, >22.5°C	30-50	Bolinao			X					X	241	Camp Atega
		Camansa		X				X			474	Tagabaca, Salvacion, Dulag, Mla. de Bugabos
				X					X		687	Tagabaca,Salvacion, Dulag, Mla. de Bugabos, Tungao, Maibu, Aupagan
				X						X	4853	Bit-os, Salvacion
Cool highlands>500 masl elevation, < 22.5°C					X			X			576	Tagabaca, Salvacion, Dulag, Mla. de Bugabos
					X					X	519	Bit-os and Salvcaion
		Bolinao		X						X	359	Camp Atega
		Cabangan		X						X	485	Bugsukan
				X				X			466	Bugsukan
		Magsaysay				X		X			68	Anticala
						X				X	382	Mt. Magsaysay
		Alimodian			X			X			1406	Kinamlutan, Mla. de Bugabos, and Maibu
		SUBTOTAL									10516	
Warm-cool hilly land , >18% slope, < 500 masl elevation, >22.5°C		Alimodian			X					X	9018	Kinamlutan, Mla. de Bugabos, and Maibu
Warm-cool hilly land , >18% slope, < 500 masl elevation, >22.5°C	> 50	Camansa			X			X			408	Bit-os, Salvacion,
					X					X	737	Bit-os, Salvacion,
		Alimodian			X			X			735	Bilay, Tungao, Kinamlutan, and Camayahn
					X					X	4,391	Tungao, Kinamlutan, Mla. de Bugabos, Amparo, and Camayahan
		Mayapay			X			X			68	Mt. Mayapay
					X					X	174	Mt. Mayapay
Cool highlands>500 masl elevation, < 22.5°C		Bolinao			X				X		110	Camp Atega
					X					X	144	Camp Atega
		Camansa		X					X		950	Bit-os and Salvcaion
				X						X	419	Bit-os and Salvcaion
		Cabangan		X				X			515	Lambingan Falls
				X						X	133	Lambingan Falls
		Magsaysay				X		X			142	Mt. Magsaysay
						X				X	370	Mt. Magsaysay and Humilog
		SUBTOTAL									18314	
TOTAL LAND AREA OF SMU AND LMU											77213	
		Build up areas/urban areas									2,758	
		Riverwash									50	
		Open pit mine				515					95	
		Quarry			severely eroded						100	
		Water reservoir /dam									9	
		Major rivers									1,503	
TOTAL											4,515	
GRAND TOTAL											81,728	

The above table describes the characteristics of some of soil types in Butuan City and its focused on the flooding and erosion hazards which are very relevant to the planning perspectives of locating the establishment of enterprises.

Below is the Butuan City Erosion Map which suggests the erosion susceptibility of some areas. The significance of erosion map in the preparation of the Butuan City Commodity Investment Plan is to identify if the enterprises to be established in Butuan City and to be funded by the Department of Agriculture thru the Philippine Rural Development Program are located in erosion risk areas. Erosion is a key issue in resource management that has often severe environmental, economic and social consequences. The erosion map will provide the local government planners data and information on which barangays in Butuan City needs most of the interventions to control erosion.

MAP 9: EROSION MAP

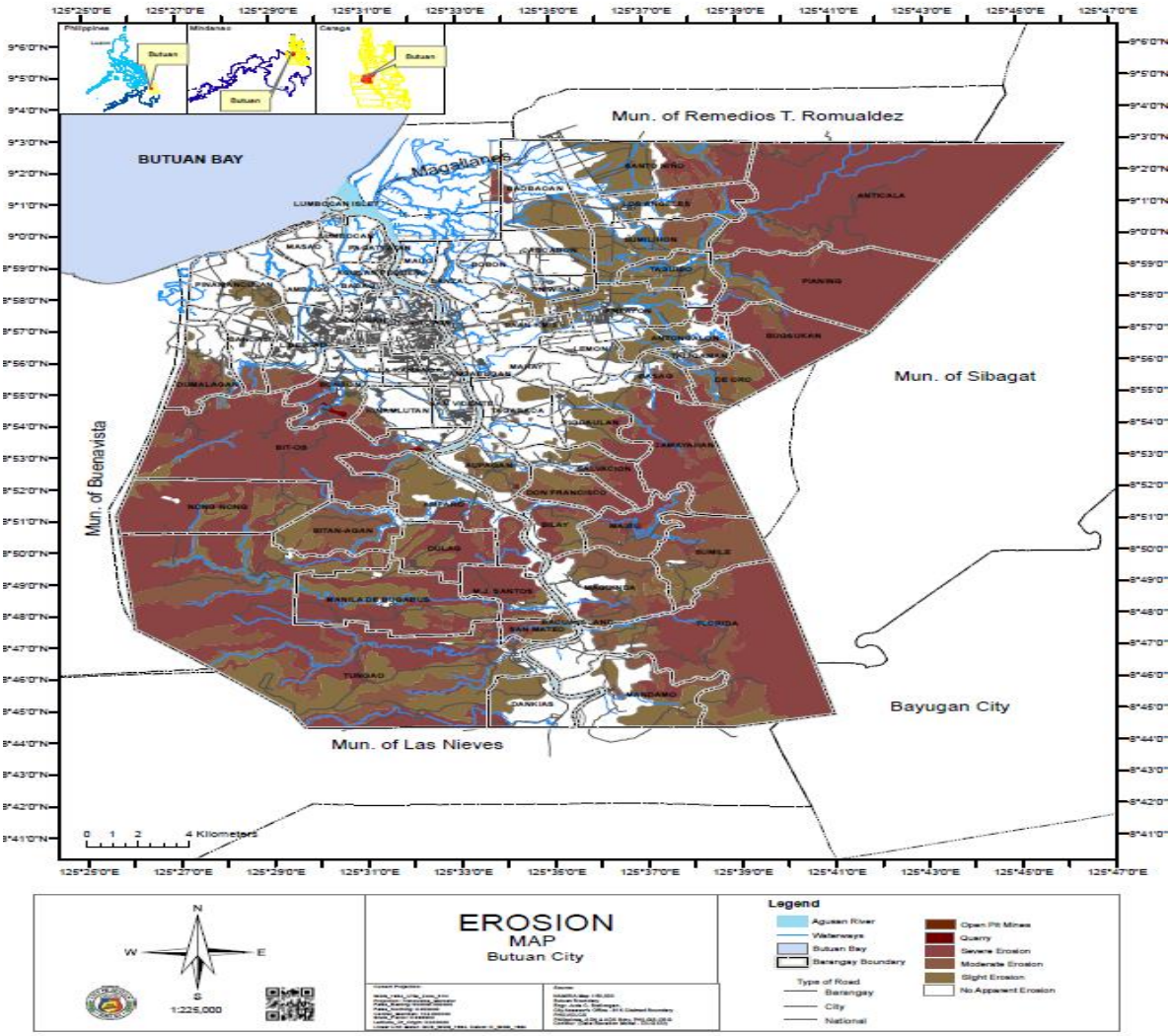


TABLE 15. STATE OF SUSCEPTIBILITY TO FLOODING						
NAME OF BARANGAYS	POTENTIAL LAND AREA IN HECTARE (AGROFORESTRY AREAS)	Flooding Susceptibility			Total Vulnerable Areas	Hazard Free Areas
		Slight Flooding Areas (No of Hectare	Moderate Flooding Areas (No. Hectares)	Severe Flooding Areas (No of Hectare		
AMPARO	1805.71	402.35			402.3	1403.3
ANTICALA	3134.95					3134.9
BANCASI	785.91	225.57			225.5	560.3
BILAY	740.84					740.8
BITAN-AGAN	1160.76	74.84			74.8	1085.9
BIT-OS	3937.67	41.07		46.53	87	3850.0
BONBON	985.36	202.58	36.21		238.7	746.5
BUGSUKAN	522.64					522.6
CABCABON	850.2	841.24	8.96		850	0
CAMAYAHAN	1972.27	2.56			2.5	1969.7
DANKIAS	878.34	504.6			504	373.7
DE ORO	422.71	67.16			67.1	422.1
DON FRANCISCO	714.85	31.63			31.6	683.2
DULAG	1034.71	19.32			19.3	1015.3
DUMALAGAN	883.04	94.05			94.0	788.99
FLORIDA	3097.08					3097.0
M.J. SANTOS	829.41	124.71			124.7	
MAGUINDA	1671.78					1671.7
MAIBU	960.26					960.2
MANILA DE BUGABUS	2355.46					2355.4
NONGNONG	1722.58					1722.5
PIANING	1503.18					1503.1
SAN MATEO	370.36	41.57			41.5	370.3
SUMILE	937.77					937.7
PINAMANCULAN	974.18	602.15	150.97	19.96	773.0	954.2
SALVACION	821.51	193.01			193.0	821.5
TALIGAMAN	249.28	66.46			66.4	249.2
TUNGAO	8626.39	42.93			42.9	8626.3
SUBTOTAL	**43949.2**	3577.82	196.14	66.49	3840.4	43882.7
Lowland Barangays (Rice Producing/Other Uses)						
ANTONGALON	608.13	348.65			348.6	608.1
AMBAGO	400.7	124.59	181.76	88.42	394.7	312.2
BAAN KM 3	491.93	483.66	8.27		491.9	491.9
AUPAGAN	820.47	373.78			373.7	820.4
BANZA	631.28	192.6	437.28	1.4	631.2	629.8
BAOBAOAN	1324.02	1281.95	0.99		1282.9	1324.0
BASAG	432.8	69.85			69.8	432

BOBON	1248.1	449.85	51.68		501.5	1248
BUHANGIN	0					
KINAMLUTAN	824.4	12.09	69.32	77.59	15	746.8
LEMON	498.6	367.01			367.0	498
LIBERTAD	924.75	344.36	71.48	2.59	418.4	922.1
LOS ANGELES	1105	540.33			540.3	110
MAHAY	915.5	672.32			672.3	915
MANDAMO	1793.29	250.82			250.8	1793.2
PIGDAULAN	916.22	75.57			75.5	916.2
SAN VICENTE	245.05	58.1	9.01	6.63	73.7	238.4
STO. NINO	2132.32	1193.63			1193.6	2132.3
SUMILIHON	1170.72	765.96			765.9	1170.7
TAGABACA	1097.28	684.22			684.2	1097.2
TAGUIBO	769.26	368.56			368.5	769.2
TINIWISAN	480.31	480.31			480.3	480.3
VILLA KANANGA	233.92	43.5	83.27		126.7	233.9
AMPAYON	1154.75	1052.84			1052.8	1154.7
SUBTOTAL	20218.83	10234.55	913.08	176.63	11324.2	20042
Fishery/Aquaculture						
BABAG	335.44	32.01	303.43		335.4	335.4
MASAO	688.79	2.28	684.8	1.71	688.7	687.0
MAUG	318.81		318.81		318.8	318.8
LUMBOCAN	418.28		224.11	194.17	418.2	224.1
PAGATPATAN	184.29		139.59	44.7	184.2	139.5

The areas in Butuan City prone to flooding are those located near the Agusan River. As it has been observed, the development along these areas are of commercial, residential and industrial purposes.

Floods are natural occurring processes that are too difficult to prevent but can be managed in order to reduce its social and economic impacts. Flooding is a threat to life and leads to damage of property. It is therefore very important that flooding risks be taken into account in the preparation of the Butuan City Commodity Investment Plan. Enterprises funded by the Department of Agriculture –Philippine Rural Development Program are in no way established in flood prone areas. The Flood Map below is the guide where to locate the establishment of enterprises to save on propertydamages and loss of lives.

MAP 10: FLOODING MAP

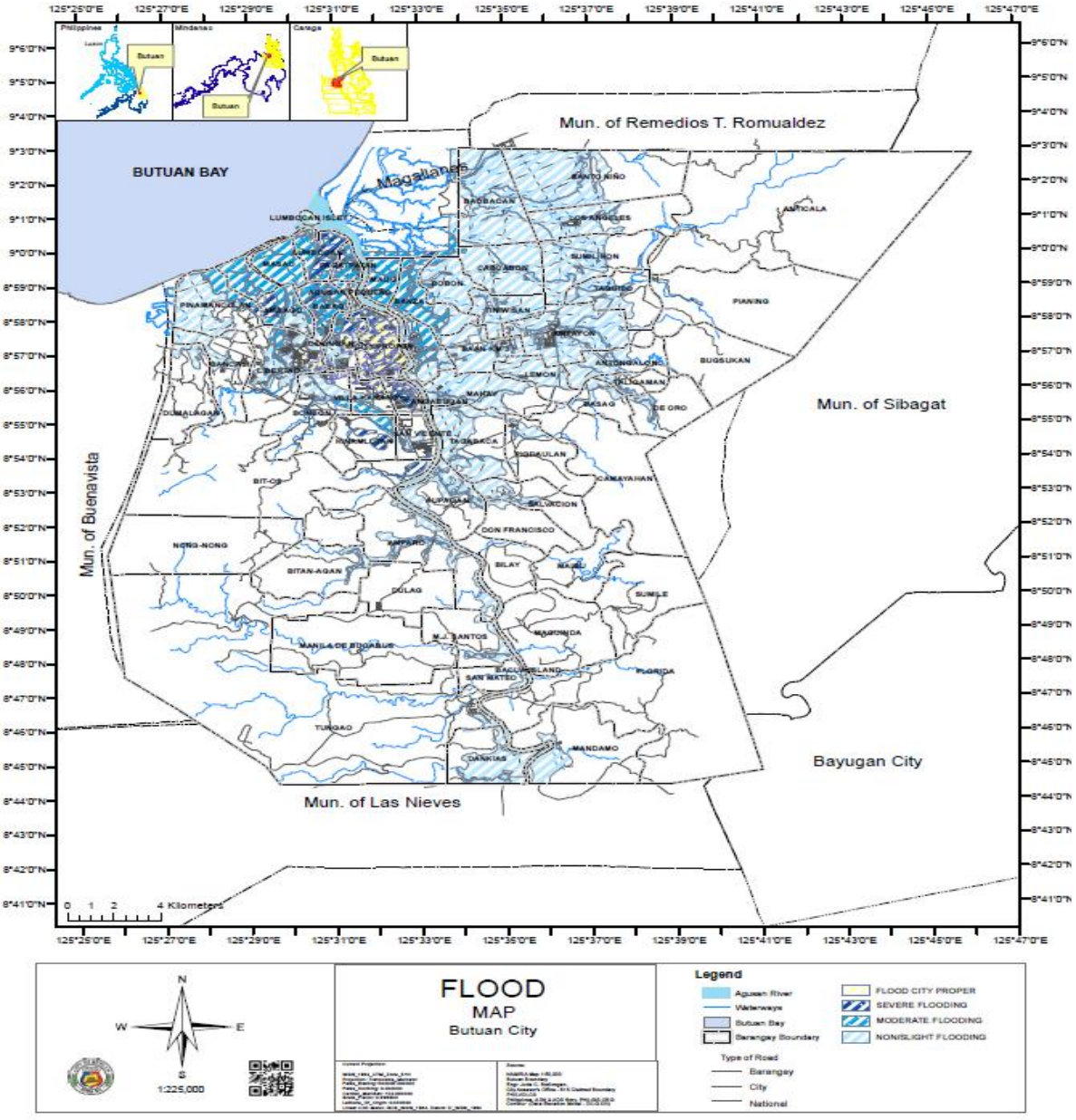


TABLE 16. CHARACTERISTICS AND QUALITIES OF DIFFERENT SOIL MAPPING UNIT, BUTUAN CITY

Pedo Ecologi Zone	LMU Co	SMU Code	Slope (%	Texture	Soil Depth (cm)	Soil Drainage	Erosion Hazard	Flooding Hazard	Soil Reacti	Soil Inherer Fertility	Elevation (masl)	Rock Outcrops
Warn-cool Upla <18% slope < 5 masl elevation>2	49N1	CaN1	3-8	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	High	60m.	Few stones and gravels on surface.
	50O1	CnO1	8-18	Fine loam	Deep to Moderately dee	Well Drained	Slight	None	5.9	High	100m.	Few
	68N	CapN	8-18	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	High	60m.	Few to Common
	76N	CasN	3-8	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	High	60m.	Few to Common
	76O1	CaO1	8-18	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	High	60m.	Few to Common
	76N1	AlN1	8-18	Fine loam	Deep to Moderately dee	Well Drained	Slight	None	4.9	High	100m.	Few
	76O1	AlO1	8-18	Fine loam	Deep to Moderately dee	Well Drained	Slight	None	4.9	High	180m.	None
Warm cool Hillyl >18% slope <5 meters elevatio 22.5˚C	111Q	BoQ3	30 ->5	Clayey	Moderately deep	Well Drained	Severe	None	7.3	Moderate	340m.	Few to Common
	112P1	CaP1	18-30	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	very low	350m.	Few to Common
	112P2	CaP2	18-30	Clayey	Deep to Moderately dee	Well Drained	Moderat	None	5.0	very low	350m.	Few to Common
	112Q1	CaQ1	30-50	Clayey	Deep to Moderately dee	Well Drained	Slight	None	4.5	very low	> 300m.	Few to Common
	112Q2	CaQ2	30-50	Clayey	Deep to Moderately dee	Well Drained	Slight	None	5.0	very low	> 300m.	Few to Common
	112Q3	CaQ3	30-50	Clayey	Deep to Moderately dee	Well Drained	Severe	None	5.0	very low	> 300m.	Few to Common
	112R1	CaR1	>50	Fine loamy	Deep to Moderately dee	Well Drained	Severe	None	4.5	very low	> 300m.	Few to Common
	112R3	CaR3	>50	Fine loamy	Deep to Moderately dee	Well Drained	Severe	None	5.0	very low	> 300m.	Few to Common
	112P1	AlP1	18-30	Fine loamy	Deep to Moderately dee	Well Drained	Slight	None	4.9	very low	> 300m.	Few to Common
	112P2	AlP2	18-30	Fine loamy	Deep to Moderately dee	Well Drained	Moderat	None	4.4	very low	> 300m.	Few to Common
	112Q1	AlQ1	30 -50	Fine loamy	Deep to Moderately dee	Well Drained	Slight	None	4.9	very low	> 300m.	Few to Common

Source: Soil/Land Resources Evaluation and SAFDZ-CLUP Integration Project of Butuan City

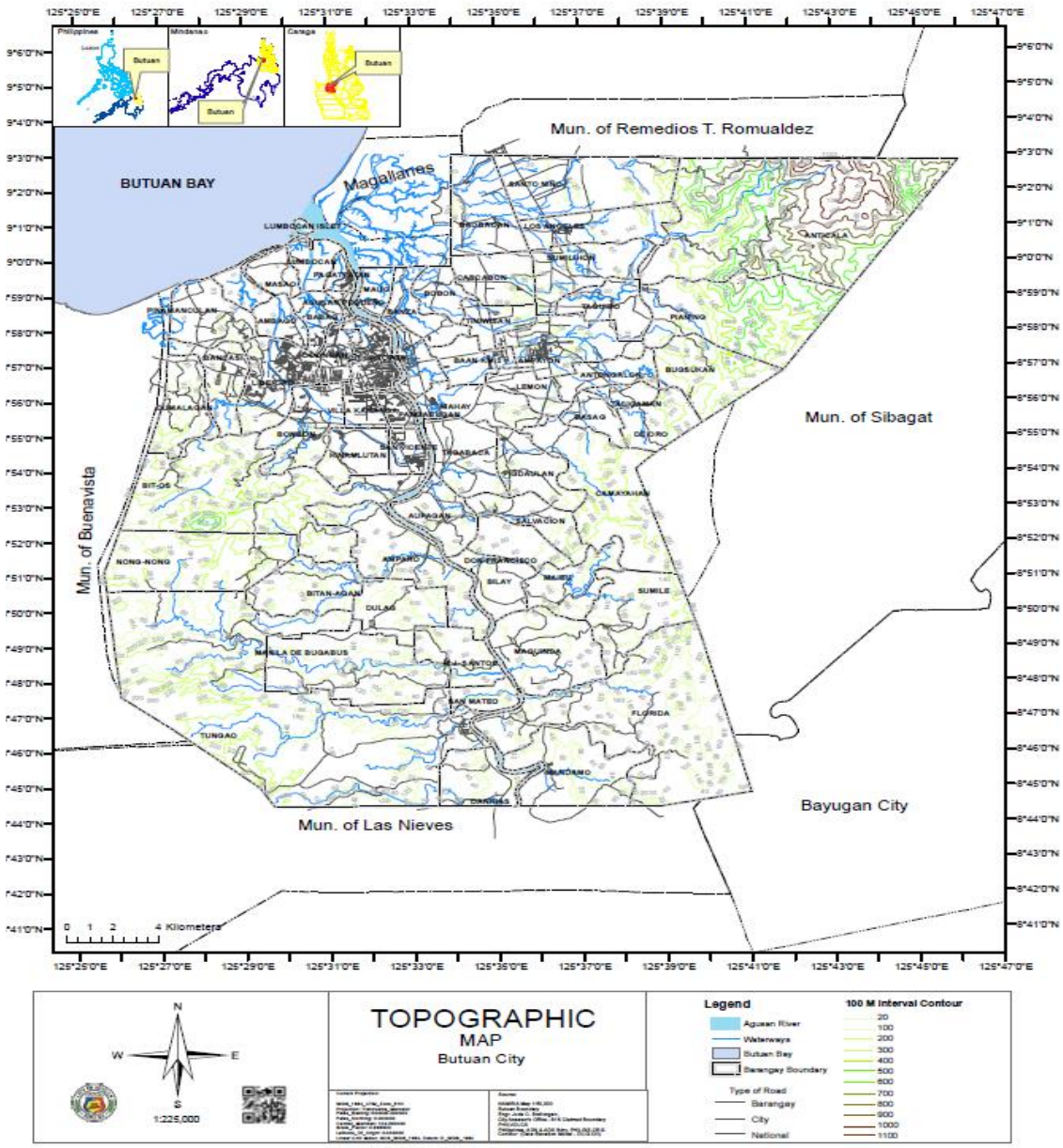
Pedo Ecological Zon	LMU Co	SMU Code	Slope (%	Texture	Soil Depth (cm)	Soil Drainage	Erosion Hazard	Flooding Hazard	Soil Reacti	Soil Inherent Fertility	Elevation (masl)	Rock Outcrop
Warm cool Hillyland > slope < 500 me elevation > 22.5˚C	156R1	CaR1	>50	Clayey	Deep to Moderately de	Well Drained	Severe	None	5.9	Moderate	> 500 m.	None
	156R3	CaR3	>50	Clayey	Deep to Moderately de	Well Drained	Severe	None	5.0	Moderate	> 500 m.	None
	156P1	CnP1	18-30	Clayey	Deep to Moderately de	Well Drained	Severe	None	5.9	Very low	> 500 m.	None
	156Q1	CnQ1	30->50	Clayey	Deep to Moderately de	Well Drained	Severe	None	5.9	Very low	> 500 m.	None
	156Q3	CnQ3	30->50	Clayey	Deep to Moderately de	Well Drained	Severe	None	6.2	Very low	> 500 m.	None
COOL Highland > meters elevation - 22.5˚C	156R1	CnR1	>50	Clayey	Deep to Moderately de	Well Drained	Severe	None	5.9	Very low	> 500 m.	None
	156R3	CnR3	>50	Clayey	Deep to Moderately de	Well Drained	Severe	None	6.2	Very low	> 500 m.	None
	163P1	MgP1	18-30	Clayey	Moderately deep	Well Drained	Moderate	None	4.8	Moderate	> 500 m.	None
	163P2	MgP2	18-30	Clayey	Moderately deep	Well Drained	Moderate	None	5.3	low	> 500 m.	None
	163Q1	MgQ1	30->50	Clayey	Moderately deep	Well Drained	Severe	None	4.8	Moderate	> 500 m.	None
	163Q3	MgQ3	30->50	Clayey	Moderately deep	Well Drained	Severe	None	5.8	low	> 500 m.	None
	163R3	MgR3	>50	Clayey	Moderately deep	Well Drained	Severe	None	5.3	low	> 500 m.	None

Pedo Ecological Zo	LMU Cod	SMU Code	Slope (%	Texture	Soil Depth (cm)	Soil Drainage	Erosion Hazard	Flooding Hazard	Soil React	Soil Inherent Fertility	Elevation (masl)	Rock Outcrops
Warn Lowland < 8 % slop 100 masl elevation >25°C	01	MoMf2	0 – 3	Coarse loamy	Deep to Moderately deep	Poorly drained	None	Modera	5.4	High	10m-15m.	None
	02	MoMf3	0 – 3	Coarse loamy	Deep to Moderately deep	Poorly drained	None	Severe	5.4	High	10m.	None
	03J	BzMf1	0 – 3	Fine loamy	Deep to Moderately deep	Somewhat po drained	None	Slight	6.8	High	15-20m.	None
	03K	BzMf2	0 – 3	Fine loamy	Deep to Moderately deep	Somewhat po drained	None	Modera	6.8	High	15-20m.	None
	04K	BzMf3	0 – 3	Fine loamy	Deep to Moderately deep	Somewhat po drained	None	Modera	6.8	High	20m.	None
	09	BuM	0 – 3	Fine loamy	Deep to Moderately deep	Poorly drained Somewhat poorly Drai	None	None	6.2	High	20m.	None
	09J	BuMf1	0 – 3	Fine loamy	Deep to Moderately deep	Poorly drained Somewhat poorly Drai	None	Slight	6.2	High	20m.	None
	09K	BuMf2	0 – 3	Fine loamy	Deep to Moderately deep	Poorly drained Somewhat poorly Drai	None	Modera	6.5	High	30m.	None
	09	DnM	0 – 3	Fine loamy	Deep	Poorly drained Somewhat poorly Drai	None	None	5.2	Medium	30m.	None

	09J	DnMf1	0 – 3	Fine loamy	Deep	Poorly drained Somewhat poorly Drai	None	Slight	5.3	Medium	30m.	None
	12J	AgMf1	0 – 3	Fine loamy	Deep to Moderately deep	Well Drained	None	Slight	7.0	Low	20m.	None
Warn Lowland < 8	12J	SmMf1&	0 – 3	Fine loam	Deep to Moderately deep	Well Drained	None	Slight	6.2	Low	20m.	None
slope < 100 masl elevatio >25°C	12K		0 – 3	Fine loam	Deep to Moderately deep	Well Drained	None	Slight	6.5	Low	20m.	None
	18N1	UmN1	3-8	Fine loam	Slight to Moderately deep	Well Drained	Slight	None	6.0	Medium	40m.	Few stones gravels

The characteristics and qualities of the different land mapping units in Butuan City will serve as guidance to the development process with regards to the determination of mitigating measures relative to the observed land limitations. The above table can be further developed to integrate the barangays in Butuan City having the corresponding the characteristics and qualities. However, there is no Barangay in Butuan City exhibiting the most severe erosion hazard.

MAP 11: TOPOGRAPHIC MAP



The above Topographic Map depicts in detail ground relief (landforms and terrain), drainage (lakes and rivers), forest cover, administrative areas, populated areas, transportation route and facilities (including roads and bridges) and other man-made features. This would also be the guide in the establishment of enterprises and its expansion production areas(lakes and rivers which would be the source of irrigation water systems), information on the remaining forest cover (maintaining the forest eco-system which would also affect some sub-systems), information on the administrative areas of the barangay where the enterprise is to be located, the settlements and so on.

TABLE 17. SUMMARY OF LAND USE REQUIREMENTS PER LAND UTILIZATION ASSESSED IN INCREASING SEVERITY OF LIMITATION

Land Utilization Ty	Suitabilit Rating	Slope Range (%	Texture	Soil Depth (cm)	Soil Drainage	Erosion Hazard	Soil Reaction (pH)	Inherent Fertility	Elevation (masl)	Rock Outcrop
1. Paddy rice (Irrigated/ Rainfed)	S1	<3	SL - C	>50	VPD-SPD	None	5.5-7.0	High	N/A	None
	S2	3-8	SiL - C	30 - 50	SPD-MWD	Slight	5.0-7.5	Medium		None
	S3	<8	LS - S	<30	WD-ED	Moderate	<5.0->7.5	Low		None
2. Corn and Upland Rice	S1	<3	SL - CL	>50	MWD-WD	None	5.5-7.0	High	N/A	None
	S2	3-8	SL - CL	30 - 50	PD-SPD	Slight	5.0-7.5	Medium		<5%
	S3	8-18	S - LS - HC	<30	VPD-PD-ED	Moderate	<5.0->7.5	Low		5-10%
3. Legumes	S1	<3	SL – CL	>50	MWD-WD	None	5.5-6.5	High	N/A	None
	S2	3-8	SL - CL	30 - 50	PD-SPD	Slight	5.0-6.5-7.2	Medium		<5%
	S3	8-18	S - LS - HC	<30	VPD-PD-ED	Moderate	<5.0->7.5	Low		5-10%
4. Vegetable *(Low elevation)*	S1	<3	SL - CL	>50	MWD-WD	None	5.5-6.5	High	N/A	None
	S2	3-8	SL - CL	30 - 50	PD-SPD	Slight	5.0-6.5-7.2	Medium		<5%
	S3	8-18	S - LS - HC	<30	VPD-PD-ED	Moderate	>5.0->7.5	Low		5-10%
5. Rootcrops	S1	<3	SL - CL	>50	MWD-WD	None	5.5-7.0	High	N/A	None
	S2	3-8	SL - CL	30 - 50	PD-SPD	Slight	5.0-7.5	Medium		<5%
	S3	8-18	S - LS - HC	<30	VPD-PD-ED	Moderate	<5.0-7.5	Low		5-10%
6. Banana and Abaca	S1	0 - 8	SL - CL	>100	WD	None	6.5	High	<500	None
	S2	8-18	SL - CL	50 - 100	MWD	Slight	5.0-6.5	Medium	<500	<5-10%
	S3	18 - 50	S - LS - HC	25.75	PD-SPD	Moderate	6.5-7.5	Low	>500	10-30%
7. Pineapple	S1	<3	SL - CL	>50	MWD-WD	None	4.5-5.5	High	<600	None
	S2	3-8	SL - CL	30 - 50	PD-SPD	Slight	4.5-6.5	Medium	<600	<5%
	S3	>18	S - LS - HC	<40	VPD-PD-ED	Moderate	>6.5	Low	>600	5-10%
8. Industrial Cr (Coconut/Oil Palm)	S1	<18	SL - CL	>75	MWD-WD	None	5.5-7.0	High	<500	None
	S2	18 - 30	SI - CL	40-75	PD-SPD	Slight	5.0-7.5	Medium	<500	<5-10%
	S3	30 - 50	S - LS - HC	<40	VPD-PD-ED	Moderate	<5.0->7.5	Low	>500	10-30%
9. Fruit/Tree Crops *(elevation)*	S1	<18	SL - CL	>75	MWD-WD	none to slig	5.5-6.5	High	<500	<30%
	S2	18 - 30	SL - HC	40 - 75	PD-SPD	moderate	5.0-5.5-7.5	Medium	500-1000	30-50%
	S3	30 - 50	S - LS	<40	VPD-PD-ED	Severe	<5.0->7.5	Low	>1000	>50%
10. Forest trees	S1	<50	SL - CL	>75	MWD-WD	none to slig	5.5-6.5	High	<500	<30%

	S2	>50	SL - CH	40 - 75	PD-SPD	Moderate	5.0-5.5-6.5-7.5	Medium	500-1000	30-50%
	S3	>50	S - LS	<40	VPD-ED	severe	<5.0->7.5	Low	>500	>50%
11. Livestock/ Pasture	S1	<50	SL - CL	<50	MWD-WD	Slight	5.5-7.5	High	N/A	None
	S2	18 - 30	SL - CH	30 - 50	PD-SPD	Moderate	5.0-5.5-7.5	Medium		<5%
	S3	30 - 50	S - CL	<30	VPD-ED	severe	<5.0->7.5	Low		5-10%
12. Cacao	S1	<18	SL-CL	>75	MWD-WD	None	6.0-7.0	High	>500	None
	S2	18 - 30	SL-CL	40-75	PD-SPD	Slight	5-6; 7-7.5	Medium	<500	<5%
	S3	>30	S-LS-HC	<40	CPD-PD	Moderate	>7.5; <5	Low	<500	5-10%
13. Coffee	S1	<18	SL-CL	>75	MWD-WD	None	4.5-7	High	>500	none
	S2	18 - 30	SL-CL	40-75	PD-SPD	Slight	4.5; 7-7.5	Medium	<500	<5%
	S3	>30	S-LS-HC	<40	CPD-PD	Moderate	<4; >7.5	Low	<500	5-10%

LEGEND:

Suitability Classes
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable

Texture
L - Loam
SiL-Silt loam
LS – Loa sand
S – Sand
HC-Heavy Clay
C-Clay
Sc-Sandy clay
CL-Clay Loam
SiCL-Silty Clay loa
SL-Sandy Loam

Soil Depth (cm)
<30-Very shallow
30-50-Shallow
50-100-Moderately deep
100-150--Deep
>150-Very deep

Soil Drainage
WD-Well drained
MWD-Moderately well-drained
SPD-Somewhat poorly drained
PD-Poorly drained
VPD-Very poorly drained
ED-Excessively drained

Rock Outcrop (%) (Surface Impediment)
0 -none
>5 -very few
5-10 -few
10-30 -common
>30 - many

The Table above provides the summary of land use requirements per land utilization corresponding to the commodity that is being identified. The planning perspective for Butuan City is increased as this table presents options if ever investment projects are identified and to be located in the Barangays of Butuan City. The only thing left to develop this Table is to integrate the Barangays having the following as stated above characteristics and qualities of their land resources.

The releavance of the data and information contained in Table below is in the area of Trace Elements content of the following soil types in Butuan City. This will guide the proponents of the investment projects if measures to increase the trace elements contents of their soil is to be increased to make sure the productivity and yield of their crops achieved the desired profitability and sustainability.

TABLE 18. LEVELS OF THE DIFFERENT SOIL FERTILITY FACTORS AND INHERENT FERTILITY STATUS OF THE DIFFERENT LMU/SMU IN BUTUAN CITY

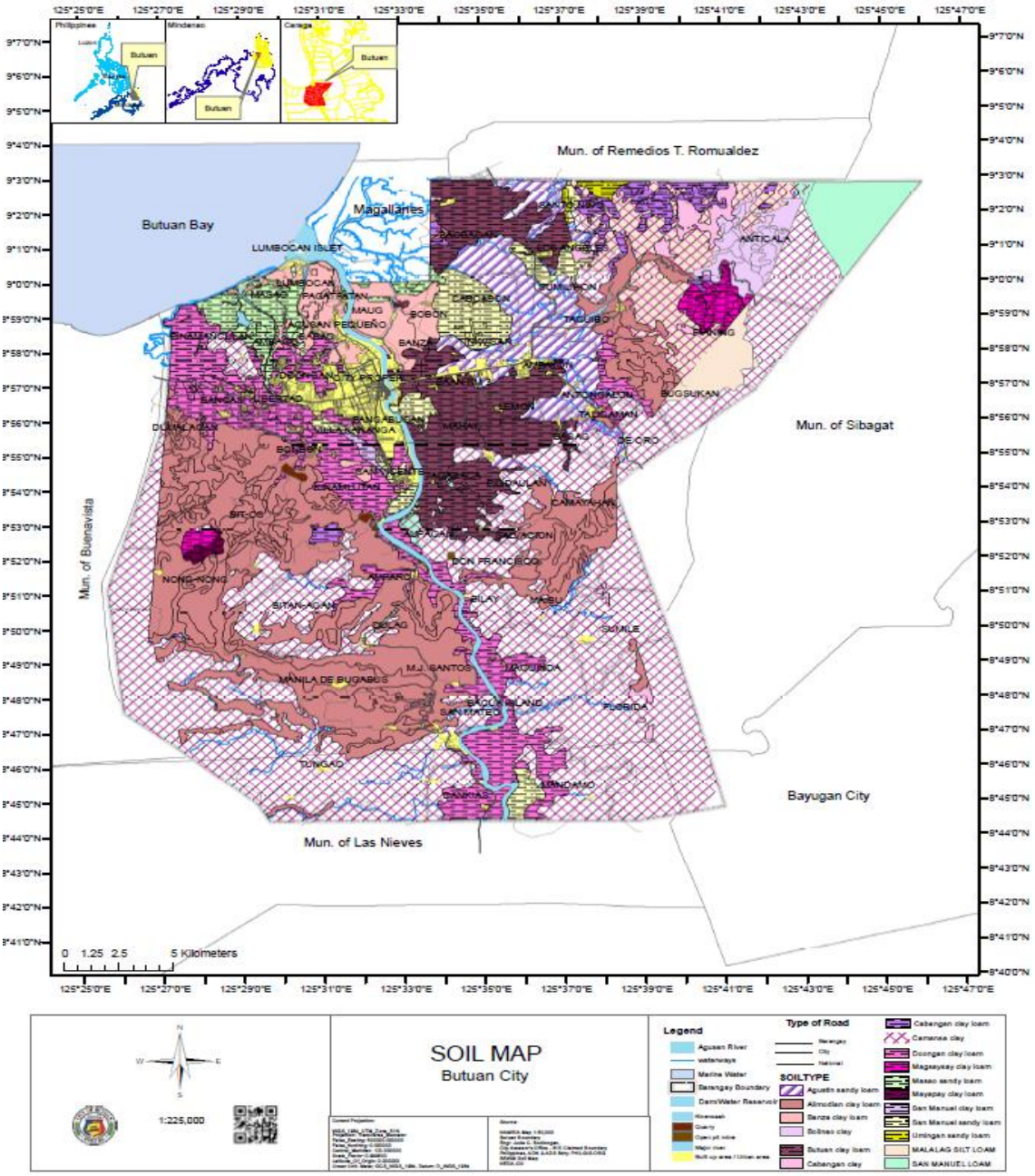
LMU Code	SMU Code	Description	FERTILITY STATUS														
			pH	BSP	CEC	OM	EC	Exchangeable Bases			P	Cu	Fe	Mn	Zn	Ca	Soil Fertility Rating
								Na	K	Mg							
01K	MoMf	Masao sandy loam, 0-3 % slope, moder seasonal tidal flooding	5.4	81.1	28.1	1.3	0.5	0.2	0.4	13.7						8.5	H
02L	MoMf	Masao sandy loam, 0-3 % slope, sev seasonal tidal flooding	5.4	81.1	28.1	1.3	0.5	0.2	0.4	13.7							H
03J	BzMf	Banza clay loam, 0-3% slope, sl seasonal flooding	6.8	89	72.43	4.3	0.22	0.03	0.4	12.8	5.7	17.43	66.2	97	0.4	51.5	M
03K	BzMf	Banza clay loam, 0-3% slope, moder seasonal flooding	6.8	89	72.43	4.3	0.22	0.03	0.4	12.8	5.7	17.43	66.2	97	0.4	51.5	M
04K	BzMf	Banza clay loam, 0-3% slope, sev seasonal flooding	6.8	89	72.43	4.3	0.22	0.03	0.4	12.8	5.7	17.43	66.2	97	0.4	51.5	M
09	BuM	Butuan clay loam, 0-3% slope, no floodi	6.2	81	56.5	2.63	0.12	0.02	1.3	15.1	71.4	11.4	224.1	95.9	2.2	29.6	H
09J	BuMf	Butuan clay loam, 0-3% slope, sl seasonal flooding	6.2	81	56.5	2.63	0.12	0.02	1.3	15.1	71.4	11.4	224.1	95.9	2.2	29.6	H
09K	BuMf	Butuan clay loam, 0-3% slope, moder seasonal flooding	6.2	81	56.5	2.63	0.12	0.02	1.3	15.1	71.4	11.4	224.1	95.9	2.2	29.6	H
09	DnM	Doongan clay loam, no flooding	5.3	72	54	2.1	0.36	0.5	0.4	26.1						11.9	M
09J	DnMf	Doongan clay loam, 0-3% slope, sl seasonal flooding	5.3	72	54	2.1	0.36	0.5	0.4	26.1						11.9	M
12J	AgMf	Agustin sandy loam, 0-3% slope, sl seasonal flooding	7	88	72.5	1.98	0.66	0.01	0.1	6	18.1	6.91	25.1	25.5	0.8	57.9	L
12J	SmMf	San Manuel sandy loam, 0-3% slope, sl seasonal flooding	6.2	84	68.5	2.56	0.32	0.02	0.08	17.5	34.6	11.8	107.8	84	0.7	39.4	M
18N1	UmN	Umingan sandy loam, 3-8% slope, slig eroded	5.4	73	14.6	0.69	0.1	0.1		10.6							M
49N1	CaN1	Camansa clay, 3-8% slope, slightly erod	4.5	57	23	1.7	0.02	0.01	0.1	4	Nil	2.27	4.03	16.75	0.2	1.8	VL
50-O1	CnO1	Cabangan clay, 8-18% slope, slig eroded	5.9	84	74.13	0.93	0.18	0.03	0.6	36.9	16.1	1.94	58.97	57.7	0.1	24.9	M
68N1	Cap N	Camansa clay, 3-8% slope, slightly erod	4.5	57	23	1.7	0.02	0.01	0.1	4	Nil	2.27	4.03	16.75	0.2	1.8	M
76N1	CasN	Camansa clay, 3-8% slope, slightly erod	4.5	57	23	1.7	0.02	0.01	0.1	4	Nil	2.27	4.03	16.75	0.2	1.8	M

76-O1	CaO1	Camansa clay, 8-18% slope, slightly ero	4.5	57	23	1.7	0.02	0.01	0.1	4	Ni	2.27	4.03	16.7	0.2	1.8	M
76N1	AlN1	Alimodian clay loam, 3-8% slope, slig eroded	4.9	51	20	1.51	0.02	0.01	0.1	2.7	Ni	0.38	3.59	5.65	0.4	0.5	VL
76-O1	AlO1	Alimodian clay loam, 8-18% slope, slig eroded	4.9	51	20	1.51	0.02	0.01	0.1	2.7	Ni	0.38	3.59	5.65	0.4	0.5	VL
112P2	AlP2	Alimodian clay loam, 18-30% slo moderately eroded	4.4	34	22.26	1.32	0.06	0.01	0.05	1.8	Ni	0.56	3.15	2.35	2.8	0.4	VL
112Q1	AlQ1	Alimodian clay loam, 30-50% slo slightly eroded	4.9	51	20	1.51	0.02	0.01	0.1	2.7	Ni	0.38	3.59	5.65	0.4	0.5	VL
112Q3	AlQ3	Alimodian clay loam, 30-50% slo severely eroded	4.4	34	22.26	1.32	0.06	0.01	0.05	1.8	Ni	0.56	3.15	2.35	2.8	0.4	VL
112R1	AlR1	Alimodian clay loam, >50% slope, slig eroded	4.9	51	20	1.51	0.02	0.01	0.1	2.7	Ni	0.38	3.59	5.65	0.4	0.5	VL
112R3	AlR3	Alimodian clay loam, >50% slope, seve eroded	4.4	34	22.26	1.32	0.06	0.01	0.05	1.8	Ni	0.56	3.15	2.35	2.8	0.4	VL
156R1	CaR1	Camansa clay, 18-30% slope, modera eroded	4.5	57	23	1.7	0.02	0.01	0.1	4	Nil	2.27	0.03	16.75	0.28	1.8	VL
156R3	CaR3	Camansa clay, 18-30% slope, modera eroded	5	29	20.06	0.6	0.02	0.02	0.04	2.4	Nil	1.22	0.87	2.33	0.26		VL
156P1	CnP1	Cabangan clay loam, 18-30%, slo slightly eroded	5.9	84	74.13	0.93	0.18	0.03	0.6	26.9	16.5	1.94	58.97	57.7	0.17	24.9	M
156Q1	CnQ1	Cabangan clay loam, 30-50%, slo slightly eroded	5.9	84	74.13	0.93	0.18	0.03	0.6	26.9	16.5	1.94	58.97	57.7	0.17	24.9	M
156Q3	CnQ3	Cabangan clay loam, 30-50%, slo severely eroded	6.2	86	74.83	0.57	0.1	0.03	0.5	33.91	19.8	1.68	52.27	38.3	0.04	5.4	M
156R1	CnR1	Cabangan clay loam, >50% slope, slig eroded	5.9	84	74.13	0.93	0.18	0.03	0.6	26.9	16.5	1.94	58.97	57.7	0.17	24.9	M
156R3	CnR3	Cabangan clay loam, >50%, slope, seve eroded	6.2	86	74.83	0.57	0.1	0.03	0.5	33.91	19.8	1.68	52.27	38.3	0.04	5.4	M
163P1	MgP1	Magsaysay clay loam, 18-30%, slo slightly eroded	4.8	40.6	20	2.75	0.1	0.1	0.2	5.6						2.3	M
163P2	MgP2	Magsaysay clay loam, 18-30%, slo moderately eroded	5.3	64.6	33.9	0.34	0.1	0.2	T	16.9						4.8	L
163Q1	MgQ1	Magsaysay clay loam, 30-50%, slo slightly eroded	4.8	40.6	20	2.75	0.1	0.1	0.2	5.6							M

163Q3	MgQ3	Magsaysay clay loam, 30-50%, slo severely eroded	5.3	64.6	33.9	0.34	0.1	0.2	T	16.9						4.8	L
163R1	MgR1	Magsaysay clay loam, >50% slope, slig eroded	4.8	40.6	20	2.75	0.1	0.1	0.2	5.6							M
163R3	MgR3	Magsaysay clay loam, >50%, slo severely eroded	5.3	64.6	33.9	0.34	0.1	0.2	T	16.9						4.8	L

LMU Code	SMU Code		FERTILITY STATUS														
			pH	BSP	CEC	OM	EC	Exchangeable Base			P	Cu	Fe	Mn	Zn	Ca	Soil Fertility
								Na	K	Mg							
118R	MyR1	Mayapay clay loam, >50% slope, slightly eroded	6.1	82.5	75.3	5.85	0.6	0.2	0.4		8	8.5		53.2		8.5	H
118R	MyR3	Mayapay clay loam, >50% slope, severely eroded	6.2	51.5	88.6	3.78	0.8	0.3	0.2	55.2	6	8.5		53.2		8.8	H
153P	BoP2	Bolinao clay, 18-30% slop moderately eroded	7.3	93	75.7	2.96	0.28	0.01	0.5	3.7	1.1	3.7	18.9	86	1.9	66.1	M
153P	BoP3	Bolinao clay, 18-30% slop severely eroded	7.3	93	75.7	2.96	0.28	0.01	0.5	3.7	1.1	3.7	18.9	86	1.9	66.1	M
153Q	BoQ2	Bolinao clay, 30-50% slop moderately eroded	7.3	93	75.7	2.96	0.28	0.01	0.5	3.7	1.1	3.7	18.9	86	1.9	66.1	M
153R	BoR2	Bolinao clay, >50% slope moderately eroded	7.3	93	75.7	2.96	0.28	0.01	0.5	3.7	1.1	3.7	18.9	86	1.9	66.1	M
153R	BoR3	Bolinao clay, >50% slope severely eroded	7.3	93	75.7	2.96	0.28	0.01	0.5	3.7	1.1	3.7	18.9	86	1.9	66.1	M
156Q	CaQ1	Camansa clay, 18-30% slop moderately eroded	4.5	57	23	1.7	0.02	0.01	0.1	4	nil	2.27	4.03	16.75	0.2	1.8	VL
156Q	CaQ3	Camansa clay, 18-30% slop moderately eroded	5	29	20.06	0.6	0.02	0.02	0.04	2.4	nil	1.22	0.87	2.33	0.2		VL

MAP 12: SOIL MAP



This is the geographical representation showing the diversity of Butuan City's soil types and /or soil properties (soil pH, texture, organic matter). Relevance of this tool to the preparation of the Butuan City Commodity Investment Plan is that it serves as a guide to us planners that in the establishment of enterprises in Butuan City, parameters such as the soil pH, soil texture and organic matter content are considered. This is also in consideration of identifying interventions to mitigate the limitations in land resources that would restrict productivity and profitability.

Climatological Data

TABLE 19. RAINFALL HISTORY FOR A FOURTEEN YEAR PERIOD IN MILLIMETER
Butuan City 2000-2014
Source: PAG-ASA, Bancasi, Butuan City
Ecological Statistics Profile, Geo –Physical Profile

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Ave./yr
2000	299.3	245	211	180.6	63.7	189.7	169.7	70.8	129.5	368.8	346.9	238	193.3
2001	190.1	138.8	138.8	83.9	220.9	106.2	77	124.5	70.5	102.2	469.1	147.6	168.2
2002	279.8	172.5	172.5	208.8	68.8	174.9	35.8	66.5	194.6	132.9	77.4	166.1	155.7
2003	340.7	60.4	60.4	4.4	195	423.6	292.3	169.9	131.1	293.8	85.3	570	231.5
2004	211.3	319.2	102.1	73.5	170.8	163.2	122	31.1	52.4	74.3	117.7	191.3	136
2005	262.1	32.6	120.5	1	116.2	197.9	168.6	89.2	148.7	193.6	205.6	547.4	173.6
2006	414.6	514.8	129.4	194.7	132	241.4	109.2	111.8	38.2	118.4	90.6	156.6	187.64
2007	419	114.7	121.9	137.7	84	249.9	49.8	66.9	77.2	141.2	243.7	210.9	187
2008	279.9	209.5	234	188	101.7	181.4	92.8	115	179.2	211	235.9	214.6	159.74
2009	470.5	401.7	124.2	130.5	159.6	114.1	95	90.6	43.1	45	472.1	163.1	192.4
2010	510.1	69.2	122.8	123.8	120.5	66.4	124	197.9	49.3	136.3	110.6	143.2	147.84
2011	745.9	512.8	336.9	70.9	167	255.6	192.2	132.5	93.2	271.3	157.2	343.9	106.05
2012	273.6	331.4	114.3	204.8	92.8	155.4	197.6	69.7	162.5	146.4	291.1	170.8	184.2
2013	511.4	275.6	179.1	111.4	100.1	287.7	105.3	200.5	19.5	137.9	232.2	130.2	190.1
2014	721.4	72.7	258.8	57.4	100.8	145.7	149.2	131.4	225.8	82.7	167.5	416.2	210.8
	5929.7	3470.9	2426.7	1771	1893.9	2953.1	1980.5	1668.3	1615	2455.8	3303	3810	2624.07

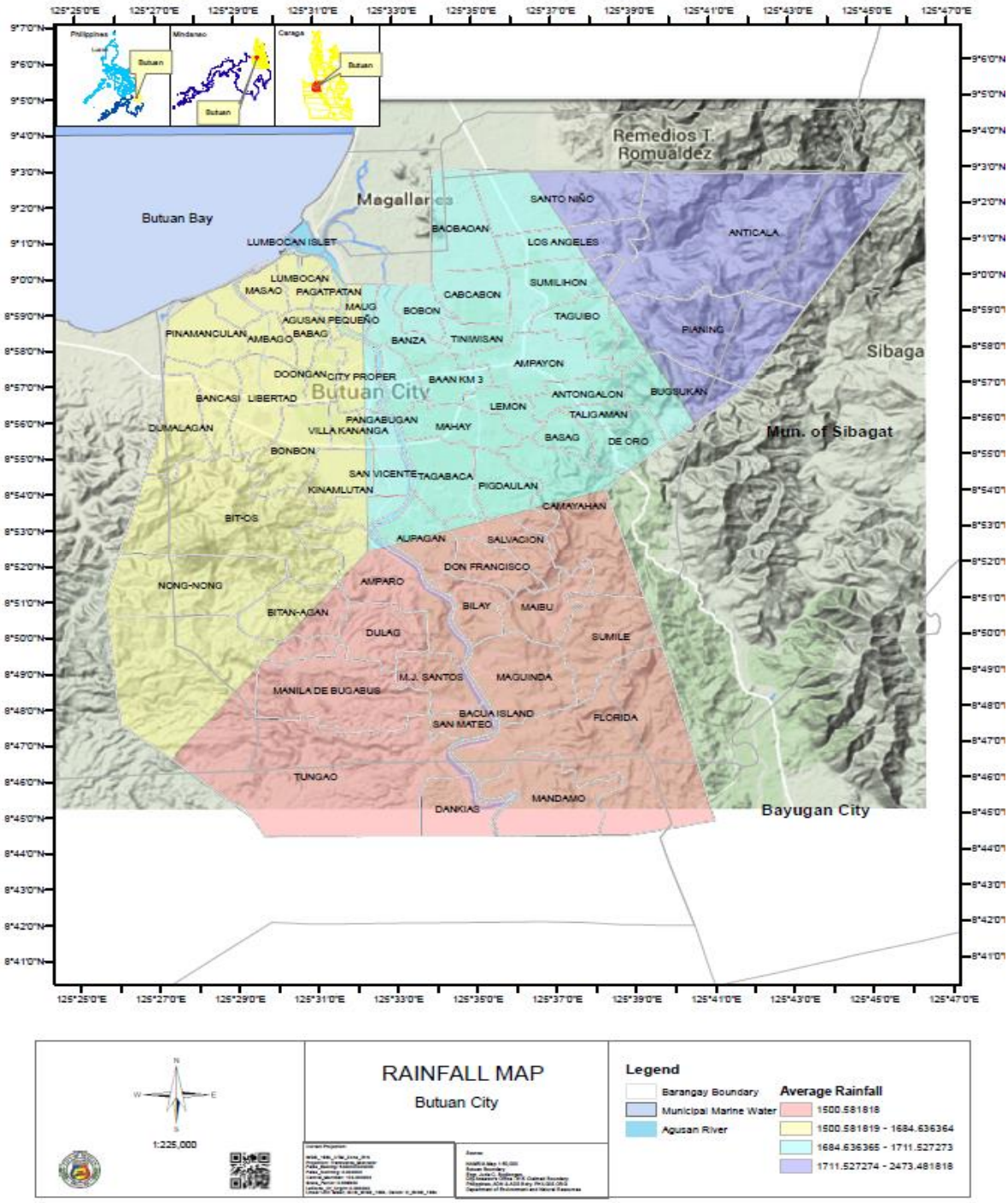
In the 14 years period historical data on rainfall pattern, 2014 exhibits the highest mean annual rainfall of 210.8 millimeters while 2011 exhibited lowest mean annual rainfall of 106.05 millimeters. The four (4) years period of 2011-2012-2013-2014 indicates an increasing trend. Generally, the months of November-December-January-February exhibits the intense rainfalls on a month-to-month basis while the month of September has the lowest rainfall.

TABLE 20. AVERAGE RAINFALL PATTERN
Butuan City
As of 2014
Source: PAGASA, Bancasi, Butuan City
Butuan City Ecological Statistics Profile

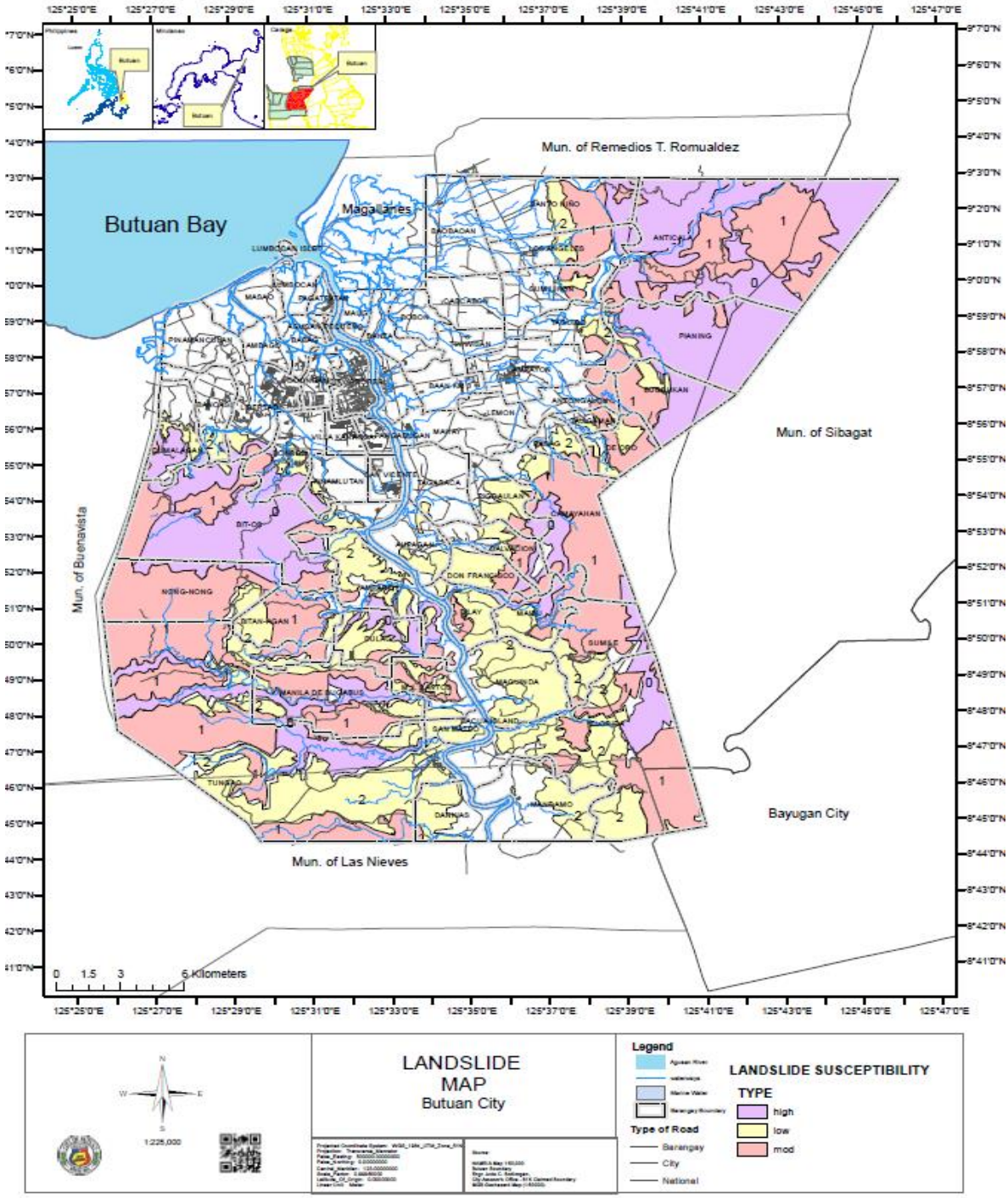
MONTH	Average Rainfall In (millimeter)		Average Mean Temp. (°C)		Average Mean Relative Humidi (%)		No. of Rainy Days		DEWPOINT	
January	23.3		25.0		90.0		27.0		23.20	
February	2.6		26.3		85.0		12.0		23.30	
March	8.3		27.1		83.0		20.0		23.70	
April	1.9		28.1		81.0		13.0		24.60	
May	3.3		29.8		79.0		21.0		25.30	
June	4.9		29.4		79.0		13.0		25.20	
July	4.8		28.7		79.0		17.0		24.70	
August	4.2		28.6		80.0		15.0		24.60	
Septembe	7.5		27.9		83.0		15.0		24.80	
October	2.7		28.4		82.0		15.0		24.90	
Novembe	5.6		28.0		85.0		16.0		24.80	
Decembe	13.4		27.6		85.0		24.0		24.40	
Average/ year	6.9		27.9		82.6		17.0		24.50	

The Table above indicates that the months of December and January exhibited the most number of rain falls while the month of April has the least rain falls in the observed year.

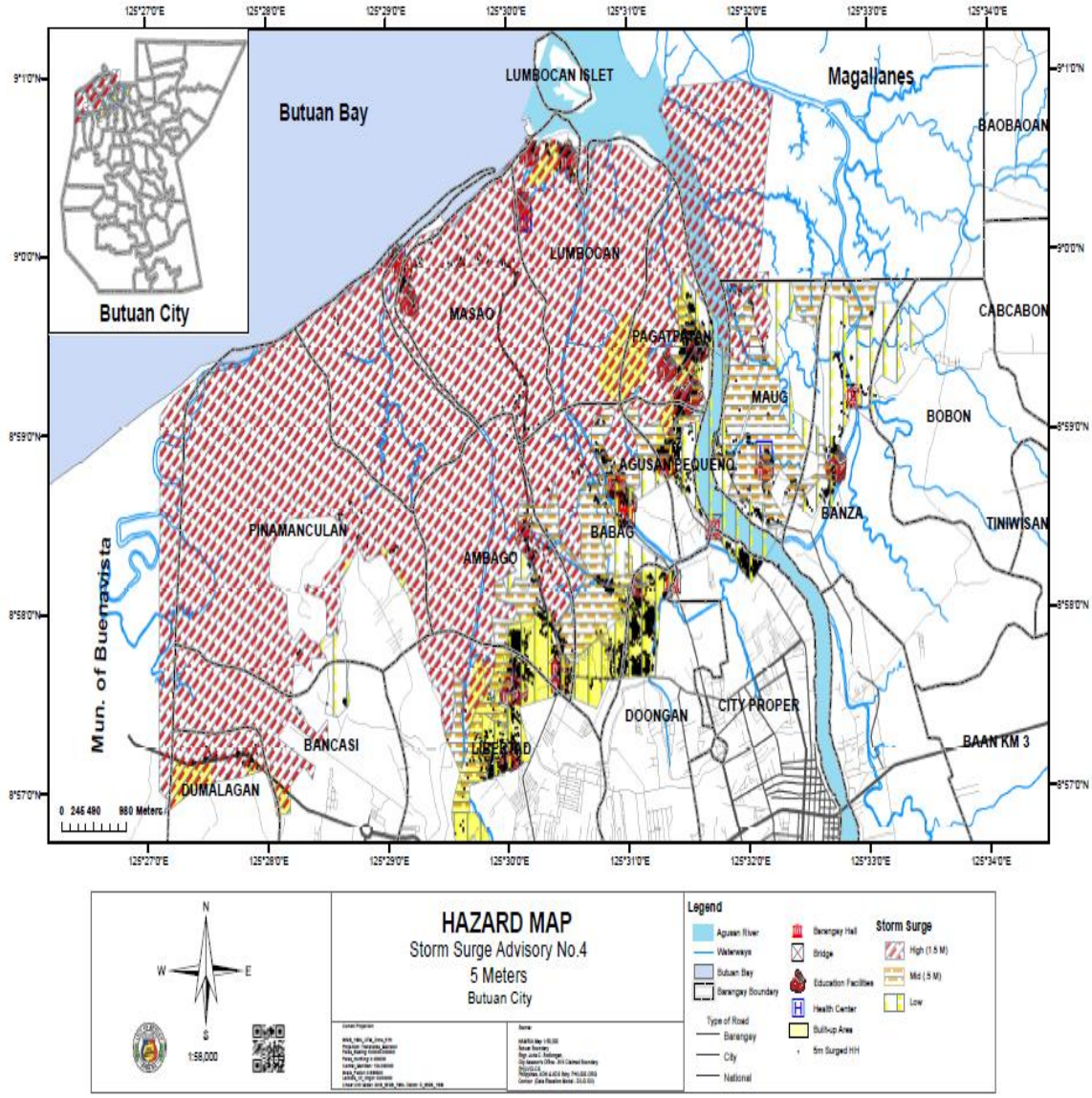
MAP 13: RAINFALL MAP



MAP 14: LANDSLIDE MAP



MAP 15: STORM SURGE MAP



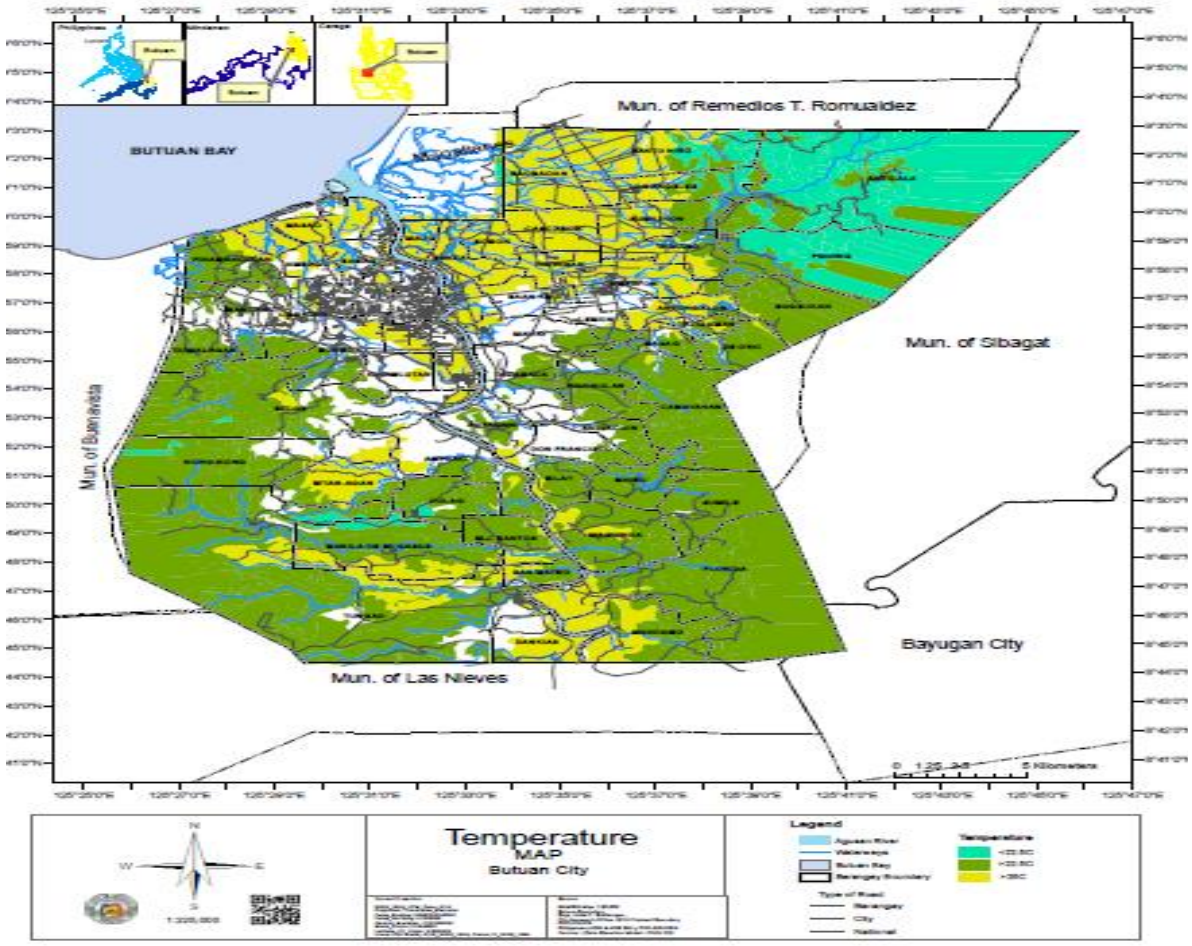
The above Landslide Map and the Storm Surge Map which are natural occurrences from the incessant rains brought by typhoons serve as guide to potential funders (DA-PRDP) where to locate the enterprises that are risks-free. This is to ensure that investments would not go for naught in terms of money, efforts and time. The occurrence storm surge are usual in Barangays near the Agusan River. Landslides can be mitigated by environmental control measures and by engineering designs and knowing these risk areas is sufficient enough to deter the location of these enterprises in the risk areas.

TABLE 21. MAXIMUM AND MINIMUM TEMPERATURE (°C)
Butuan City
2010-2014
Source: PAGASA

MONTH	2010		2011		2012		2013		2014	
	Maximum Temp	Minimum Temp.	Maximum Temp.	Minimum Temp.	Maximum Temp.	Minimum Temp.	Maximum Temp.	Minimum Temp.	Maximum Temp.	Minimum Temp.
January	30.0	23.4	29.5	23.4	31.1	23.7	32.4	22.2	32.1	17.6
February	31.7	23.2	30.4	23.2	31.1	23.8	33.8	21.5	33.8	19.4
March	32.1	23.6	31.1	23.7	32.3	23.9	34.7	22.2	35.0	20.0
April	33.0	24.3	31.6	24.4	32.5	24.4	35.2	22.5	34.8	21.2
May	33.7	25.4	32.4	24.5	33.4	24.9	36.2	22.4	36.2	23.3
June	34.5	25.6	32.5	24.7	33.2	31.8	35.4	22.0	35.6	23.3
July	33.3	24.5	32.4	24.6	32.3	24.5	34.9	22.5	35.2	23.3
August	32.9	24.4	32.0	24.7	33.3	23.9	35.7	22.6	35.5	23.0
September	33.4	24.2	32.8	24.4	31.8	24.2	35.5	23.2	34.3	21.5
October	32.9	23.9	32.5	24.2	31.7	24.1	35.0	22.0	33.6	23.4
November	32.7	23.9	32.1	24.4	30.7	23.4	33.7	21.6	35.0	22.4
December	31.7	23.8	30.99	24.4	31.5	23.7	34.1	22.3	34.0	22.5
Ave./ year	32.65	24.18	31.69	24.22	32.1	24.69	34.72	22.25	34.63	21.74

Generally, the hottest months on a year to year basis observed in the five (5) years period are May-June-July while the coolest months are from December – February.

MAP 16: TEMPERATURE MAP



Land Limitation

Land limitations are soil/land characteristics and qualities that serve as constraints or limit agricultural productivity. These physical constraints contribute to land degradation and affect the long term sustainability and productivity of any given area. The extent of which are presented in Table 5. These limitations may appear in a given area singly or in combination with other constraints as identified below:

a. Soil depth of less than 50 centimeters
b. Slope of greater than 30 percent
c. Moderate to severe erosion and steep slope
d. Poor drainage and moderate to severe flooding
e. Salinity intrusion
f. Stoniness /coarse fragments / rock outcrops ranging in quantity from common to many

CHAPTER 2: DEVELOPMENT VISION AND FRAMEWORK OF BUTUAN CITY

The over-all vision and mission of Butuan City which seeks to attain a status as a hub city augurs well with the agricultural sector vision of a dynamic agricultural sector. The consideration of the Caraga Region as a production system where it is fully supported by sub-production systems (provinces and cities) will make Butuan City a Hub City by virtue of its being the Capital City. The over-all vision can be attain if all the challenges and calls can be hurdled and complex issues and problems are addressed.

The framework that is being adopted in the development of the agricultural sector which is one of the contributing factor in achieving the goal seeks to identify and apply good practices to help solve the complex problems. Its task is to provide the leaders of Butuan City, planners and development workers especially in the agriculture sector pre-designed, pre-built code components and templates.

Short of a master plan in its totality, the Butuan City Commodity Investment Plan adopting the Value Chain Development approach seeks to achieve the following:

1. Helps the leaders of Butuan City advance support for national initiatives –in this case the Philippine Rural Development Program
2. Understanding of the interconnectedness of complex social, economic and political development issues
3. Development of extensive networks among leaders and the programmatic communities
4. Commitment of the local government unit to strategic partnerships to initiate, sustain and scale dynamic mission-driven programs
5. Personal experiences (good governance) of the local leaders in developing its constituencies and markets for high –impact social and economic initiatives

A balanced investment and development opportunities with responsible environmental and social management in harmony with community aspirations.

- Over All Vision Statement and Development Goals

Vision Statement

A great hub City of opportunities for all that spurs and supports CARAGA's sustainable growth and development

Mission Statement

The City of Butuan will strive to achieve the community's vision of a great, inspiration, competitive, liveable and sustainable City.

Objectives

a. To make the Barangays in Butuan City progressive with initial focus on the 10 most depressed barangays

b. To improve level of food security
c. To increase income of rural barangays/depressed barangays
d. To enhance policy environment and governance

- Agriculture Sector Vision and Goals

Vision Statement

A dynamic agricultural sector of Butuan City which attains foods security, self sufficiency,and global competitiveness propelled by organized and empowered agricultural stakeholders in the year 2016.

Mision Statement

The City Agriculturist Office as the implementing arm of the City Government of Butuan in agricultural development will:

i. Serve as a catalyst to a more productive, investmentfocused and marketoriented agricultural development in the city.
ii. Promote appropriate and sustainable farming systems that enable the farmers and fisherfolks to attain productivity and profitability as the key to raising the quality of life for all;
iii. Transform the agricultural sector into a vibrant, competitive and technology based industry

Goals

Food sufficiency and agriindustrialization shall be pursued over the next six years.

Objectives

i. Increase productivity in crop, livestock and fishery production while ensuring the protection and preservation of the environment and equity for small farmers and fisherfolks.
ii. To enhance profits and incomes particularly of the small farmers and fisherfolks by going into agribusiness and entrepreneurship, adopting value adding activities and generally for the agricultural sector to shift into agroindustrialization.
iii. Empower agricultural stakeholders (e.g. farmers, fisherfolks, rural women and youth, upland dwellers, livestock raisers and AEWs') through improved mechanisms and processes for their participation in program implementation and monitoring

- Sector Strategy and target outcomes

Strategies

1. Facilitate and promote diversification of production and livelihood options
2. Improve rural infrastructure and facilities

3. Develop markets and sharpen regulatory competence
4. Improve the sector's credit access
5. Strengthen research, development and extension
6. Secure food availability and affordability
7. Create job opportunities by expanding existing markets, aggressively exploring new markets and promoting new investments on agro-industries, agri-services, agro-forestry and fisheries in both public-private partnership and private sector led modes
8. Promote more value –adding into products and develop the capacities of stakeholders for value-chain management
9. Promote vertical and horizontal integration of input, production and marketing
10. Increase yield/production of major commodities for food security, economic importance and export potential/importance
11. Increase forward linkages to the industry and service sectors
12. Increase agricultural sector resilience to climate change risks thereby reducing annual average agricultural and fishery production losses

Key Result Areas

1. A competitive, sustainable and technology based local agriculture sector and fishery sector
2. Productive and progressive farmers and fisher folks contributing to an effective and efficient governance
3. Efficient and developed value chains
4. Agricultural commodities are well integrated in the domestic and international markets
5. A resilient and sustainable agricultural sector to climate change and promotes integrity of the environment
6. Accelerated infrastructure development enhancing competitiveness and productivity in the industry , services and agriculture sector

In pursuit of achieving an economic development in Butuan City, the following development projects are initially identified:

1. **Integrated Rubber Production and Marketing**
   This is the development of the local rubber industry adopting the Value Chain Development approach. This is to be led by the local rubber champion, the Km. 7 Farmers Producers Cooperative based in Barangay Tungao. This covers the consolidation of rubber cup lumps produced by the farmers in all rubber production areas in Butuan City and marketed as crumb rubber. Processing will be done in a processing plant located in Prosperidad, Agusan del Sur until the production of cup lumps in Butuan City can warrant the establishment of a processing facility for higher value rubber products. To increase the capacity

2. **Cacao Beans Processing and Marketing**

The identified proponent group based in Antongalon, Butuan City aims to consolidate the production of cacao farms initially established by the National Greening Program of the Department of Environment and Natural Resources and the Philippine Coconut Authority. Ten percent (10%) of the consolidated beans will be processed to tableya and the remaining beans will be sold to institutional buyers in fermented form.

3. **Banana Consolidation and Marketing Project**

One of the problems besetting the promotion and development of the local banana industry is the pricing structure provided by Celebes Corporation, a leading manufacturer and exporter of banana chips. Due to the inability of the local industry to supply the required volume of raw materials, Celebes Corporation is forced to source its raw materials outside of Butuan City at a higher price discouraging farmers to invest in their banana farms for higher productivity and profitability.

The proposed intervention aims to develop a mechanism where the identified proponent group will consolidate and market cardava banana to Celebes Corporation at a much higher price compared to the prevailing price offered by the firm. The difference from the price offered to outside sources and the prevailing company price would be the income of the proponent group. This would be the set-up until the local banana industry has the capacity to engage in first frying activities where the products can also be absorbed by the firm. The proponent group can also develop some ways to develop food products that will be absorbed by the local market.

4. **Integrated Coco Coir and Geonets Production and Marketing**

The abundance of coconut husks in Butuan City will be a good source for additional livelihood opportunities for the coconut farmers which they consider as farm wastes. Coco coir and geonets are in demand nowadays for local and export markets. The problem of the local coconut industry is that there is no identified champion that can agitate the farmers into adopting a mode to promote the local coir industry by way of producing coconut products which are in demand.

The proposed intervention aims to develop the capacity to produce coco coir and other coconut products such as geonet, coco peat and possibly coco panel boards as construction materials.

The development of these four (4) commodities are the initial steps to economic development of Butuan City. These are to be supported by the provision of other interventions such as rural access infrastructures, provision of fiscal and non-fiscal incentives and other related measures.

Development Challenges

(from the Revised Caraga Regional Development Plan and Butuan City Planning and Development Office)

On Food Security

A. Low Productivity of the crops subsector

Butuan City has not yet fully utilized much of its resources. Of around 4, 00 hectares of land available for economic use, it has only utilized 19,291.16 hectares in 2012. Of that area, 18,834.13 hectares are in agriculture, 150.05 in industry and agro-industry, and 306.98 in commerce and services. A total of 19,864 hectares of its agricultural lands are under-utilized or not utilized at all. The City's productivity in areas utilized for agriculture (crops, agribusiness, livestock and fishery) is high at around P 214,000 per hectare compared to the regional average. But the unutilized large tract of lands has pulled down its productivity. The City is only making around P 36.0 M output per hectare in areas utilized for industrial activities, too low in a condition where industries in other areas are making it at nearly P 500 million per hectare. It is also making around P 122 million per hectare in areas utilized for commerce and services, also low compared to more than P 500 million per hectare that other areas are making.

Butuan City requires 22,326.08 hectares to satisfy the rice requirements of its population, however, only 18, 834.13 hectares of rice production areas are developed. The City needs around 39.35 million kilos of milled rice and it is currently producing around 37.99 million kilos, short by around 1.4 million kilos.

B. Declining livestock/poultry production

For the past few years, Butuan City exhibited a declining trend in its livestock production and it remains a net importer (local) of this commodity. Livestock production of Butuan City is short by almost 9 million kilos to feed its people. More focus should be given to this sub-sector's productivity and eventually contribute a decent share to the agriculture sector particularly in meeting the goal of meat sufficiency.

C. Declining productivity of the fishery sub-sector

Production output of the fishery sub-sector continues to drop as it recorded a 1.27 percent decline in its production in 2012. The decrease is attributed to low fish catch.

On livestock and fish production, the City needs a total of 17.14 million kilos to provide its people but is producing only around 8 million kilos (1 million kilos of fish and others, livestock, short by almost 9 million kilos.

D. Slow pace of modernizing the agriculture sector

Adoption of new technologies to improve farm productivity is very slow as most farmers prefer using traditional methods over the modern ones because of the attendant costs. Advocacy on diversified farming system as well as adoption of matured technology should be strengthened through improved access to information and trainings.

E. Adverse weather and impact of climate change

Butuan City is highly vulnerable to climate change and weather variability. Among the natural hazards that Butuan City has been experiencing includes flooding, salt water intrusion, landslides, flashflood, etc., thus appropriate measures should be identified and adopted to lessen the impact of these weather and climate abnormalities. Low productivity of the agricultural sector is one probable impact from these hazards.

On Development of Agribusiness Land /rural Development

F. Indiscriminate conversion of agricultural lands to other uses

Butuan City is experiencing rapid conversion of agricultural lands to commercial uses exploiting the cap thereby reducing greatly the agricultural areas for food production.

G. Inefficient physical infrastructures

Development of lands for agricultural production activities will be protracted when irrigation systems and other related facilities are unavailable. Slow development of agribusiness lands can be ascribed to slow completion of irrigation systems projects.

H. Credit and Finance

Credit and financing programs encourage small farmers to adopt new technology to increase farm yields and offset policy biases against agriculture. Credit and financing programs are important because economic agents in the agricultural sector who suffer from a cash-flow problem and liquidity constraint may produce sub-optimal inputs use and therefore, output.

I. Declining interests/absorption capacities of rural based organizations to participate in rural development programs

There are existing rural-based organizations (RBO's) which are not yet ready to absorb/implement development programs. This creates a gap in realizing the goals of various programs and projects implemented by government and non-government entities.

J. Slow mobilization of local entrepreneurs for farm diversification

Farm diversification has not significantly progressed even with the availability of matured technologies. There is a need for special programs that would require the engagement of rural based organizations towards farm diversification and up scaling of local industries from the agri-based crops sub-sectors.

Development Opportunities

- **Available land for agriculture, fishery and fishpond, and agro-forestry development**

More or less 60,032 hectares of Butuan City's total land area are potential for agro-forestry development. Out of these potential area, more or less 50% are still available for productive utilization.

- **Convergence of efforts among the key partners**

The convergence efforts among regional line agencies has been profound implemented development programs/projects such as BUB, NGP, PRDP, PAMANA aimed to promote productivity. Development efforts should be strengthened and geared towards industry up scaling and increased land utilization.

- **Engagement of CSOs and private sector in rural development**

The civil society organizations (CSOs) have been mainstreamed in the development efforts of the City Government of Butuan. The civil society organizations have been engaged as partners in the delivery of services to the community in the areas of agriculture, health and environment. Greater outreach services can be achieved by these CSOs to promote and develop the agriculture sector in Butuan City.

- **Significant increase in the budget for agri/fishery development**

For the past three (3) years, a significant increase in the budget of key agencies for rural development has been observed. Foremost of these agencies is the Department of Agriculture which enjoyed a more than 50% increase in their 2014 budget for agricultural support services.

CHAPTER 3: PRIORITY COMMODITY CHAIN DEVELOPMENT

1. Rubber Commodity Value Chain

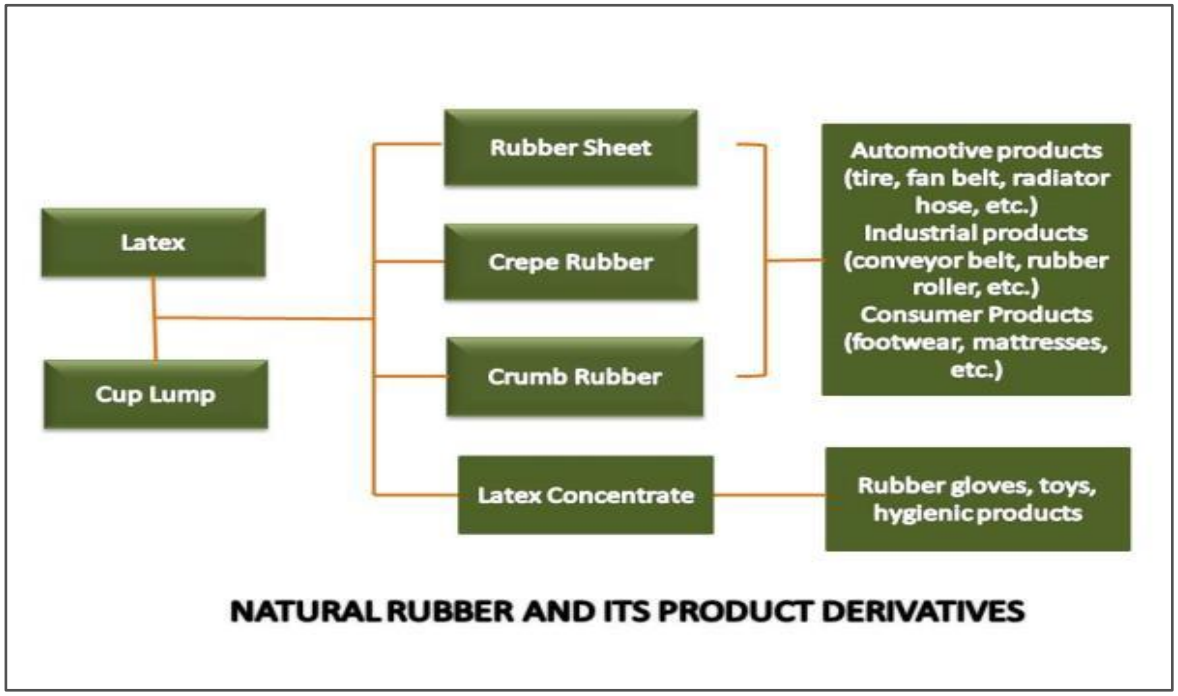
OVERVIEW OF THE INDUSTRY

Product Description

The raw material used for natural rubber processing is a "white milky fluid" called latex, which is mainly tapped from rubber tree (*Hevea brasiliensis*). Harvesting of latex commences on the 5th to 6th year after planting. Rubber cultivation focuses on growing rubber trees and producing raw rubber from field latex, while rubber manufacturing converts the raw rubber into value added products.

Natural rubber products can be broadly classified under two categories, namely, dry or solid rubber and latex concentrate of "liquid rubber". Dry rubber refers to the grades, which are marketed in the dry form such as rubber sheet, crepe rubber, and crumb rubber. Latex concentrate is made from freshly tapped un-coagulated field latex. It is used in the manufacture of rubber-based high-end products like surgical gloves, catheters, condoms, balloons, and garments Skim latex is produced as a by-product during the preparation of latex concentrate. It has a dry rubber content of only 3 to 7% and its dirt content is very low.

FIGURE 1. NATURAL RUBBER AND ITS PRODUCTS DERIVATIVES, 2014



The raw material lobtained by Mindanao processors from the farmers or traders is commonly in the form of cup lumps. The processors, in turn, process these into rubber sheets, crepe rubber, and crumb rubber.

Rubber sheets are produced by processing the latex using chemicals and rollers. The rollers are less expensive than the machinery used to make crepe rubber. According to industry stakeholders, the production of rubber sheets is the most viable for village level processing plants managed by cooperatives. Rubber sheet could be categorized as Air Dried Sheet (ADS) and Ribbed Smoked Sheet (RSS). The main difference between ADS and RSS is the method used for drying the sheet. ADS is dried using hot air while RSS uses smoke in a smokehouse with temperature up to 60°C. Among the two, RSS is the most popular in the international market although ADS is considered to be of a better grade of rubber. RSS is a general purpose rubber and predominantly used in tire manufacturing.

Crepe rubber is a type of crude natural rubber in the form of colorless or pale yellow crinkled sheets, prepared by pressing bleached coagulated latex through corrugated rollers. It is often used to produce shoe soles, clear adhesives and medical supplies. The pale crepe rubber is a premium grade crepe whose processing involves two coagulation steps followed by warm drying. Its color is light tan. The sheets are packed as bales and marketed as "thin pale crepe".

Crumb rubber is also known in the trade market as "Technically Specified Rubber" or "Standard Philippine Rubber (SPR)". Crumb rubber processing is relatively faster than other natural rubber semi-processed products. Likewise, crumb rubber is generally more clean and uniform than sheets and crepes. Raw materials used for making crumb rubber can be field latex or low quality lump. The steps included in crepe rubber processing using field latex are latex coagulation, milling, drying, bale pressing, and packing. If the raw material used is lump, the step will be started by soaking and/or washing the lump, and then followed by hammer milling, crepe formation, milling, drying, and bale pressing, and packing.

Natural crumb rubber is packed and compressed in bales not exceeding 50 kilograms and each bale is wrapped in transparent polyethylene bag, dispersible in the rubber or a thicker quality which may be stripped from the bales and free from all kinds of coating. The product is classified into 12 Grades according to the following properties: a) Color Coding - marker; b) Dirt Retained; c) Ash; d) Nitrogen Content; e) Volatile Matter Content; f) Initial Plasticity (Po); g) Plasticity retention Index (PRI); h) Lovibond Colour Index; and i) Mooney Viscosity.

The tire industry is the largest consumer of natural rubber, accounting for approximately 80% of the global consumption of natural rubber. Other industrial products made from natural rubber include belts, hoses, tubes, linings and bearings, consumer products like balls, erasers and footwear, medical products like gloves and catheters, as well as seismic materials. Natural rubber is considered more eco-friendly and superior in quality as compared with synthetic rubber, therefore its use in manufacturing rubber bands, surgical gloves and drapes, contraceptives, nipples on baby bottles, shoe soles, as well as carpet backing is displaying a phenomenal increase.

Key products produced and traded by the Mindanao rubber industry are cup lumps, crumb rubber, crepe rubber, and rubber sheets. Cup lumps and crumb rubber comprise bulk of products traded. To date, there is only one company in Mindanao who produces finished products. The company is based in Bukidnon and produces boots/footwear exclusively for the export market. The only company in Bukidnon who was into liquid rubber production has closed down. The machinery and equipment were bought by a processing plant in Zamboanga Sibugay.

TABLE 22. KEY PRODUCTS PRODUCED AND TRADED IN MINDANAO REGIONS

Region	Cup Lump	Crumb Rubber	Crepe Rubber	Rubber Sheet	Latex Rubber	Finished Product
Zamboanga Peninsula	●	●	●	●	○	
Northern Mindanao	●	●	●	●		●
Davao Region	●					
SOCCSKSARGEN	●	●	●	●		
Caraga	●	○	○	○		

ARMM	●	●	●	●		
Legend						
●	Established product		○	Start-up/For establishment		
Source: KII/FGD/Past Studies, VCA Mindanao						

PRODUCTION TRENDS

1. Domestic Production

Most rubber is grown between 15 degrees north and 10 degrees south with hot and humid climate and a well distributed rainfall of 1,900 mm or more per year with temperatures ranging from 24 to 35 degrees. Mindanao has the ideal growing conditions for rubber.

Of the 185,476.20 hectares of land planted to rubber in the Philippines in 2013, Mindanao accounted for 98.7%. Rubber plantations in Zamboanga Peninsula comprised 46.4% of the total area under cultivation. Soccsksargen ranked second with 40,916 MT, which was about 48% of the total area under rubber cultivation in Zamboanga Peninsula.. ARMM, which had the third largest area planted to rubber at 34,115.00 hectares, accounted for 19%.

TABLE 23. NATURAL RUBBER PRODUCTION IN THE PHILIPPINES, 2013

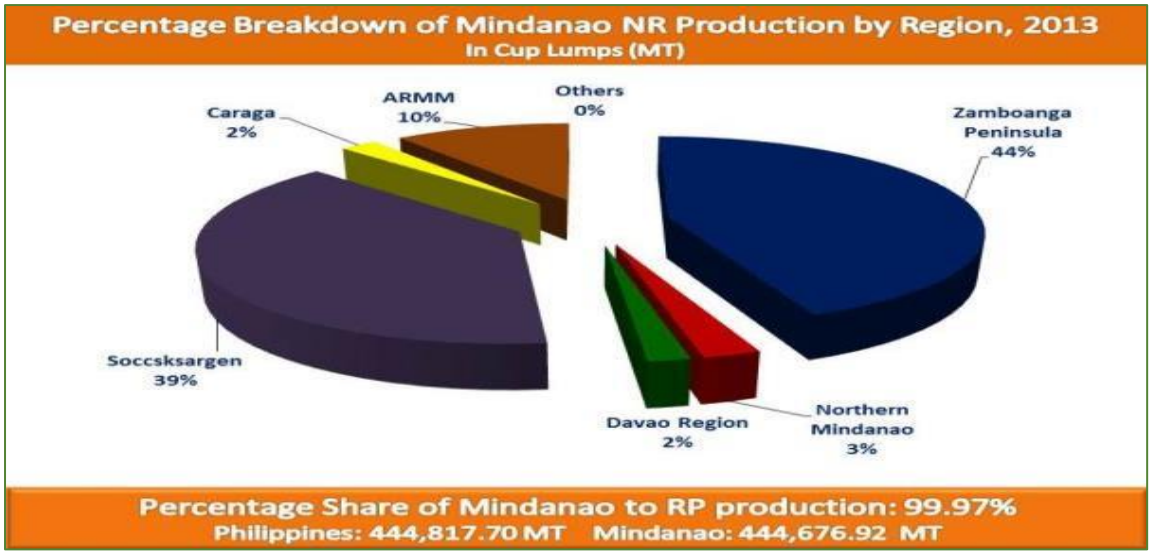
Note: Volume – in cup lumps MT

Island Group/ Region	Area Planted (in Ha)	Volume (MT)	Ave Yield (MT/ha)
Philippines	185,476.20	444,817.70	2.40
Luzon	1,384.00	131.62	0.10
Visayas	1,018.00	9.16	0.01
Mindanao	**183,074.20**	**444,676.92**	**2.43**
Zamboanga Peninsula	*86,033.00*	*195,357.03*	*2.27*
Northern Mindanao	*6,929.20*	*11,261.00*	*1.63*
Davao Region	*3,533.00*	*8,240.80*	*2.33*
Soccsksargen	*40,916.00*	*172,953.92*	*4.23*
Caraga	*11,548.00*	*10,030.83*	*0.87*
ARMM	*34,115.00*	*46,833.34*	*1.37*

Average cup lump yield in Mindanao in 2013 was 2.43 MT per hectare. Among the regions, Soccsksargen had the highest average yield at 4.23 metric tons of cup lump per hectare. This is more or less at par with the average yield in Malaysia.

In 2013, Philippinecup lump production was at 444,817.70 MT with Mindanao accounting for 99.97%. Of the 444,676.92 MT of cup lumps produced in Mindanao, 44% came from Zamboanga Peninsula. SOCCSKSARGEN contributed 39% of the total cup lump production. ARMM had the third highest production volume at 46,833.34 MT, comprising 10% of the Mindanao production. Cup lump production in Mindanao posted an increase of 14% in 2013 over 2009 production volume.

FIGURE 2. PERCENTAGE BREAKDOWN OF MINDANAO NR PRODUCTION BY REGION, 2013



Bukidnon is the key rubber producing province in the region. In 2013, the province accounted for 97% of the region's production and 96% of the hectarage planted to rubber. Percentage increase in production volume was lower than the expansion rate in hectarage and number of tappable trees due to the decline in tapping productivity per tree and increasing number of aging/senile trees per hectare.

In 2013, 99.51% of the region's rubber production came from North Cotabato. The province was also the country's largest producer. North Cotabato is the only province in the country where average number of tappable trees per hectare reached 400 and above. Rubber is generally cultivated under a monocropping system in this province.

CARAGA

Caraga is in the process of rehabilitating its rubber plantations after being hit by successive typhoons. Agusan del Sur is the main rubber producer in the region. In 2013, the province accounted for 94% of the region's rubber output. From a production volume of 16,102.18 MT in 2012, rubber production in Agusan del Sur dropped to 9,428.70 MT in 2013. Average tapping productivity per tree also dropped from 5.97 kg in 2009 to 3.49 kg in 2013. As per interviews with farmers, many of their trees have surpassed their productive stage and need to be replaced. Majority of the smallholders though have not yet recovered from loses incurred due to natural calamities.

During the last three years, there has been a significant increase in rubber plantations in Agusan del Norte and Surigao del Sur. During the last five years, area planted to rubber in the region increased by 18.88% per year. Farm productivity is still an issue that the region has yet to fully address.

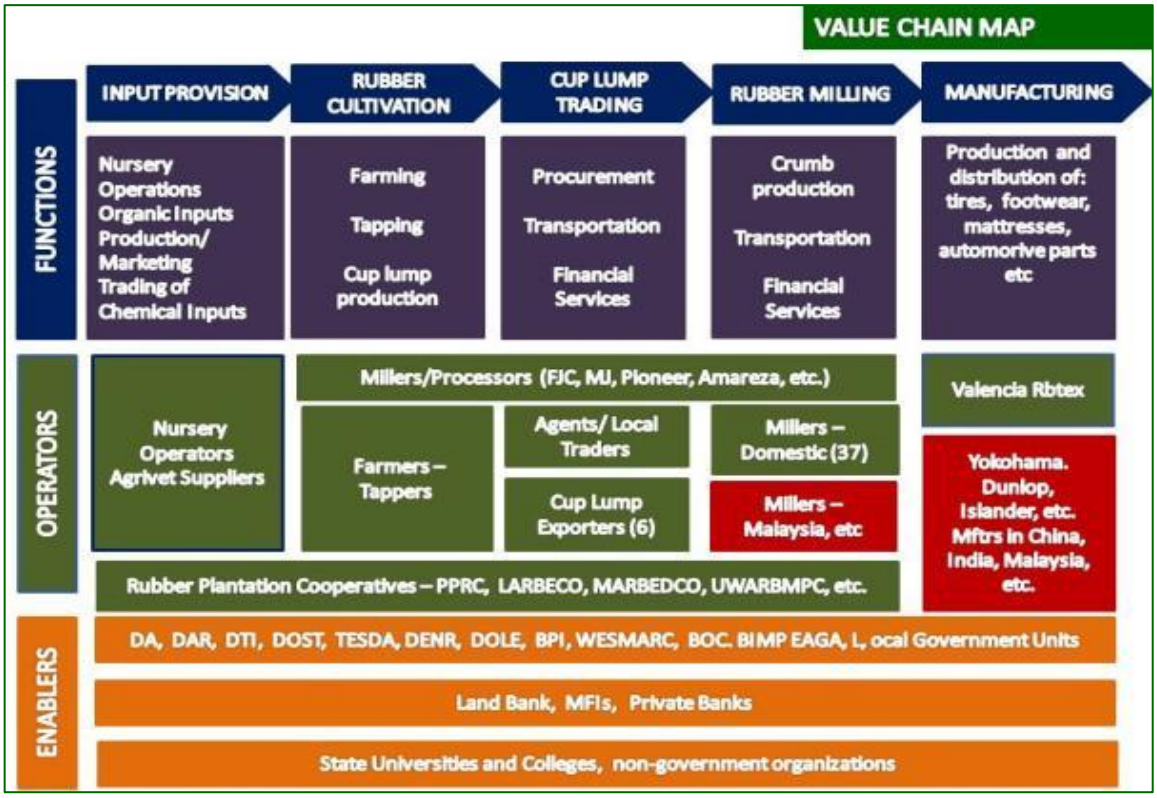
TABLE 24. NATURAL RUBBER PRODUCTION TRENDS IN CARAGA, 2009 TO 2013

Indicators	2009	2010	2011	2012	2013	Annual % Grow Rate
CARAGA						
Volume (cuplump MT)	14,686.12	14,618.65	15,247.66	16,610.83	10,030.83	-6.34%
Area Planted (Ha)	5,941	6,840	6,860	11,528	11,548	18.88%

TABLE 24. NATURAL RUBBER PRODUCTION TRENDS IN CARAGA, 2009 TO 2013						
Indicators	**2009**	**2010**	**2011**	**2012**	**2013**	**Annual % Grov Rate**
Ave Yield/Ha (MT)	2.47	2.14	2.22	1.44	0.87	-12.97%
No. of tappable trees	2,466,525	2,487,175	2,485,625	2,912,359	2,929,078	3.75%
Ave. No. of tappab tree/hectare	415.17	363.62	362.34	252.63	253.64	-7.78%
Ave Yield/Tree (kg)	5.95	5.88	6.13	5.70	3.42	-8.50%
Agusan del Norte						
Volume (cuplump MT)	26.85	29.52	106.43	421.10	505.68	356.67%
Area Planted (Ha)	30.00	700.00	700	755	765	490.00%
Ave Yield/Ha (MT)	0.90	0.04	0.15	0.56	0.66	-5.23%
No. of tappable trees	10,300	12,450	13,000	180,000	195,478	359.57%
Ave. No. of tappab tree/hectare	343.33	17.79	18.57	238.41	255.53	-5.11%
Ave Yield/Tree (kg)	2.61	2.37	8.19	2.34	2.59	-0.15%
Agusan del Sur						
Volume (cuplump MT)	14,603.18	14,525.27	15,077.24	16,102.18	9,428.70	-7.09%
Area Planted (Ha)	5,860	6,050	6,070	9,980	9,990	14.10%
Ave Yield/Ha (MT)	2.49	2.40	2.48	1.61	0.94	-12.43%
No. of tappable trees	2,447,725	2,447,725	2,445,625	2,700,000	2,700,000	2.06%
Ave. No. of tappab tree/hectare	417.70	404.58	402.90	270.54	270.27	-7.06%
Ave Yield/Tree (kg)	5.97	5.93	6.16	5.96	3.49	-8.29%
Surigao del Norte						
Volume (cuplump MT)	0.00	0.00	0.00	0.00	5.00	
Area Planted (Ha)	1	-	-	120	120	2380%
Ave Yield/Ha (MT)	-	-	-	-	0.04	
No. of tappable trees	-	-	-	400	400	
Ave. No. of tappab tree/hectare				3.33	3.33	
Ave Yield/Tree (kg)					12.50	
Surigao del Sur						
Volume (cuplump MT)	56.09	63.86	63.99	87.55	91.45	12.61%
Area Planted (Ha)	50.00	90.00	90.00	673.00	673.00	249.20%
Ave Yield/Ha (MT)	1.12	0.71	0.71	0.13	0.14	-17.58%
No. of tappable trees	8,500	27,000	27,000	31,959	33,200	58.12%
Ave. No. of tappab tree/hectare	170.00	300.00	300.00	47.49	49.33	-14.20%
Ave Yield/Tree (kg)	6.60	2.37	2.37	2.74	2.75	-11.65%
Source: BAS/PSA						

Value Chain Mapping

FIGURE 3. CRUMB RUBBER VALUE CHAIN MAP

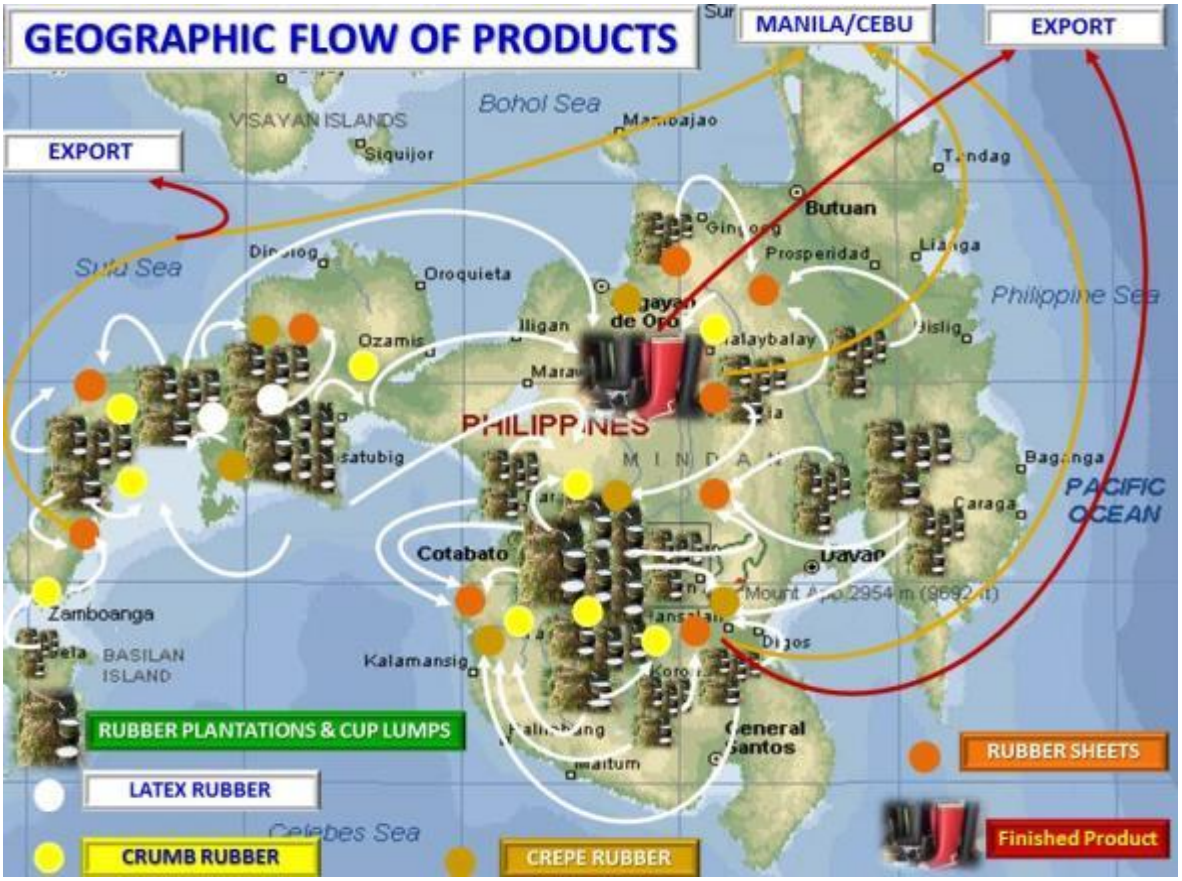


About 70 to 80 percent of the Mindanao's rubber production is exported. Exports consist primarily of cuplumps and a small percentage of crumb rubber. It is said that a significant volume of natural rubber products is marketed backdoor to Malaysia at about P5/kg higher than local price. The remaining 20% to 30% is processed as rubber crumbs and crepe for domestic consumption.In the domestic market, the Mindanao rubber industry caters primarily to footwear, bushing and automotive, and mattress companies in Bukidnon, Cebu, and Manila/Luzon. In the domestic market, Sibugay caters primarily to footwear, bushing and automotive, and mattress companies in Bukidnon, Cebu, and Manila. With the significant slowdown of the export market during the recent months, processors and traders are increasingly looking into marketing tie-ups with Philippines based rubber companies such as Yokohama.

FIGURE 4. KEY MARKETING CHANNELS

Figure 4 shows the flow of products within Mindanao regions and key urban centers such as Cebu and Manila. As can also be seen in the Table, Sibugay and North Cotabato are the main sources of planting materials. Neighboring provinces such as Maguindanao, Sultan Kudarat, Davao provinces, Bukidnon and Lanao provinces buy planting materials from Sibugay and North Cotabato. According to farmers interviewed, nursery operators in these areas have better quality planting materials and price is cheaper compared to sources in their respective areas.

FIGURE 5. GEOGRAPHIC FLOWS OF PRODUCTS



KEY FUNCTIONS AND PLAYERS

Input Provision

Zamboanga and North Cotabato are the main sources of planting materials in Mindanao. During the last five years, there has been a significant increase in nurseries in response to the strong demand for rubber seedlings both from farmers and from development programs such

as the National Greening Program of DENR. In Zamboanga Peninsula, thereare 14 nurseries with production capacity ranging from 50,000 to 500,000 seedlings. Selling price is at Php35.00-45/polybag. North Cotabato has four major nurseries operators and more than 20 micro scale nurseries. Nurseries have similar production capacity as Sibugay. Planting materials in North Cotabato are generally cheaper than in other areas. Price per polybag ranges from PhP 25 to PhP 35.

As of 2013, only20 nurseries have been accredited by the Bureau of Plant Industry (BPI). Fifty-five percent (55%) of the accredited nurseries are in SOCCSKSARGEN.

TABLE 25. ACCREDITED RUBBER NURSERIES IN MINDANAO, 2013

Company	Location
Zamboanga Peninsula	
HVCC Plant Nursery	Sto. Niño, Tampilisan, Zamboanga del Norte
PLGU-Zamboanga Sibugay Rubber Nursery	Veterans Village, Ipil, Zaboanga Sibugay
Sibugay Management Resources Corporation	Mirangan, Siay, Zamboanga Sibugay
Northern Mindanao	
Municipal Rubber Budwood Garden and Nursery	Brgy. Bel-is, Kapatagan, Lanao del Norte
La Suerta's Fruit Tree Nursery	Purok 10, Sinaguyan, Don Carlos, Bukidnon
Binahon Agro Forestry Farms (BAFF)	Bol-ogan, Songco, Lantapan, Bukidnon
EMC Planting Materials and General Merchandise	Purok 3, Bantuanon, Lantapan, Bukidnon
Davao Region	
Lola Marge Plant Nursery and AgriculturalDevelopme Services	Kumintang St., Mintal, Tugbok Dist. Davao City
SOCCSKSARGEN	
Pelf Plant Nursery	Brgy. Balindog, Kidapawan City
Kylle's Nursery and Garden	Balindog, Kidapawan City
Cordero Plant Nursery	Malasila, Makilala, North Cotabato
Chyb's Rubber Nursery	Lower Saguing, Makilala, North Cotabato
4M Nursery	San Nicolas, Makilala, North Cotabato
Canaya Rubber Nursery	San Vicente, Makilala, North Cotabato
Cayona-Talento Nursery & Agri. Supply	Paco 116, Kidapawan City
Carloza Plant Nursery	124 Saguing, Makilala, Cotobato
Gercris Plant Nursery	San Vicente, Makilala, North Cotabato
MFSF Agricultural Ventures	Malasila, Makilala, North Cotabato
Bebot Rubber Nursery	Ginatilan, Kidapawan City
Caraga	
Mcneil Plant Nursery	Km. 7, Tungao, Butuan City

Source: Bureau of Plant Industry

To ensure rubber plantation productivity, farmers should have accessto the appropriate productive plantingmaterials, sourced from nurseries thatare adequately supported by rubberclones multiplication gardens. Below are some of the recent initiatives to facilitate access of farmers to good quality clonal planting materials:

- The provincial government of Agusan del Sur established a budwood garden and nursery in Bayugan City last November 2013 to support the achievement of the target set by the local rubber industry to have at least 6,000 to 7,000 hectares of rubber plantation by 2016. The provincial government, along with the rubber growers and farmers, is aiming to replenish the damaged rubber trees devastated by typhoon Pablo. It is expected that 8,889 seedlings would be ready for planting by December 2014.

Budwood gardens are the source of authentic rubber clones, needed for the horticultural practice of producing authentic planting materials. The recommended clones are: RRIM 600 (Rb 99-01); RRIM 628; RRIM 712; RRIM 901; PB 217 (Rb 99-02) -1 PB 235 (Rb 99-04); PB 260; USM 1 (Rb 99-03); PB 311; PB 330 and PB 331.

Budwood gardens and nurseries should be expanded to complement the development of hybrid clones and expansion of research and development activities.Modern concepts of establishing a rubber plantation now take into consideration the earliest possible return on investment by using high yielding clones and adopting techniques that reduce gestation period of rubber. One of the recent varieties being introduced in North Cotabato by the provincial government and local rubber industry leaders is PB260, a fast-growing rubber varietywhich can betapped in only three years after planting. Current investigations also show that gestation period of rubber can be reduced by following standard nursery practices. Among such practices are the use of an appropriate soil medium, suitable size of polyethylene bags, and a sound fertilization program during the early growth of the seedlings – both in the ground and in polybags.

Farming and Tapping

Farmers are mostly smallholders with average farm size of 1.5-3.0 hectares. Farms in Bukidnon are generally bigger than those in other regions/provinces. Big rubber plantations are owned by processors, trader-exporters, cooperatives, and wealthy families. The larger processors have their own nurseries and farms are more input intensive.

During the past decades, rubber has generally been planted as a monocrop. Today, there is an increasing number of smallholders who are adopting the rubber-based farming system or the growing of intercrops with shorter duration for cash or subsistence. Generally, during the first three (3) years, farmers plant corn during the first cropping seasons followed by legumes as 2nd crop. During the 4th to 5th year of cropping when rubber trees have already developed a wide canopy, the farmers grow solanaceous vegetables. The crop diversification components included: rubber + banana + fruit trees + corn - peanut/mungbean. For the crop-animal integration, the components are: rubber + banana + fruit trees + corn - peanut/mungbean + poultry + swine.

Under a rubber-based farming system, the recommended girth size of 50 centimetres is generally achieved during the 5th year, which is a year earlier than in a monocrop rubber farm. A study by Rodrigo et al. (2004) demonstrated that apart from its overall economic benefits, agroforestry can be beneficial to the growth of rubber trees. Intensive intercropping of young rubber with banana may result in an increase in growth and yield of rubber trees, and to a reduction in the length of the unproductive immature phase of rubber. Intercropping had a positive effect on the growth of rubber throughout the six years of the study, with the result

that trees grown with intercrop were ready for tapping four months earlier than those growing on their own.

Many of the rubber trees planted are low yielding clone. Dry rubber yield can be increased from 2,100 kilogram per hectare per year to more than 3,500 kilogram per hectare per year with the use of new high yielding clones. The USM1 from the University of Southern Mindanao, for example, has a dry rubber yield of 2,498.15 kilogram per hectare per year, which is 18.81% higher than that of the standard RRIM 600 clone from Malaysia.

Usually, tapping of rubber trees starts in the fifth to seventh year after planting and then continues for 25 to 30 years. After 30 years a decline in latex production makes further tapping of the trees uneconomical (also in terms of use of land). The trees must then be removed, uprooted and converted to other crops. The age at which rubber trees are actually replaced vary considerably, depending on the health of the tree, prevailing rubber prices and access to replanting funds and seedlings. Aside from lack of funds for replanting, farmers also find labor cost for uprooting to be expensive.

In smallholdings, tapping is generally done by the head of the family with the aid of other able family members or hired tappers. Large plantations operate primarily with hired labor specialized in tapping. The recommended harvesting schedule is one day latex collection, one day off, namely S/2 d/2, or even one day collection, two days off S/2 d/3. Some farmers though practice S/2 d method, meaning latex tapping takes every day due to lack of money. Highly intensive tapping along with a too deep cut exposing the cambium to cancerous growth are some of the wasteful practices. When a rubber tree is first tapped, the dry rubber content (DRC) is usually very high. This yield would slowly drop until stability level is reached. The greater the density of tapping the faster will be the drop in DRC. If the tapper does his job properly, the latex yield should be quite constant in the first (five) 5 years of tapping. In ten (10) years time, about half of the productive life of the rubber tree, is lost due to improper and harmful tapping practices. In such instances the provision of good planting material becomes less significant and even counter-productive due to mismanaged latex exploitation as clonal planting material is more susceptible to tapping intensity. Tapping of immature trees also contributes to low yield production. In some cases, tappers do not use appropriate rainguards or rainskirts to protect the latex while being harvested.

Tapping is usually done at dawn or early in the morning. Density and consistency of latex varies according to climatic conditions and time period (of tapping). Early morning tapping is said to result to increased productivity and harvest of premium quality latex with substantial reduction in the percentage of field coagulum. The better yield is attributed to the higher turgor pressure prevailing in the cooler hours of early morning. Since the latex is collected only after sunrise, there is adequate time for dripping to stop and, therefore, the percentage of field coagulum is less. Early morning collection of latex ensured better preservation of latex due to the congenial temperature during this time. Tappers also lack access to proper tools. In many cases, tappers do not use rain guards.

Milling/Processing

TABLE 26. RUBBER PROCESSING/MILLING PLANTS IN MINDANAO	
Zamboanga Peninsula	Amaresa Rubber Company

TABLE 26. RUBBER PROCESSING/MILLING PLANTS IN MINDANAO	
	CTK Asia Rubber Corporation
	Dacon
	FJC Rubber Processing Plant
	GTH Rubber Mill (proposed)
	HBM Rubber Company
	Kalamohoy
	Malangas Rubber Mill
	MJ Rubber Company
	Philippine Pioneer Rubber Products Corporation
	Philippine Rubber Company
	Tire King Rubber
	UWARBMPC
	Zanorte Rubber – Oil Palm Plantation
Northern Mindanao	Pioneer Enterprises
	MSU Rubber Processing (Crepe Rubber/Rubber Sheets)
	F.S. Sajulga Processing Plant (stopped operations; being operated by Pione Enterprises)
	Standard Rubber Corporation
SOCCSKSARGEN	Amaresa Rubber Company
	DAVCO
	FARMA
	MJ/San Nicolas
	MRDI
	STANDECO
	Sto. Nino Rubber Company
CARAGA	Agusan del Sur Rubber Producer, Inc.
	FASRMCO (not yet in operations)
	Vivencio Ocite (not yet in operations)
ARMM	TARBIDC
	MARBEDCO
	SCADBIDC
	LARBECO
	6 other processing plants
Source: KII/FGD	

Processing/milling plants are concentrated in Zamboanga Peninsula (especially Sibugay), North Cotabato, and Basilan. Mills in Zamboanga Peninsula have a total production capacity of 28,500 MT per year. SOCCSKSARGEN has the biggest annual production capacity of 36,000 MT. Most of the processing plants in this region operate at a daily capacity of 7 MT to 12 MT per day. Their processing facilities are relatively modern and more productive compared to those in Zamboanga Sibugay and Basilan. Processing plants funded by MRDP will soon be operational in Caraga, Bukidnon, and Compostela Valley.

In Basilan, there are 10 processing plants with daily capacity of 2 to 5MT registering a total annual capacity of only 2,435 MT. The semi-finished rubber products are sold to Pioneer Enterprises. Most of the processing facilities are obsolete and less productive.

The Philippine Pioneer Rubber Corporation, one of Land Bank's first operational projects under its ACCESS (Accelerating Change in the Countryside thru Equity Sharing Strategy) program, provides toll processing services at PhP 7.50/kilo. Clients consist of smallholders, plantation owners, and traders. Among the shareholders of the corporation are 6 rubber plantation cooperatives.

CTK Asia Rubber Corporation, a rubber processing company located in Zamboanga City Ecozone, is the only company with an ISO certification. Buyers like Yokohama Tires require suppliers to have an ISO certification. Processing plants in Mindanao have difficulties in complying with requirements. Likewise, companies also do not have testing equipment to check rubber quality.

Natural rubber processing sector consumes large volumes of water and energy and uses large amount of chemicals as well as other utilities. It also discharges massive amounts of wastes and effluents. The most common environmental issues are wastewater containing chemicals and smell, hazardous waste, noise, and thermal emission.

During the recent months, processors have difficulties in moving their stocks due to the slowdown of orders from China. To maintain the loyalty of suppliers, companies continue to buy cup lumps from farmers. The companies are now looking at opportunities in the domestic market and in emerging foreign markets such as Russia.

FJC Rubber Processing Plant, one of the more progressive companies in Sibugay, is in the process of diversifying into the production of liquid rubber. The company has already acquired the necessary equipment and is in the process of setting up its supply chain. The production of liquid rubber entails that latex has to be in the factory within 4 hours after harvest. Supply chain collaboration and good farm to plant access are among the critical factors. The company requires assistance in the development of its supply chain. The company plans to provide premium price to farmers who can deliver good quality latex.

Trading

Traders in the rubber industry often form the link between the producers, the manufacturers, the exporters and the auction market. Small traders operate at the local level in villages or barangays. Generally, they source out the cup lumps from the smallholder farmers. The national level or larger traders buy from other small traders or from the local processors. The larger traders also act as brokers if they possess a brokering license. The small traders deal in field lumps while the larger or national level traders deal with crepe and crumb rubber. There are registered traders who act as rubber exporters as well. Processing companies also have their own agents who are paid a commission of PhP 1/kilo.

The traders provide logistic support such as transportation and storage or warehouse facilities. In some instances they provide financial assistance to smallholders. However, a common complaint among the smallholders is that traders often ‘cheat’ them out of a fair price either by manipulating the weight of the product sold or the quality. On the part of the traders,

similar complaints can be heard where the quality, especially in latex, is not up to the required standards due to adulteration.

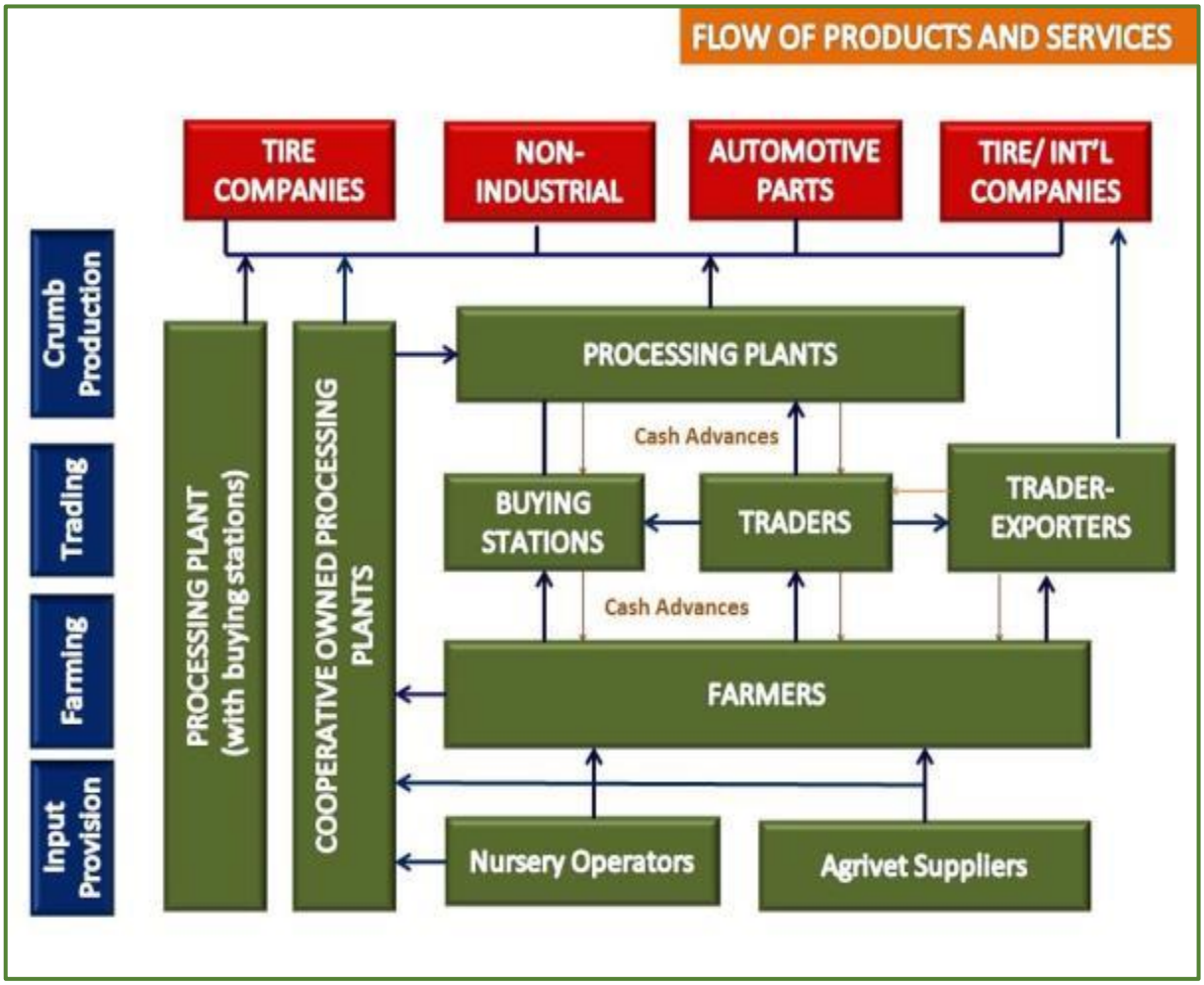
NATURE OF INTERFIRM RELATIONSHIPS

Horizontal Relationship

Rubber is grown in geographically dispersed areas by a large number of smallholders. The cost of agglomerating, sorting, grading, and transporting is high when many fragmented producers are involved. As such, processors generally prefer to work with organized farmers.Likewise, membership in a collective group facilitates access to skills and resources necessary to grow a business.

Vertical Linkages and Supply Chain Governance

FIGURE 6. FLOW OF PRODUCTS AND SERVICES



From the above map showing the flow of products, it can be seen that there is an increasing number of vertically integrated firms. The establishment of PPRDC and cooperative owned processing plants has provided farmers and traders the option to process their latex into crumb rubber. Some semi-processors are supported by their own plantations but also access raw materials from plantations and smallholders.

Natural rubber handled through open trading involves grades such as TSR 20, RSS1, and RSS3. The few dealers transacting most of the rubber on open markets are subsidiaries of large companies. Major trading firms in the London market included Symington and Son. Ltd. (along with Symington Italia Gomma Lattice of Rome, part of the Guthrie group which controls large plantations in Malaysia) and Cargill PLC (a subsidiary of the giant grain marketing company, with trading offices in Singapore and Tokyo).

PRICE AND COST STRUCTURE

Income and Profit

TABLE 27. COSTS AND RETURNS: ONE HECTARE RUBBER PLANTATION AT 500 TREES PER HECTARE

Farm Establishment and Gestation Period (Year 1 to 5)						
Items	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Materials/Inputs	24,400	10,500	11,500	12,000	13,000	71,400
Seedlings	17,500					17,500
Fertilizer	1,000	1,000	1,500	2,000	3,000	8,500
Fungicide	3,500	3,500	4,000	4,000	4,000	19,000
Insecticide	2,400	2,400	2,400	2,400	2,400	12,000
Weedicide		1,600	1,600	1,600	1,600	6,400
Calixin		2,000	2,000	2,000	2,000	8,000
Labor	22,000	12,000	10,000	10,000	10,000	64,000
Land Preparation	6,000					6,000
Planting	4,000					4,000
Farm Maintenance	12,000	12,000	10,000	10,000	10,000	54,000
Transportation	8,000	2,000	2,000	2,000	2,000	16,000
Planting materials	5,000					5,000
Procurement	3,000	2,000	2,000	2,000	2,000	11,000
Total	54,400	24,500	23,500	24,000	25,000	151,400
Total cost amortized over 30 years						5,047
Productive Years **Note: A rubber tree has 25 to 30 productive years. Shown below is just for Year 6 to 10**						
	Year 6	Year 7	Year 8	Year 9	Year 10	
Fertilizer	1,750	1,750	2,000	2,000	2,000	
Fungicide	1,500	1,500	2,000	2,000	2,000	
Insecticide	1,500	1,500	1,500	1,500	1,500	
Weedicide	1,000	1,000	1,000	1,000	1,000	
Farm Maintenance (Labor)	5,000	5,000	6,000	6,000	6,000	
Amortization	5,047	5,047	5,047	5,047	5,047	
Transportation	4,000	3,750	4,500	5,000	5,500	
Total Cultivation Expenses	**19,797**	**19,547**	**22,047**	**22,547**	**23,047**	
Yield	1,500.00	1,750.00	2,500.00	3,000.00	3,500.00	

TABLE 27. COSTS AND RETURNS: ONE HECTARE RUBBER PLANTATION AT 500 TREES PER HECTARE					
Unit Cost per kilo cup lump (excludi tapping)	13.20	11.17	8.82	7.52	6.58
Unit Price per kg of cuplump	32	32	32	32	32
Gross Income	**48,000**	**56,000**	**80,000**	**96,000**	**112,000**
Tapping Fees	16,000	18,667	26,667	32,000	37,333
Total Expenses	**35,797**	**38,213**	**48,713**	**54,547**	**60,380**
Net Income	**12,203**	**17,787**	**31,287**	**41,453**	**51,620**
Total cost per kg of cuplump	23.86	21.84	19.49	18.18	17.25
Source: KII/FGD					

Cost of plantation establishment (first 5 years) for a typical farm range from PhP 150,000 to 200,000 per hectare (approximately 500 trees). On the 6th year onwards, farmers spend PhP 6,000 to PhP 25,000(excluding tapping cost) depending on fertilizer application and weeding and pruning frequency. At Year 7 where 100% of the trees are already tappable, production cost of one kilogram of cup lump ranges from PhP10 to 12 excluding tapping cost. Tapping fee is one-third of the selling price.

For high input – high output plantation, the cost for the first five years is about PhP 250,000. Average expense during the 6th year and onwards ranged from PhP 20,000 to 30,000 (excluding tapping cost). A farmer can get an average of 500 to 600 grams of latex per tree per month or about 6,000 kilos to 7,200 kilos cup lump per year on Year 10 and onwards. Production cost per kilo of cup lump during the 10th yearranges from PhP 4.50 to 6.50.

Relative Financial Position of Players

TABLE 28. RELATIVE FINANCIAL POSITION OF VC PLAYERS

Assumptions:
Year 7 Rubber Plantation at PhP 11.17/kg production cost of cup lump
Tapping Fee: PhP 22.40
2.1 kilos of cup lump: 1 kilo of crumb rubber
Cup lump Price: PhP 32.00/kilo

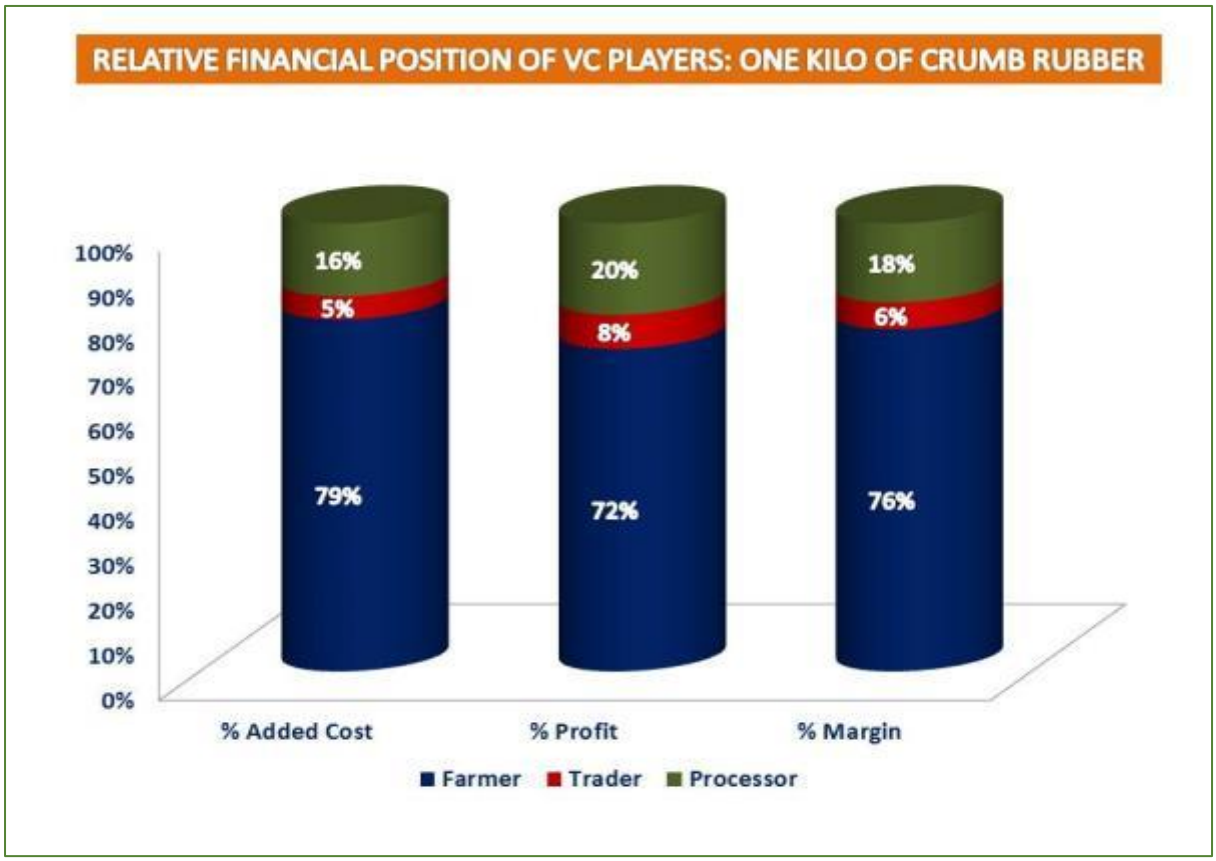
Player	Product	Costs			Selling	Profit		Margins	
		Total Unit Cost	Added Unit Cos	% Added Unit Cost	Unit Price	Unit Profi	% Profit	Unit Marg	% to Price
Farmer	Cup lump	45.86	45.86	79%	67.20	21.34	72%	67.20	76%
Trader	Cup Lump	70.20	3.00	5%	72.45	2.25	8%	5.25	6%
Processor	SPR 20	81.95	9.50	16%	88.00	6.05	20%	15.55	18%
Total			58.36	100%		29.64	100%	88.00	100%
Source: KII									

The cost of raw material is the major cost component of the crumb rubber product/SPR 20. According to processors, averages of 2.1 kilograms of cup lumps are needed to produce 1 kilogram of crumb rubber. At the current price of PhP 32 per kilogram of cup lump, the raw materials cost would be PhP 67.20 per kilogram of cup lump, which is about 76% of the ex-

plant price of SPR at PhP 88 per kilogram. Percentage share of farmer and tapper to total production cost is about 79%.

Profit per kilo of SPR 20 is about PhP 29.64. Seventy-two percent (72%) of the profit goes to the farmer while trader and processor get 8% and 20%, respectively. Farmer's percentage share of the profit is lower than his/her percentage share to added unit cost. The distribution can be made more equitable by improving productivity of farmers.

FIGURE 7. RELATIVE FINANCIAL POSITION OF VC PLAYERS



Markets and Market Opportunities

MARKETS AND MARKET TRENDS

Domestic Market

There are three big tire-making companies that buy dry rubber: Dunlop, Bridgestone and Yokohama. The industry needs to upgrade its quality in order to take advantage of a proposed expansion in the passenger tires production of Yokohama Tire Philippines, Inc. (YTPI) by an additional 8,000 tires per day. YTPI imports 94% of its natural rubber requirements from Thailand and Indonesia

Other key domestic markets are the footwear manufacturers makers of mattresses, and producers of automotive parts. The demand from the subsectors has remained at relatively same level during the past two years.

Philippine imports of natural rubber are minimal and have been in a declining trend during the last five years. In 2013, natural rubber imports amounted to only about 156 MT with total value of US$ 156,000.

TABLE 29. PHILIPPINE IMPORTS OF NATURAL RUBBER, 2009 - 2013

Indicators	2009	2010	2011	2012	2013	% Change 2013/09
Product: 400129 Natural rubber in other forms nes						
Volume (MT)	3,814	75	31	no data	14	-100%
Value (US$)	5,084,000	246,000	50,000	1,000	5,000	-100%
Unit Value/MT	1,333	3,280	1,613		357	-73%
Exporters	China – 93% Korea – 7%					
Product: 400110 Natural rubber latex, whether or not prevulcanised						
Volume (MT)	168	49	50	35	58	-65%
Value (US$)	327,000	126,000	254,000	74,000	126,000	-61%
Unit Value/MT	1,946	2,571	5,080	2,114	2,172	12%
Exporters	Thailand – 64% Malaysia – 24% Japan – 10%					
Product: 400121 Natural rubber in smoked sheets						
Volume (MT)	166	2	55	24	20	-88%
Value (US$)	254,000	2,000	100,000	20,000	17,000	-93%
Unit Value/MT	1,530	1,000	1,818	833	850	-44%
Exporters	Malaysia – 100%					
Product: 400122 Technically specified natural rubber (TSNR)						
Volume (MT)	104	No Quantity	No Quantity	No Quantity	17	-84%
Value (US$)	165,000	-	-	-	8,000	-95%
Unit Value/MT	1,587				471	-70%
Exporters	China – 100%					
Source: International Trade Centre/Intracen						

PRICE TRENDS

Export Market

TABLE 30. NATURAL RUBBER PRICES, 2012 TO 2ND QUARTER 2014

Indicators	2012	2013	2014	
			1st Quarter	2nd Quarter
SGX, RSS3 (US$/MT)	3,378	2,795	2,251	2,118
SGX, TSR20 (US$/MT)	3,162	2,517	1,978	1,727
Europe, TSR20 (US$/MT)	3,250	2,595	2,078	1,823
Source: Rubber Statistical Bulletin (Jul – Sept 2014 edition), IRSG				

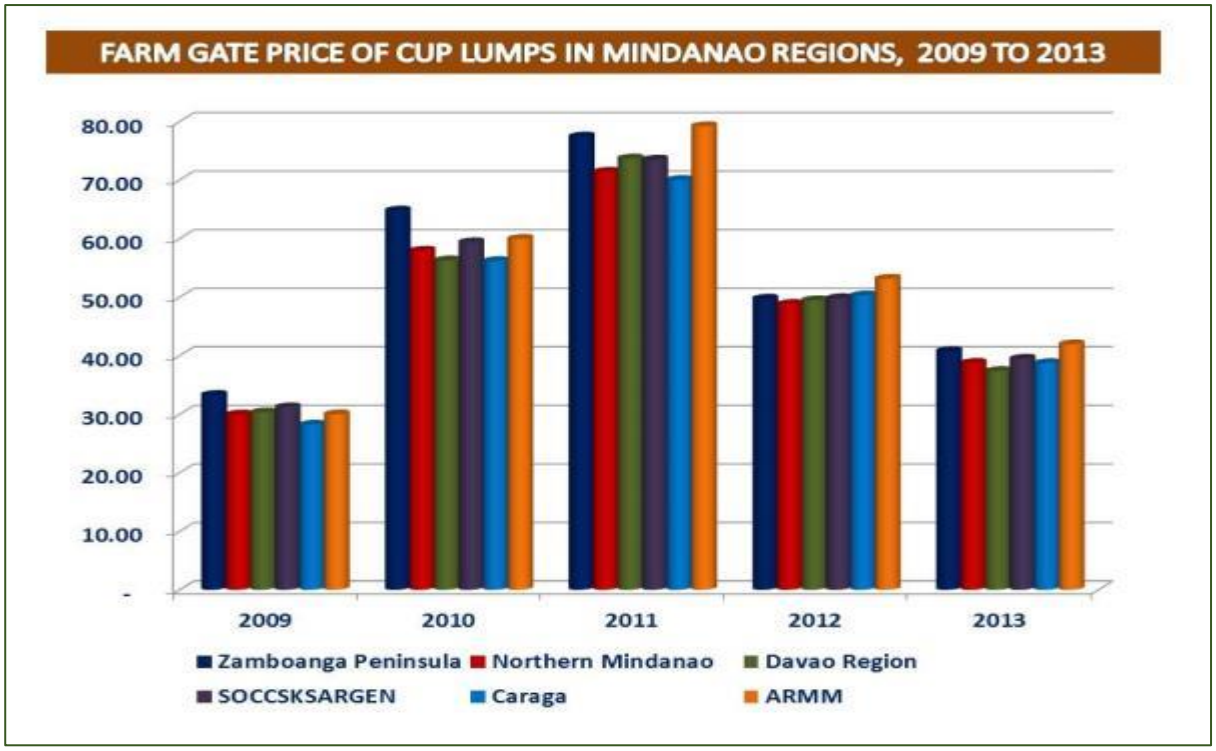
As per World Bank January 2014 commodity report, price of natural rubber has been relatively stable during the 4th quarter of 2013 butwas 60% down since its early 2011 historical highs. Demand fall for vehicles and the consequent fall in demand for tyres and other auto rubber

components have led to low consumption of rubber leading to the price fall around the world. The natural rubber market appears to be over supplied due to the strong production growth by Thailand and Indonesia. The World Bank report also indicated that the rubber market may come under more pressure in the medium term as new planting in several countries are entering the production stage (including Thailand, Laos, India, and Cambodia). Dr. H.P. Smith, the renowned rubber market analyst and former Secretary General of IRSG, has predicted that natural rubber prices are likely to decline to the levels of around US $ 2.50 for the next few years and then further down to around US $2.00 afterwards. According to him, prices will improve only towards the end of the current decade.

Domestic Market

In the local market, prices for raw material sourcing are based on estimated dry rubber content (DRC) of the material and dirt content. According to processors, they incur higher processing cost when DRC is low. They use up more water and energy to clean the cup lumps. Likewise, quality of products also suffers and, consequently, they also receive price discounts. However, when material is in short supply to meet contractual obligations for export of finished products, processors frequently buy any and all available raw material and are less concerned about quality. In general reverse economies of scale occur and those who need higher quantities pay more. Price is governed by law of supply and demand.

FIGURE 8. FARM GATE PRICE OF CUP LUMPS IN MINDANAO REGIONS, 2009 TO 2013



Local prices of natural rubber products are based on the price movement in the international market. During the past decade, price of cup lumps ranged from P35-42/kg with fluctuations ranging from 1% to 10%. In October 2011, the price of cup lumps went up as high as Php73.00 per kilo. In the succeeding month of November 2011, price started going down. In the early part of 2012, price of rubber cup lumps increased slightly by 3%. FromJuly toSeptember2014, price of cup lump was between PhP 21 to PhP 32.

Farm gate price in the three key producing areas (North Cotabato, Zamboanga Sibugay, and Basilan) are generally higher compared to other rubber producing provinces. This can be attributed to the following factors: i) better bargaining position due to volume and presence of cooperatives; ii) lower cost of transaction especially transportation – proximity to processing plants; and iii) presence of higher number of buyers – strong competition. Some players say that local prices are dictated by processors and exporters stationed Zamboanga Sibugay and North Cotabato.

The strong price variation is a challenge for rubber producers, in particular smallholders. For rubber producers, price fluctuation makes investment decisions difficult as rubber trees yield latex only at least five years after planting In addition, smallholders have less information than traders and are price takers, and thus particularly vulnerable to price fluctuations and disadvantaged in price negotiations.

TABLE 31. FARM GATE PRICE OF CUP LUMPS IN MINDANAO REGIONS, 2009 TO 2013
In Philippine Pesos (PhP)

Region/Province	Farm Gate Price (PhP/kilogram)				
	2009	2010	2011	2012	2013
ZAMBOANGA PENINSULA	33.29	64.77	77.41	49.72	40.76

Zamboanga del Norte	34.23	66.36	80.83	53.33	41.80
Zamboanga del Sur	30.82	61.00	78.66	50.05	39.67
Zamboanga City	28.63	57.69	70.49	47.72	42.42
Zamboanga Sibugay	33.98	65.36	76.53	49.14	40.77
NORTHERN MINDANAO	**29.94**	**57.91**	**71.39**	**48.82**	**38.75**
Bukidnon	30.09	58.42	71.64	49.33	38.96
Misamis Oriental	24.45	47.72	63.84	39.51	36.91
DAVAO REGION	**30.30**	**56.27**	**73.66**	**49.44**	**37.37**
Davao del Norte	28.40	57.36	74.73	50.08	39.17
Davao del Sur	27.85	51.70	67.81	44.05	34.89
Davao City	29.00	49.79	70.17	44.25	34.25
Compostela Valley	30.89	57.73	74.07	51.39	40.30
SOCCSKSARGEN	**31.17**	**59.36**	**73.47**	**49.81**	**39.47**
North Cotabato	31.18	59.36	73.48	49.82	39.47
Sarangani	31.46	59.74	70.68	48.87	38.75
Sultan Kudarat	26.92	60.4	76.38	51.59	41.03
CARAGA	**28.2**	**56.14**	**70**	**50.28**	**38.72**
Agusan del Norte	24.05	55.94	76.02	56.42	41.68
Agusan del Sur	28.16	56.09	69.87	50.06	38.56
Surigao del Sur	37.25	64.63	83.73	60.79	40.6
ARMM	**29.97**	**59.93**	**79.17**	**53.13**	**41.92**
Basilan	30.34	62.82	79.17	53.13	41.92
Source: BAS/PSA					

Support Services

Financial Services

Land Bank is by far the largest formal credit institution of the rural communities in the province. Its credit delivery system is able to penetrate a substantial percentage of the province's total number of municipalities reaching the small-holder rubber producers, traders and processor.

Non-financial Services

Main providers of training and extension services (from rubber plantation establishment to processing) including organizational development support to cooperatives are the Department of Agriculture, Department of Agrarian Reform, TESDA, Department of Labor and Employment (DOLE), Department of Trade and Industry, and the local government units.

The Philippine government has recently established the Philippine Rubber Research Institute (PRRI) which is located in Zamboanga Sibugay. PRRI is mandated to initiate and administer research and development programs to improve quality and increase productivity of rubber especially benefitting smallholder rubber producers and processors.

New thinking calls for advisory services that recognize the importance of different actors (public sector, private companies along the value chains, service providers, farmers) in providing customized market-based services with pluralistic delivery channels. There is also the need to simulate the acquisition and use of non-financial services. Players, especially farmers, are generally hesitant to invest in upgrading. Embedded service delivery models should be explored to address issues on accessibility and weak demand.

Profitable value chains are supported by services that allow the chain to grow, be more efficient, and enhance its competitiveness. The range of services that can add value and strength to the rubber industry are the following: market information and product development support, business/farm management, supply chain management, extension services to facilitate adoption of sustainable production practices/good agricultural practices and quality assurance (including certification).

With large buyers such as Yokohama increasingly concerned with quality and sustainability assurance and the growing preference for ISO 9001 certified suppliers, it would be necessary to instil standards or certifications into the value chain. . To facilitate chainwide certification, effective support markets, information channels, and supply chain coordination must be established.

Enabling Environment

Formal Rules, Regulations and Policies

The following are the key policies relevant to the rubber industry:

1. In 1997, the Philippine Government through the Department of Agriculture (DA) launched the Rubber Development Program (RDP) as a component of the Gintong Ani – High ValueCommercial Crops Program (GA-HVV C) with the objective of expanding rubber to 500,000 hectares in 10 years (GA-RDP, 1997). On May 10, 2010 then President Gloria Macapagal Arroyo signed RA 1089 into law, creating the Philippine Rubber Research Institute (PRRI) in Zamboanga Sibugay to promote the expansion of rubber, among other aims. Although already established, PPRI is not yet fully operational. It would significantly help the industry if the institute can provide laboratory testing services in addition to research and development on improved clonal varieties.
2. The DA and the local government units have been providing substantial support to smallholders especially in facilitating their access to planting materials. Many of the LGU s in Mindanao are putting substantial funds for plant-now-pay- later or plant-now-pay-never programs. Care must be taken, however, that these programs would also help in promoting the development of vibrant markets for planting materials.
3. The Department of Trade and Industry in collaboration with the Philippine Rubber Industries Association, Inc. (PRIA) has initiated the investment and market promotion program as well as formulation of policy and institutional development related programs.
4. The Association of Southeast Asian Nations (ASEAN) and its six trading partners are targeting to sign by 2015 the Regional Comprehensive Economic Partnership (RCEP), a free trade agreement that is expected to further open up new and bigger markets for local businesses. The end-goal of ASEAN economic integration is the full realization of an ASEAN Economic Community (AEC), wherein the region will be transformed “into a single market

and production base, a highly competitive region, a region of equitable economic development, and a region fully integrated into the global economy." As such, when the AEC commences in 2015, it can be expected that the economies will aggressively open up given that barriers to trade – both tariff and non-tariff will be eliminated. Economies will be liberalized to achieve the goal of ASEAN becoming a single market and production base. On the other hand, this will increase competition among rubber producing countries in the ASEAN region.

Informal Rules and Socio-Cultural Norms

1. The social structure of Mindanao (and, in general, the Philippines) facilitated the formation of preferred buying arrangements/personalized economic relations or the "suki" system.
2. Although informal rules play a crucial role in reducing the risks linked to exchange, formal agreements and institutions are needed to support efficient exchange over a long period of time. The presence of effective formal institutions means that less reliance needs to be placed on informal social norms and generalized inter-personal trust to "enforce" agreements. As formal and informal institutions increase the certainty that agreements or contracts will be respected, players are more likely to be more willing to invest and undertake more complex transactions.

TABLE 32. EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT (E-VSA) RANKING AND PRIORITIZATION RESULTS

Indicated below is the ranking of Butuan City among the municipalities of Agusan del Norte for rubber using the parameters.

PROVINCE	MUNICIPALITY	NUMBER OF FARMERS (15%)	VOLUME OF PRODUCTION (MT) (15%)	AREA PLANTED (HA) (10%)	POVERTY INCIDENCE (10%)	VSA RANK (50%)	COMPOSITE INDEX	E-VSA RANK
AGUSAN DEL NORTE	BUTUAN CITY	165	283	1045	28	1	0.65586	**1**
AGUSAN DEL NORTE	NASIPIT	0	0	13440	28	5	0.40048	**2**
AGUSAN DEL NORTE	LAS NIEVES	0	0	423	53	6	0.34595	**3**
AGUSAN DEL NORTE	TUBAY	0	0	0	39	3	0.34089	**4**
AGUSAN DEL NORTE	MAGALLANES	0	0	0	29	2	0.33757	**5**
AGUSAN DEL NORTE	CARMEN	0	0	0	41	4	0.32986	**6**
AGUSAN DEL NORTE	BUENAVISTA	0	0	185	38	7	0.30338	**7**
AGUSAN DEL NORTE	REMEDIOS T. ROMUALDEZ	0	0	0	41	8	0.29871	**8**
AGUSAN DEL NORTE	JABONGA	0	0	5	46	10	0.29693	**9**
AGUSAN DEL NORTE	SANTIAGO	0	0	9	48	12	0.29674	**10**
AGUSAN DEL NORTE	KITCHARAO	0	0	3	40	11	0.28329	**11**
AGUSAN DEL NORTE	CABADBARAN	0	0	0	28	9	0.27198	**12**

MAP 17: EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT (E-VSA) FOR RUBBER

Rubber Commodity Development Plan

In Butuan City, established rubber plantations is estimated to be 1,381.95 hectares. Majority of these rubber production areas are located in Barangay Tungao (945.20) and its establishment is spearheaded by Km 7 Tungao Farmers Producers Multi-Purpose Cooperative. Almost 10% of these existing rubber trees are aged 40 years and considered towards senility and prospects for replacements. There are rubber buying agents based in Barangay Tungao and actively buying as much as 38.9881 tonsof cup lump every 20 days. Buying prices are dependent on the strategies of individual buying agents which resulted to non-uniformity of prices per kilo of cup lumps. Majority of the rubber growers including the tappers are beholden already to buyers/agents through cash advances which takes a toll on the buying prices. A need is identified to develop the assembler and consolidatorship capacity of Km. 7 Tungao Farmers Producers MPC. This is a critical requirement prior to the establishment of a village type processing plant to ensure that the required volume is satisfied. This is the learning curve for the cooperative towards developing its business acumen and entrepreneurship.

Km. 7 Tungao Farmers Producers MPC has also taken cognizance of the fact that tappers are strong determinants to the success of the local rubber industry for the reason that they are somewhat unregulated. There is a great need to enhance the tapping skills, regulate and professionalize the tappers through a partnership between the cooperative and the Technical Skills and Development Authority (TESDA).

Beyond the local horizon, Km. 7 Farmers Producers MPC is a member of the Caraga Rubber Industry Federation Inc. which is contemplating of establishing a processing plant to service the whole Caraga Region. As a support mechanism, the cooperative will establish a village type crumb rubber processing plant to service the rubber growers of Butuan City. This needs more or less 1,000 hectares of rubber production areas for an optimum and profitable operation. The product of this processing facility will form part of the regional output that will be sold wholesale to higher markets to secure best price. To support the operations of the local rubber processing plant, the cooperative will be spearheading a development program to promote and develop 500 hectares of rubber production areas every year for the next five years and thereafter. Generally, the development of the local rubber sub-sector will adopt the following strategies namely:

1. Concreting of the existing farm to market road network estimated to be 16.8 kilometres covering the two barangays of Tungao and San Mateo. This is the needed infrastructure that would support the consolidation activities of cup lump sourced out from the farmers of Barangays Tungao, San Mateo and from the rubber producing barangays of Las Nieves.
2. Increasing the capacity of the Km. 7 Tungao Farmers Producers MPC assemble and consolidate all the cup lumps produced by the rubber growers in Butuan City , Las Nieves and Buenavista, Agusan del Norte. This requires the provision of a warehousing facility, hauling vehicle and the corresponding capital. The cooperative will be the champion to spearhead the promotion and development of the local rubber industry.
3. Establishment of a sustainable rubber seedling production facility to produce and provide good quality planting materials to expansion areas. This includes the establishment of a rubber bud wood/clonal garden, seedlings nursery, water system and other support facilities. The maintenance of the access road will be the responsibility of the City Government of Butuan aside from its financial counterpart to the project implementation.
4. Establishment of a liberalized credit mechanism to facilitate the engagement of the existing rubber growers and motivate prospective rubber growers to participate in the rubber development program. This credit mechanism will adopt the “Plant Now Pay Later Program, “Charge to Crop (Existing cup Lump Production)” and other innovations.

The main considerations of jumpstarting the development of the local rubber industry in Barangay Tungao and San Mateo are the following:

1. Presence of growth centers
2. Increasing hectarage devoted to rubber production
3. Presence of local champion
4. Level of focused interventions
5. Established nucleus farms

TABLE 33. LIST OF EXISTING RUBBER PRODUCTION AREAS

Barangay	No. of Has.	Area Harvested	No. of Farmers	Prodtn. in Mt

Tungao	945.20	800.65	335	38.9881
San Mateo	57.77	51.75	33	2.6894475
Bit-os	8		1	
Anticala	40	9	31	
Pianing	1		1	
Aupagan	7	5	4	
Bilay	2	2	1	
Bugsukan	10	8	2	.236
Don Francisco	7		12	
Florida	34	12	27	
Dankias	41	32	19	
MJ Santos	9	3.5	9	
Maibu	2		1	
Mla. De Bugabus	23.5	16	33	
Mandamo	13.5		11	
Salvacion	41	12	9	
Taligaman	15	9	12	
Dulag	16.25	9.5	13	
Basag	7.5	7.5	.528	
Total	1,381.95	1,046.90	554	46.5704475

Source: Office of the City Agriculturist
As surveyed on May 2016

Below are the observed gaps/constraints in the promotion and development of the Rubber sector and the proposed interventions.								
Value Chain Segment	**Key Gap/ Constraint in VC Development in Butuan City**	**Brief Description of Potential Intervention**	**Target Result/ Outcome**	**Target Areas to be covered**	**Proposed Lead Player**	**Estimated Project Cost (000)**	**Risk & Risk Management/**	**Rank**
Input Supp	Lack of supply of genuine clonal rubber planting materials of fast growing and high yielding clones	Scaling up the existing rubber bud wood garden and nursery of the proponent group	Increased supply of budded rubber planting materials of recommended clones and strains	Tungao	Km. 7 Tungao Farmers Producers MPC	8,500	City Government of Butuan allocates funds for the development of rubber and absorbs seedlings produced by the PG for the Plant Now Pay Later Program administered and managed by the PG	1
	High costs of chemical inputs leading to low usage	Setting up of rubber development fund to institute fertilizers bulk purchases program	Reduced procurement costs of chemical inputs leading to increased usage	Tungao, San Mateo Bit-os Anticala Aupagan Bilay Bugsukan Don Francisco Florida Dankias MJ Santos Maibu Mla. De Bugabus Mandamo	Km. 7 Tungao Farmers Producers MPC	**3,500**	Alternative mode of procurement will be recommended to the procuring entity to lessen the cost of procuring the chemical inputs PG can also source out financing from other sources to be used in the	3

				Salvacion Taligaman Dulag Basag			procurement of inputs and provided to the rubber growers on a plant now pay later scheme	
Input Suppl	Limited availability and commercial distribution of organic inputs specific for rubber	Increasing the capacity of Km. 7 Tungao Farmers Producers MPC produce organic inputs specific for rubber	Reduced production costs, mitigation of climatic change/environmental warming		Km. 7 Tungao Farmers Producers Cooperative		The project proponent can enhance their capacity to produce organic fertilizers(Vermicomposting) or they can tap organic fertilizer producers from among their fellow farmers - cooperatives	5
Production	Poor adoption of sustainable farming practices due to lack of access to extension services in the areas of farming and tapping	Capacitating rubber tappers program/creation of rubber commodity doctors	Professionalization of the tappers, establishment of accredited rubber doctors	Same production areas	Office of the City Agriculturist, TESDA, ATI RTC-13, Km. 7 Tungao Farmers Producers Cooperative	**30**	A pool of accredited tappers are published and recommended, Accredited rubber scientists/doctors are recommended as development services provider	1
	Low use of fertilizers among smallholders	Development of rubber techno guides location specific to Butuan City ,costs	Promotion of rubber farming as a profitable business enterprise		Office of the City Agriculturist, Km. 7 Tungao	**25**	Best practices in rubber farming are taken from successful farmers	1

	due to lack of understanding on costs and benefits of proper and efficient use of fertilizers resulting partly to low yield	and returns data from successful rubber growers in Butuan City			Farmers Producers MPC		and documented and replicated	
	Low yield and quality of yield due to adverse weather conditions	Adoption of rain protective structures technology and development of local knowledge and technology	Increased yield and quality of cup lumps		Km. 7 Tungao Farmers Producers MPC	**8,000**	Engage partners such as Agricultural Training Institute, TESDA and DOST for the development of a locally based rain protection technology and locally designed structures	2
	Lack of other structures that would enhance the capacity to produce rubber and rubber products	Provision of water system that supports seedlings production and establishment of production areas	Increased seedlings vigor Ability to establish expansion areas even in drought	San Mateo and Tungao	San Mateo Rubber Growers Association, Km. 7 Farmers Producers Cooperative	**6,500**	To ensure sustainability of the project, the water systems should be driven by alternative sources of energy such as micro hydro and solar powered	

Value Chain Segment	Key Gap/ Constraint in VC Development in Butuan City	Brief Description of Potential Intervention	Target Result/ Outcome	Target Areas to be covered	Proposed Lead Player	Estimated Project Cost (000)	Risk & Risk Management/	Rank
Assembly	No established local commodity champion to assemble and consolidate rubber products to spur the growth and development of the local rubber industry	Provision of a warehousing facility, hauling facility and the corresponding capitalization to consolidate and assemble rubber products	Increased leverage to demand better prices, established mechanism to ensure quality standards	Tungao		**9,000**	Counterpart funds should also be coming from the proponent itself, drawing capitalization from its members	
	Weak coordination and collaboration among the different stakeholders resulting to the slow promotion and development of the local	Establishment of a cooperation mechanism between and among the barangay based rubber growers association and the Butuan City Rubber Industry Development Council	Vertical and horizontal relationship established between the rubber stakeholders	Same production areas		**25**	The cooperation mechanism should be based on sound business principles and etiquettes	1

	rubber industry							
	Weak capacity among farmers to organize themselves into structured groups	Strengthening of the barangay based rubber growers association which would be the core of the rubber commodity development council	Institutionalization of the Butuan City Rubber Industry Council	Same production areas		**25**	Articles of cooperation and individual association by laws formally set up to prevent being politicized	
Assembly	Low capacity of the rubber sector to chart and implement its development plan	Professionalization of the Butuan City Rubber Industry Council	Increased efficiency and effectiveness of the local rubber sector in the development planning process	Same production areas	Office of the City Agriculturist, Project Management Office	**75**	The professionalization of the Butuan City Rubber Industry Council must be adequately insured from the political patronage and sponsorship system	
Transformatio	Lack of capacity to process raw rubber	Provision of a common service facility – rubber processing plant	Increasing/adding value to rubber products Improves resilience of farmers to price fluctuations	Tungao	Km. 7 Tungao Farmers Producers MPC, DA	**20,000**	This would be a Joint Venture between the Km. 7 Farmers Producers Cooperative and the Investor.	5
	High level of losses and wastes due to poor quality of cup-lumps	Development of a good agricultural practices program for the rubber farmers	Reduced losses and wastes for cup-lumps, reduced adulteration of cup lumps resulting to price and market competitiveness			**30**	Incorporation of the quality control measures in the consolidation activities of the proponent group	1

	Poor farm to market road resulting to increased costs of marketing and transaction costs	Improvement through concreting of the existing farm to market road serving the production areas	Increased movement of goods to intended market , Reduced transport time and costs of products	P22A(TF1)-P22(Danapa)-P26(Lauan)-P27A/P27(Kauswagan)-P13 (Bagong Silang, San Mateo) -P28(Tud-ol)Tungao FMR	City Government of Butuan and DA RFO-13	**216,000**	No more budget allocation for the proposed project due to stringent requirements and inefficiency of the proponent local government unit to submit on time	1
Marketing	Absence of long term contracts, farmers governed by spot transactions resulting to volatility of price	Facilitate market matching, study missions to secure longer term marketing contracts/arrangements	Insulation of rubber farmers from price fluctuations and manipulations	Same production areas	Km 7 Tungao Farmers Producers MPC	**25**	Facilitation services to be offered by DA and CGB connotes transparency and generates trust of the rubber farmers	1
	Insufficiency of production volume to warrant establishment of buying station	Establishment of rubber expansion areas	Enhanced capacity to meet the market demand in terms of volume requirement	Same production areas	Km 7 Tungao Farmers Producers MPC	**31,250**	Investment safeguards includes deposit of the producer group with the Bangko Sentral ng Pilipinas and access loan to finance the rubber expansion areas. The City Government of Butuan also assist the Proponent Group in securing a financial loan.	3

	Low capacity to offer product differentiation in terms of quality, volume and consistency	Adoption of the good agricultural practices/good manufacturing practices for rubber	Sale ability and sustainability of the rubber products in terms of quality	Same production areas			This GAP Protocol will be packaged In a document and best practices from other places are also incorporated.	1
Support Services								
Financial	Low capacity of the proponent group to put up the required counterpart funds	Provision of non-financial services to the identified producer group to strengthen financial position	Sustainability plan developed with PG members committed to put up additional equities to operate the identified enterprises	Tungao	Project Management Office, Km 7 Tungao Farmers Producers MPC	**50**	To enhance the sustainability of the project, handholding with the producer group in the stages of organizational development must be adequately considered.This includes accessing funding support to finance the gaps outside of the PRDP intervention.	1
Extension	The context of the local extension delivery system is not oriented to promoting and	Improving the delivery of extension works towards the promotion and development of rubber	The promotion and development of the local rubber industry would drive agricultural transformation	Butuan City	Office of the City Agriculturist in partnership with the Km7 Tungao Farmers Producers		The promotion and development of the local extension delivery system should always consider that agricultural transformation must	1

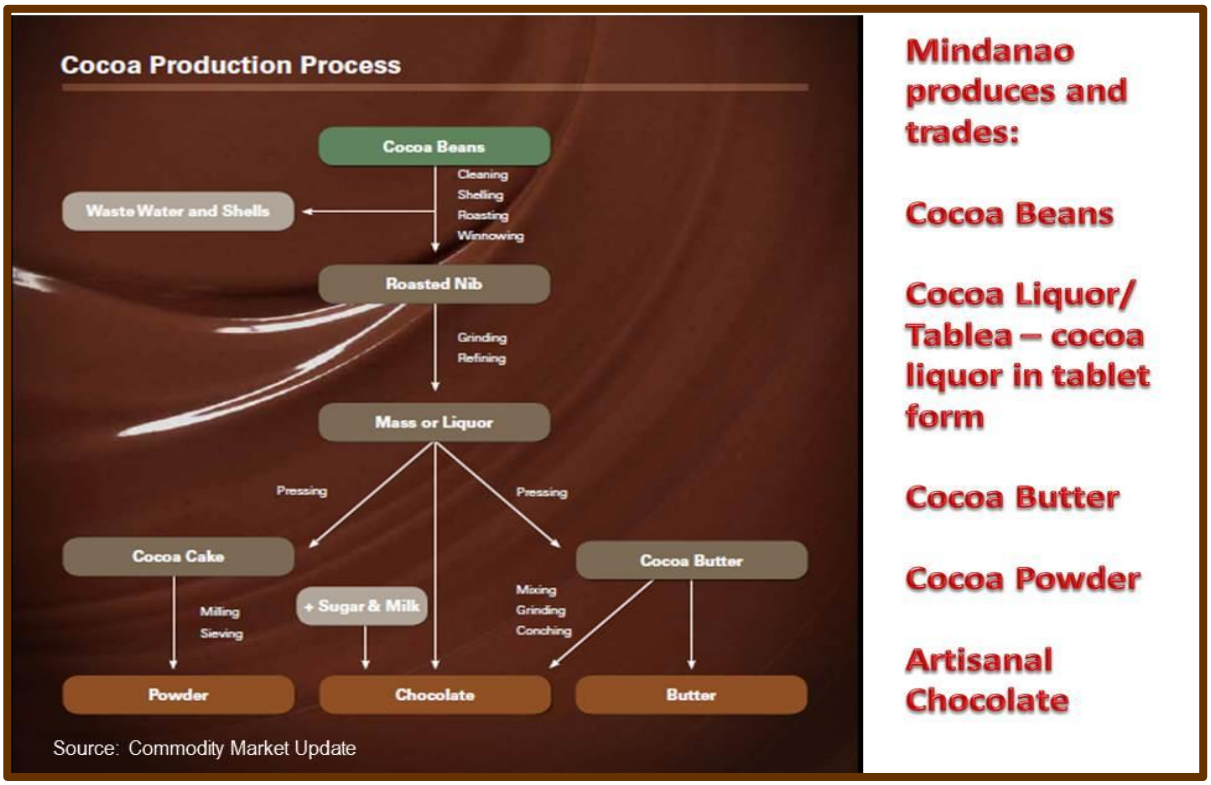
	developing rubber as one of the economic drivers				MPC		always be private led	
Enabling Environme	The lack of understanding resulting to the lack of support to the initiatives towards the promotion of the local rubber industry	Development of a system where the Butuan City Commodity Investment Plan is automatically enrolled in the Butuan City Investment Development Plan and allocated yearly budget allocations	Increased technical, financial and legislative support to the Office of the City Agriculturist to undertake the promotion and development of the local rubber industry	Butuan City	City Development Council		Fund sourcing mechanism must be adequately established in the SP Resolution approving the Butuan City Investment Plan	1

2. Cacao Commodity Value Chain

OVERVIEW OF THE INDUSTRY

Product Description

Cacao ((Theobroma cacao spp.) is a rainforest, understudy tree that requires shade and wind protection. It is grown in all humid tropical lowland regions around the equator, most notably Central and South America, West Africa and Sri Lanka, Indonesia and the Philippines. It thrives best in areas where rainfall is between 1,150 to 2,500 mm per year and temperatures between 21 to 30 degrees centigrade.



The tree produces pods that contain about 20 to 60 cocoa beans surrounded by a sweet tasting pulp. When fermented and processed, the beans produce one of the most desired flavour in the world – chocolate. The world cocoa market distinguishes between two broad categories of cocoa beans: "fine or flavour" cocoa beans, and "bulk" or "ordinary" cocoa beans. Fine or flavour cocoa beans are produced from Criollo or Trinitario cocoa-tree varieties, while bulk cocoa beans come from Forastero trees. There are, however, known exceptions to this generalisation. Nacional trees in Ecuador, considered to be Forastero-type trees, produce fine or flavour cocoa. On the other hand, Cameroon cocoa beans, produced by Trinitario-type trees and whose cocoa powder has a distinct and sought-after red colour, are classified as bulk cocoa beans. The share of fine or flavour cocoa in the total world production of cocoa beans is just under 5% per annum. Virtually all major activity over the past five decades has involved bulk cocoa (*ICCO website*). Mindanao primarily grows Forastero trees and produces “bulk” beans.

Cocoa is an important crop around the world: a cash crop for growing countries and a key import for processing and consuming countries. 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:

3. Dried cocoa beans (fermented/unfermented);
4. Semi-finished cocoa products (cocoa paste/liquor, cocoa butter, cocoa powder);
5. Couverture, or industrial chocolate;
6. 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 - 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 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 - 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.

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 (licor)
- 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 biggest 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 cacao beans with SOCCKSARGEN farmers contributing to its supply base.

Dominant product currently produced and traded in the domestic region by other regions in Mindanao is the tablea.

TABLE 34. COCOA PRODUCTS PRODUCED AND TRADED IN MINDANAO

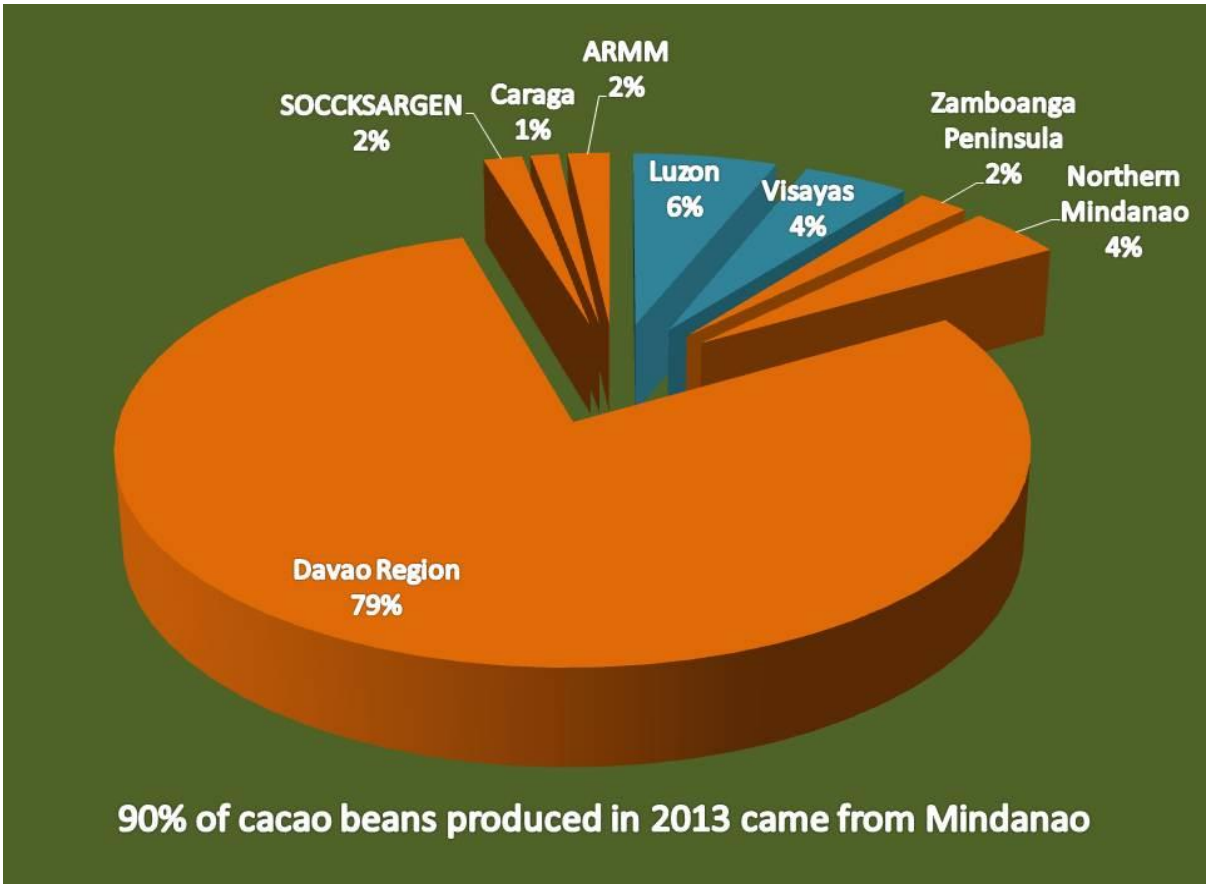
Region	Cacao Beans	Tablea/ Cocoa Liquor	Cocoa Butter	Cocoa Powde	Chocolate
Zamboanga Peninsula	○	●			
Northern Mindanao	○	●			○
Davao Region	●	●	○	○	○
SOCCKSARGEN	●	●			○
Caraga	○	●			
ARMM	○	●			
Legend	●	Dominant	○	Emerging	
Source: Interviews/FGD, VCA Rubber - Mindanao					

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 cocoa pod husk) is discarded as cocoa waste. The waste from cocoa can be transformed into commercial products and provide farmers with opportunities to diversify his/her business. The following are some examples of products that could be derived from the Cacao tree without infringing on seed yields (*Antonio Figueira, Jules Janick, and James N. BeMiller, 1993-cacaoweb.net*):

a) Animal feed from cocoa husk - As pelletised dry 100% cocoa pod husk, it can be used as an animal feed. The animal feed is produced by first slicing the fresh cocoa husks into small flakes and then partially drying the flakes, followed by mincing and pelleting and drying of the pellets.
b) Production of soft drinks and alcohol - In the preparation of soft drinks, fresh cocoa pulp juice (sweatings) is collected, sterilised and bottled. For the production of alcoholic drinks, such as brandy, the fresh juice is boiled, cooled and fermented with yeast. After 4 days of fermentation the alcohol is distilled.
c) Potash from cocoa pod husk - Cocoa pod husk ash is used mainly for soft soap manufacture. It may also be used as fertiliser for cocoa, vegetables, and food crops. To prepare the ash, fresh husks are spread out in the open to dry for one to two weeks. The dried husks are then incinerated in an ashing kiln.
d) Jam and marmalade - Pectin for jam and marmalade is extracted from the sweatings by precipitation with alcohol, followed by distillation and recycling of the alcohol in further extractions.
e) Mulch - Cocoa bean shells can be used an organic mulch and soil conditioner for the garden.

PRODUCTION TRENDS

Domestic Production



In 2013, Philippine cacao bean production was at 4,831 MT with Mindanao accounting for 90%. Of the 4,366.52 MT of cacao beans produced in Mindanao, 88% came from Davao Region. Among Mindanao regions, Northern Mindanao had the 2nd highest production but volume was only about 5% of Davao's production.

TABLE 35. RP COCOA BEAN PRODUCTION: MINDANAO VIS-À-VIS OTHER CACAO PRODUCING REGIONS

Island Group/Region	Production Volume (in MT	% Share to RP Production
Luzon	293.60	6%
Visayas	215.47	4%
Mindanao	**4,366.52**	**90%**
Zamboanga Peninsula	**103.51**	**2%**
Northern Mindanao	**196.31**	**4%**
Davao Region	**3,844.30**	**79%**
SOCCKSARGEN	**79.10**	**2%**
Caraga	**57.84**	**1%**
ARMM	**85.46**	**2%**
Philippines	**4875.59**	**100%**

Source: BAS

Mindanao's production in 2013 decreased slightly by 4% over 2009 figures. Except for Davao Region and SOCCKSARGEN, production volume in all regions was lower in 2013 compared to 2009. Northern Mindanao registered the highest decline at 65% followed by Caraga at 63%. In Northern Mindanao, Bukidnon's production went down from 466 MT in 2009 to 115 MT in 2013. The highest decrease in production volume was in 2012. In Caraga, Agusan del Norte's production went down from 84.54 MT in 2009 to 7.14 MT in 2013. The declining trend started in 2010.

TABLE 36. CACAO PRODUCTION VOLUME: 2009 – 2013, MINDANAO REGIONS

Region/Province	Production Volume (in MT)					% Chang (2013/09)
	2009	2010	2011	2012	2013	
ZAMBOANGA PENINSULA	**132.43**	**121.63**	**112.37**	**115.24**	**103.51**	**-22%**
Zamboanga del Norte	82.73	77.63	76.64	82.79	69.64	-16%
Zamboanga del Sur	23.64	18.72	13.64	11.57	9.45	-60%
Zamboanga Sibugay	16.62	16.36	14.76	14.86	18.15	9%
Zamboanga City	9.44	8.92	7.33	6.02	6.27	-34%
NORTHERN MINDANAO	**561.58**	**554.52**	**396.07**	**220.94**	**196.31**	**-65%**
Bukidnon	466.00	462.00	310.00	140.00	115.00	-75%
Camiguin	8.41	8.03	7.57	6.44	6.58	-22%
Lanao del Norte	60.40	56.85	54.00	51.30	52.86	-12%
Misamis Occidental	16.84	16.14	15.86	15.95	16.13	-4%
Misamis Oriental	9.93	11.50	8.64	7.25	5.74	-42%
DAVAO REGION	3,509.89	3,506.33	3,617.11	3,762.89	3,844.30	10%
Davao del Norte	313.87	332.83	342.03	346.57	371.82	18%
Davao del Sur	1,682.17	1,664.72	1,680.79	1,709.97	1,718.04	2%
Davao Oriental	486.52	491.22	506.16	485.25	483.13	-1%
Compostela Valley	177.28	181.17	204.61	206.31	141.58	-20%
Davao City	850.05	836.39	883.52	1,014.79	1,129.73	33%
SOCCSKSARGEN	**79.38**	**73.36**	**72.71**	**73.97**	**79.10**	**0%**
North Cotabato	11.78	10.11	10.61	13.34	19.25	63%
Sarangani	34.90	32.22	30.35	28.75	27.75	-20%
South Cotabato	27.73	26.27	27.58	27.83	28.09	1%
Sultan Kudarat	4.97	4.76	4.17	4.05	4.01	-19%
CARAGA	**157.40**	**124.14**	**58.57**	**63.44**	**57.84**	**-63%**
Agusan del Norte	84.54	54.11	6.50	5.60	7.14	-92%
Agusan del Sur	27.14	23.85	23.44	31.88	25.11	-7%
Surigao del Norte	29.15	28.76	14.77	11.50	10.55	-64%
ARMM	**110.06**	**101.45**	**91.40**	**83.31**	**85.46**	**-22%**
Basilan	3.92	3.74	3.44	3.14	2.98	-24%
Lanao del Sur	61.20	59.13	55.40	51.96	55.95	-9%
Maguindanao	3.26	2.85	2.75	2.55	2.33	-29%
Sulu	38.80	33.10	27.50	23.30	22.10	-43%
Tawi-tawi	2.88	2.63	2.31	2.37	2.10	-27%

TABLE 36. CACAO PRODUCTION VOLUME: 2009 – 2013, MINDANAO REGIONS						
Region/Province	**Production Volume (in MT)**					**% Chang (2013/09)**
	2009	**2010**	**2011**	**2012**	**2013**	
MINDANAO	**4,550.74**	**4,481.43**	**4,348.23**	**4,319.79**	**4,366.52**	**-4%**
Legend						
	Top Ten Cacao Producing Provinces in Mindanao (2013)					
Source: BAS						

The first Five of the top 10 cacao producing provinces in Mindanao are all in Davao Region. Davao del Sur is the largest cacao producing province in Mindanao based on BAS data. As per production data in the Southern Mindanao Cocao Industry Road Map, Davao del Norte has the highest production at 2460.26 MT followed by Davao City at 1,306 MT. Provinces in rank 6th to 10th in terms of production volume are Bukidnon, Zamboanga del Norte, Lanao del Sur, Lanaodel Norte, and South Cotabato.

Of the 9,430.71 hectares of land planted to cacao in 2013, Mindanao accounted for 79%. 70% of the 7,413 hectares of cacao farms were in Davao Region. The integration of cacao development in the DENR National Greening Program, PCA Kaanib Program, and DA and DAR projects has facilitated the massive planting of cacao in the region. For 2014, the DENR National Greening Program in Davao Region targets to distribute 1,342,000 seedlings. At 80% survival and planting density of 500 trees per hectare, the target seedling distribution translates to an expansion of about 2,147 hectares. The Greening Program in Davao Region is being implemented in partnership with PhilCocoa, a partner of OLAM International Limited. Further increase in cacao hectarage can be expected this year with the signing of a contract growing agreement between seven ARCs in Davao City and KFI.

Northern Mindanao ranked second with 678 hectares of cacao farms. With the commitment from the provincial government of Misamis Oriental to establish 40,000 hectares of cacao plantation and the signing of a production and trading agreement with KFI, Northern Mindanao may soon become one of the major players in the cacao industry.

Caraga, which as of 2013, had 570 hectares planted to cacao, is also set to establish 3,725 hectares of cacao plantation under DENR National Greening Program. The local government of Marihatag in Surigao del Sur and KFI has also recently signed an agreement for the massive planting of four million cacao trees in the town's 5,000 hectare pilot site.

In Zamboanga Peninsula, major cocoa farms recently established or in the process of being established are the following:

- Zamboanga City: Golden Beans Eco-Agro Producers Cooperative cacao plantation under a growership agreement with KFI
- Zamboanga del Norte: TVI Resource Development Philippines Inc. (TVIRD) formed a partnership with KFI for the establishment of a cacao plantation to provide livelihoods for the displaced workers. The cacao business initially covered 100 hectares of consolidated plantations in two towns before expanding to 1,600 hectares of block farms in four years.

- Zamboanga del Sur: Midsalip Farmers Multi-Purpose Cooperative (MIFAMCO) cacao plantation covering an initial of 200 hectares; also under a growership agreement with KFI

Soccksargen, which had the lowest hectarage devoted to cacao in 2013, is also targeting a 2,000 hectares expansion under the DENR National Greening Program.

In ARMM, Lamitan Agrarian Reform Beneficiaries Cooperative (LARBECO) in Barangay Limook, Lamitan City, and Basilan is currently rehabilitating some 400 hectares of cacao plantation. The group has entered into a growership agreement with KFI. At least 4 ARCs in Lanao del Sur have signified interest to go into cacao production covering 300 to 400 hectares under a contract agreement with KFI and with the support of DAR.

TABLE 37. AREA PLANTED TO CACAO: MINDANAO VIS-À-VIS OTHER CACAO PRODUCING REGIONS

Island Group/Region	Area Planted to Cacao (in HA)	% Share to Total RP
Luzon	1,388.00	15%
Visayas	629.71	7%
MINDANAO	**7,413.00**	**79%**
Zamboanga Peninsula	348.00	4%
Northern Mindanao	678.00	7%
Davao Region	5,193.00	55%
SOCCKSARGEN	177.00	2%
Caraga	570.00	6%
ARMM	447.00	5%
Philippines	**9,430.71**	**100%**
Source: BAS		

Although data from BAS shows that area planted to cacao in Mindanao decreased from 7,830.82 hectares in 2009 to 7,413.00 hectares in 2013, information from the industry players indicates that there has been an increase of cocoa farms in the various regions starting some time 2nd half of 2013. As per BAS data, Davao Region had 5,193 hectares of cacao farms in 2013. Industry stakeholders claim and which is also indicated in the Southern Mindanao Cacao Industry Road Map that hectarage planted to cacao has already reached 16,500 hectares with around 8 million trees planted.

The five provinces of Davao Region occupied the first 5 ranking in terms of area planted. Davao del Sur had the largest area planted at 1,045 hectares. Provinces in rank 6th to 10th in terms of area planted are Lanao del Norte, Agusan del Sur, Lanao del Sur, Zamboanga del Norte, and Bukidnon.

TABLE 38. AREA PLANTED TO CACAO: 2009 – 2013, MINDANAO REGIONS

Region/Province	Area Planted to Cacao (in hectares)					% Change 2013/09
	2009	2010	2011	2012	2013	
ZAMBOANGA PENINSULA	**446.00**	**425.00**	**394.00**	**359.00**	**348.00**	**-22%**
Zamboanga del Norte	220.00	224.00	224.00	225.00	225.00	2%

TABLE 38. AREA PLANTED TO CACAO: 2009 – 2013, MINDANAO REGIONS						
Region/Province	**Area Planted to Cacao (in hectares)**					**% Change 2013/09**
	2009	**2010**	**2011**	**2012**	**2013**	
Zamboanga del Sur	126.00	98.00	67.00	32.00	21.00	-83%
Zamboanga Sibugay	95.00	98.00	98.00	98.00	98.00	3%
Zamboanga City	5.00	5.00	5.00	4.00	4.00	-20%
NORTHERN MINDANAO	**937.00**	**927.00**	**877.00**	**877.00**	**678.00**	**-28%**
Bukidnon	460.00	450.00	400.00	400.00	200.00	-57%
Camiguin	32.00	32.00	32.00	32.00	34.00	6%
Lanao del Norte	387.00	387.00	387.00	387.00	387.00	0%
Misamis Occidental	50.00	50.00	50.00	50.00	50.00	0%
Misamis Oriental	8.00	8.00	8.00	8.00	7.00	-13%
DAVAO REGION	**4,945.00**	**4,958.00**	**5,226.00**	**5,151.00**	**5,193.00**	**5%**
Davao del Norte	920.00	928.00	932.00	936.00	1,045.00	14%
Davao del Sur	1,385.00	1,385.00	1,385.00	1,355.00	1,355.00	-2%
Davao Oriental	682.00	682.00	842.00	842.00	892.00	31%
Compostela Valley	670.00	675.00	735.00	675.00	549.00	-18%
Davao City	1,288.00	1,288.00	1,332.00	1,343.00	1,352.00	5%
SOCCSKSARGEN	**133.00**	**130.00**	**134.00**	**161.00**	**177.00**	**33%**
North Cotabato	12.00	12.00	11.00	24.00	33.00	175%
Sarangani	48.00	45.00	42.00	41.00	41.00	-15%
South Cotabato	55.00	55.00	65.00	80.00	85.00	55%
Sultan Kudarat	18.00	18.00	16.00	16.00	18.00	0%
CARAGA	**855.00**	**840.00**	**825.00**	**585.00**	**570.00**	**-33%**
Agusan del Norte	200.00	195.00	190.00	50.00	35.00	-83%
Agusan del Sur	395.00	385.00	385.00	385.00	385.00	-3%
Surigao del Norte	90.00	90.00	82.00	70.00	70.00	-22%
Surigao del Sur	170.00	170.00	168.00	80.00	80.00	-53%
ARMM	**514.82**	**499.80**	**464.00**	**448.90**	**447.00**	**-13%**
Basilan	35.00	35.00	35.00	35.00	45.00	29%
Lanao del Sur	250.00	250.00	250.00	250.00	250.00	0%
Maguindanao	35.00	30.00	25.00	20.00	18.00	-49%
Sulu	190.00	180.00	150.00	140.00	130.00	-32%
Tawi-tawi	4.82	4.80	4.00	3.90	4.00	-17%
MINDANAO	**7,830.82**	**7,779.80**	**7,920.00**	**7,581.90**	**7,413.00**	**-5%**
Legend						
	Top 10 Provinces in terms of area planted to cacao (2013)					
Source: BAS						

Based on BAS data, area planted to cacao in 52% of the provinces in Mindanao decreased in 2013 over 2009 figures. This may be an indication that there are still many farmers who are not aware of the market opportunities or if they are aware of market opportunities, the need for immediate income prevails.

2013 average yield per hectare in Mindanao was 590 kilograms per hectare, which is 12% higher than the national average. Based on BAS statistics, average yield in Mindanao in 2013 increased only by 1% over 2009 performance. Field tests conducted by various research institutes in cacao producing countries suggest that it is possible for farm yields to be from 1.5 to 2 metric tons/hectare with the combination of improved pest control management, use of planting materials of high yielding varieties, and appropriate fertilizer application.

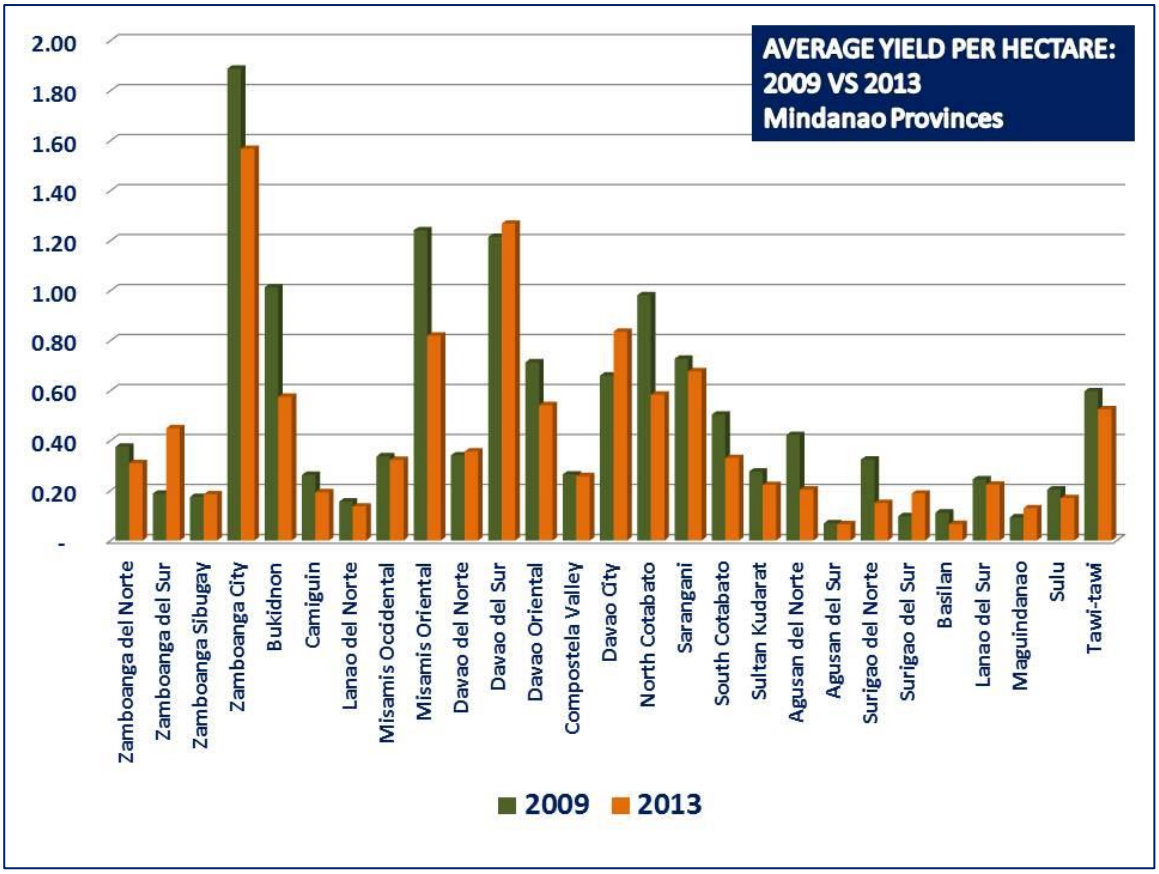
TABLE 39. CY 2013 AVERAGE YIELD PER HECTARE (IN MT)

Top 10 Provinces in terms of Average Yield		Ranking of Regions by Average Yield	
Province	**Ave Yield (in MT)**	**Region**	**Ave Yield (In MT)**
Zamboanga City	1.57	Davao Region	0.74
Davao del Sur	1.27	SOCCKSARGEN	0.45
Davao City	0.84	Zamboanga Peninsula	0.30
Misamis Oriental	0.82	Northern Mindanao	0.29
Sarangani	0.68	ARMM	0.19
North Cotabato	0.58	Caraga	0.10
Bukidnon	0.58		
Davao Oriental	0.54	**Mindanao**	**0.59**
Tawi-tawi	0.53	**Philippines**	**0.52**
Zamboanga del Sur	0.45		
Source: Calculated from BAS data			

At the regional level, Davao Region has the highest yield at 740 kilograms per hectare while Caraga had the lowest average yield at 10 kilograms per hectare. Compared to other regions, farmer in Davao have relatively better access to good planting materials and support services. Target of Davao Region players is to have an average yield of at least 1 MT per hectare.

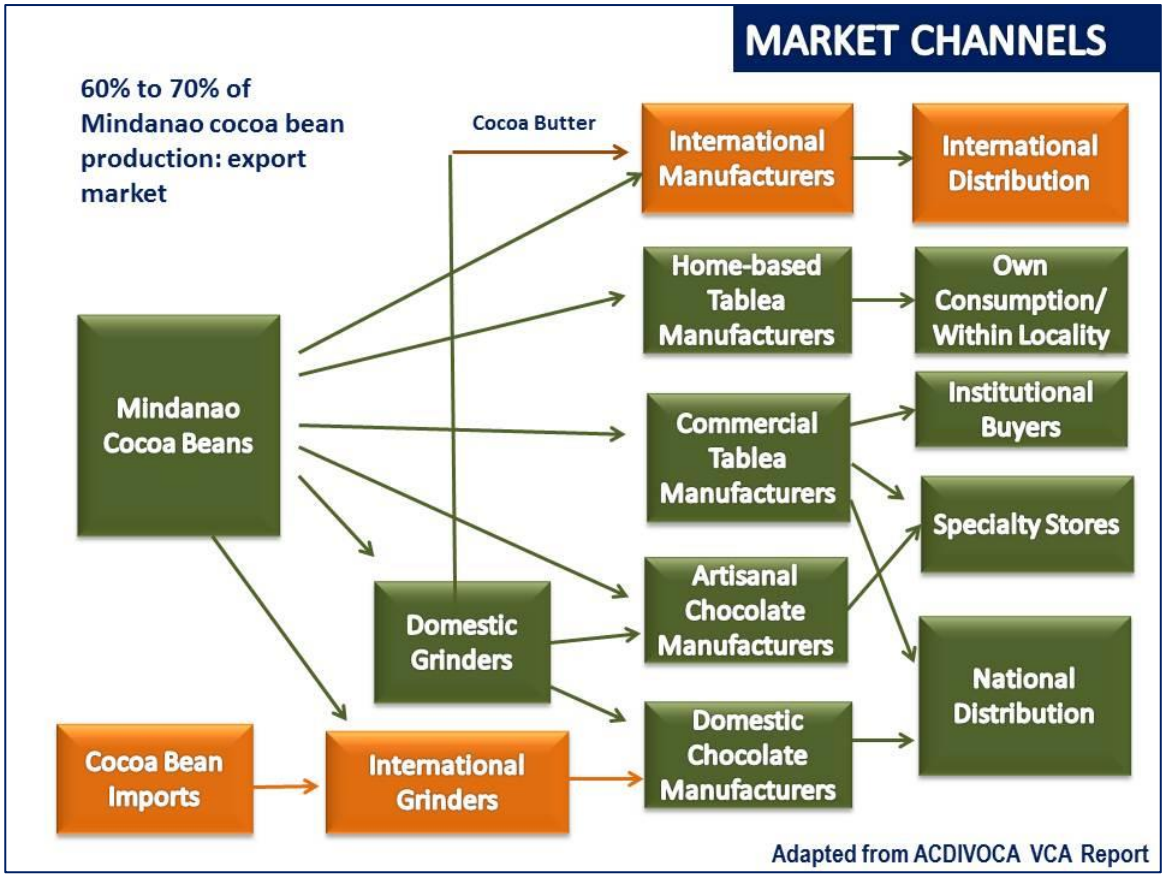
A comparison among the different provinces in Mindanao showed that Zamboanga City had the highest average yield at 1.57 MT per hectare followed by Davao del Sur at 1.27 MT per hectare. Current production volume though in Zamboanga City is still very low. Agusan del Sur had the lowest average yield at 7 kilograms per hectare.

Majority of the provinces had a lower average yield in 2013 compared to 2009 performance. Surigao del Sur posted the highest percentage increase in average yield in 2013. Other provinces whose average yield increased in 2013 over 2009 figures are Zamboanga Sibugay, Davao del Sur, Davao del Norte, Davao City, and Maguindanao.



Nature and Structure of the Industry

Value Chain Mapping



With proper care, cacoa trees begin to yield pods in 18 months and reaches full bearing capacity in 4 years producing 70 to 100 pods or more per tree per year. After ripe pods are harvested, they need to be cut open with machetes and the beans are taken out. The cocoa beans then need to be fermented, dried, cleaned and packed. Farmers in Mindanao though generally sell wet beans. The production of tablea, which is the most traditional and commonly produced domestic chocolate product, does not require the use of fermented beans. There are manufacturers though who combine both fermented and unfermented beans in order to produce higher quality tablea. In the cocoa bean for export, integrators/consolidators do the drying and fermentation to ensure consistency. Fermentation is a critical step for the chocolate flavour to be fully developed on subsequent roasting in the factory. In Mindanao, cocoa beans and the tablea/cocoa liquor comprise bulk of the products being produced and traded.

A recent development in the cocoa bean for export value chain is the outgrowership contracts being initiated by integrators/consolidators representing large global players in the cocoa industry. This effectively makes the chain shorter and facilitate access of farmers to inputs, technology, and capacity building. Another business model that has evolved sometime in 2013 is the direct export of a federation of cooperatives (FEDCO in Davao Region) to an international grinder (ADM Asia – Singapore).

The description of the key cocoa marketing channels in Mindanao is presented in Table __.'

Legend

●	Established	○	There are some farme already involved in t channel	◌	Start-up phase a very low volume	◌	Still being established

TABLE 40. COCOA MARKETING CHANNELS IN MINDANAO

Marketing Channel	Regions where chain exist and status					
	R9	R10	R11	R12	R13	ARMM
Export of cocoa beans multinational chocola manufacturers/grinders and premiu chocolate manufacturers v exporters and integrators	○	◌	●	○	◌	○
	Zamboanga Peninsula Integrator – KFI. With office in Dipolog Current volume traded in this channel is still very low Main business model: Outgrowership agreement – !st batch in caca plantation establishment phase; Spot transactions for non-outgrowers Northern Mindanao Integrator – KFI. Cacao plantation has yet to be established. Procureme operations not yet fully in place. Davao Region Integrators/Exporters – KFI, CSI Trade, PhilCocoa, Fuentespina, Seed Cor etc. Dominant channel in region. Main source of integrators during the last fi years. Both outgrowership agreement and spot sales (either directly integrators/exporters or via intermediaries) SOCCKSARGEN Integrators/Exporters – KFI and other integrators (via consolidators Davao); CSI – direct Volume traded in this channel is still low. CARAGA Integrator – KFI 1st batch in cacao plantation establishment phase ARMM Integrators – KFI; it is said that PhilCocoa/Nestle used to source fro Basilan group KFI outgrowers – rehabilitation of cacao farms					
Small volume sales of unferment beans to home based tablea make who sell within their locality or f their own consumption.	●	●	●	●	●	●
Fermented and unfermented beans commercial tableya makers with and outside the region (e.g., Ceb and Manila) who sell to institution buyers, specialty store supermarkets, and other retail outle			●	○		
	Davao Region supplies commercial tablea makers in the region, Northe Mindanao, Cebu, and Manila. SOCCKSARGEN has one commercial tablea producer (Kablon Farm) wh sources beans from own farm and farmers.					
Good quality beans from traders ar cocoa powder from grinders artisanal chocolate manufacture within the Region, Cebu, and Mani who sell to specialty stores and hig end supermarkets			○	○		
	Except for Kablon Farms which is based in SOCCKSARGEN, the artisan chocolate manufacturers source their beans and cocoa powder from Dava This is a relatively small market.					

TABLE 40. COCOA MARKETING CHANNELS IN MINDANAO

Marketing Channel	Regions where chain exist and status					
	R9	R10	R11	R12	R13	ARMM
Cocoa beans and powder f domestic chocolate manufacture who sell nationwide.			○			
	Only a small percentage of bean and cocoa powder requirements of larg chocolate manufacturers are sourced domestically. They use importe cocoa powder primarily from Malaysia.					

Source: KII/FGD, VCA Cacao-Mindanao

As can be seen from above table, Davao Region sells cocoa beans to Northern Mindanao, Cebu, Manila, and the export market. Farmers in SOCCKSARGEN who have sizeable volume sell to traders and consolidators in Davao Region. Traders in SOCCKSARGEN offer a lower price compared to consolidators as they deal with lower quality beans intended for the tablea market and for home consumption. In addition to beans, Davao Region is also the source of planting materials. The geographic flow of products is presented in Table and in the map below.

TABLE 41. GEOGRAPHIC FLOW OF PRODUCTS AND SYNERGIES

SOURCE	MARKET							
	Mindanao Regions						Cebu/ Manila	Export
	R9	R10	R11	R12	R13	ARMM		
R9	Beans Tablea							Beans (low volume)
R10		Beans Tablea						
R11		Beans Planting Materials	Beans Tablea Powder	Planting Materials	Planting Materials	Planting Materials	Beans Tablea Chocolate	Beans Butter
R12			Beans	Beans Tablea Chocolate			Chocolate	Beans (low volume)
R13					Beans Tablea			
ARMM	Scions	Beans	Beans			Beans Tablea	Beans	Beans (low volume)

Source: KII/FGD

Key Players and Functions

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) From buyers as part of the outgrowership contract agreement: This is a recent development and has so far been effective in addressing the lack of capacity among farmers to pay upfront for planting materials. Likewise, with secured markets, farmers are more willing to invest in good planting materials. It is also assumed that buyers would exercise great caution in the selection of planting materials as it is of their interest for farms to have high yield.

d) Purchase of planting materials from nurseries: Main clientele of nurseries are the commercial farmers, new entrants to cacao farming, and government and development agencies.

Among the regions in Mindanao, Davao Region has the highest number of nurseries followed by Zamboanga Peninsula. From just 10 nursery operators in 2008, there is now an estimated 167 nurseries in Davao Region. The aggregate production of these nurseries in 2013 was estimated at 3 million seedlings. One of the nurseries well known for its quality grafted seedlings of UF 18, BR 25 and PBC 123 (a hybrid of between Trinitario and Upper Amazon) is the Puentespina Farms in Malagos. The nursery is accredited with the Bureau of Plant Industry. A concern of the nursery operators in Davao Region is the proliferation of nurseries which have not applied for Bureau of Plant and Industry accreditation and majority do not have budwood garden to source their scion. Likewise, quality of seedlings is of varying levels. To support the development and further strengthen nursery operation and for intra-industry policing, the Davao Seedlings Producers Association was organized.

In Zamboanga Peninsula, the Cacao Industry Development Association of Mindanao Incorporated (CIDAMI) has identified about 40 to 50 nurseries during the field assessment they conducted in 2013. Farmer owned nurseries had production capacity of about 4,000 to 5,000 seedlings. Nurseries produced from 500 to 1,000 seedlings per month. In Zambaonga del Norte and Sibugay, seedlings were sold at PhP 25 to 30 each. The price of seedlings in Zamboanga City ranges from PhP 18 to 20. Sometime in 2011, the Office of the Provincial Agriculturist (OPA) in Zamboanga del Norte received a PhP1.6 million grant from ACDI/VOCA for the implementation of the "CoCoPal Farming System Extension Project" in the Provincial Agro-Industrial Center (PAIC) at Brgy. Irasan, Roxas. Majority of the funds went to the construction of 120,000-capacity cacao nursery and the establishment of 1,000 hills cacao budwood garden. The propagated clones are the NSIC-approved varieties, K1, K2, UF18, UIT1, ICS40, and BR25. A bulk of the propagated plants is dominated by the BR25 and UF18 varieties.

Basilan in ARMM has a budwood garden operated by the Lamitan Agrarian Reform Beneficiaries Cooperative (LAMBERCO). Clones propagated are the BR25, UF18, UIT1, ICS40, K2

and K1. Zamboanga nurseries without a budwood garden get their scions from LAMBERCO. Planting materials produced by the cooperative are currently being used to rehabilitate their 400 hectare farm since many of their trees are already 35 years old.

Other areas with budwood gardens are: a) USM in Kabacan, Cotabato; b) Sta. Maria – Davao del Sur; c) San Isidro – Davao del Norte; d) Mati – Davao Oriental; e) San Isidro – Davao del Norte: f) Mati- Davao Oriental; g) Ninoy Aguino – Sultan Kudarat; h) Zamboanga City; i) Zamboanga Sibugay; and j) Dipolog – Zamboanga del Norte.

Although there are a number of nurseries in the 6 Mindanao regions, there are only 11 nurseries accredited with Bureau of Plant Industry with 64% located in Davao Region. Zamboanga Peninsula, Caraga, and ARMM have no BPI accredited cacao nurseries.

TABLE 42. ACCREDITED CACAO NURSERIES
CY 2012 - 2013

Company	Location
Northern Mindanao	
La Suerta's Fruit Tree Nursery	Don Carlos, Bukidnon
Binahon Agro Forestry Farms (BAFF)	Lantapan, Bukidnon
Davao Region	
Cocoa Foundation of the Philippines, Inc.	Tugbok District, Davao City
Silva Cacao Nursery	Baguio District, Davao City
Dayot Plant Nursery	Talomo District, Davao City
Kennemer Foods International, Inc.	Calinan, Davao City
Puentespina Orchids and Tropical Plants	Baguio District, Davao City
Lola Marge Plant Nursery and Agricultural Development Services	Tugbok Dist. Davao City
JNS Agriplants Nursery	Brgy. Don Salvador Lopez, Mati City
Soccksargen	
Cayona-Talento Nursery & Agri. Supply	Kidapawan City
Mulato Nursery	Makilala, North Cotabato
Source: BPI	

Aside from quality issues of planting materials, the current aggregate production capacity of nurseries in Mindanao is not sufficient to support the achievement of the 2020 target of 100,000 MT beans. Assuming that Mindanao retains 90% share of the production of cocoa beans and an increase in productivity from 590 kilograms per tree to 2 kilograms per tree, it would require about 44,848,766.60 trees to produce about 89,697.53 MT of beans. Based on BAS data, number of bearing trees in Mindanao was at 3,083,940 in 2013. This means that Mindanao has to plant 41,764,826.60 trees by 2018. At 80% seedling survival rate, this would require 52,206,033.25 of seedlings.

Another key input vital to the achievement of the 2020 target is land. At a planting density of 500 to 800 trees per hectare, Mindanao would need about 70,000 to 105,000 hectares of cocoa farm to achieve 90% share of the Philippine target of 100,000 MT by 2020. Although cacao can be grown anywhere in the country, Mindanao has two advantages,

namely, good rainfall and good soil. Studies have shown that the potential expansion for cacao growing is huge: about 1.9 million hectares of coconut lands in Mindanao are highly suited to be interplanted with cacao. Roughly, only about 6% of the total coconut land area will be needed for cacao production even at a planting density of 500 trees per hectare. Intercropping may be the best option since coconut is already well established and, as such, will entail less labor cost. It can also provide additional income to coconut farmers. Fertilizer marketing generally passes through three levels, namely, importers/manufacturers; distributors-wholesalers; and dealers-retailers. Distributors operate in one province and sell to dealers, then dealers sell to end users, such as farmers. Distributors can also sell directly to farmers or large plantations, and may also have a dealer's license. In the study conducted by Philippine Institute for Development Studies (PIDS).

A study conducted by CIRAD with support from Mars Chocolate indicated that fertilizer is critical in cocoa farming. Cacao industry experts believe that yield can be improved from current levels of around 590 kilograms/hectare to 1 ton/hectare through use of good quality planting materials and labor intensive measures such as pruning, tree replacement, and sanitation. However, experts are on the opinion that the only way to reach yields of 2 MT per hectare is to use fertilizer and pesticide, neither of which is commonly used on cacao farms. Aside from yield increases, experiments conducted by CIRAD in West Africa showed that fertilizer extends the productive life of trees and improve pod quality and, consequently, bean quality and weight. Given the critical need for fertilizer, there is a need to make fertilizer safer, accessible, and affordable for the farmers.

Recently, there has been an increasing use of plastic bags for pod sleeving. These bags are readily available within the locality. A problem with these bags though is its disposal. The plastic bags are almost always non-biodegradable and improper disposal can cause clogs in drainage and canals

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.

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. With the entry of ARBOs in cocoa farming and the trend towards contract growing, block farming is fast becoming the new norm. Block farming is aimed at cutting down the syndrome of subsistence farming parallel to cutting down cost of transaction and delivery of extension services. The system involves farmers coming together, in a joint effort to produce crops on a large scale for commercial purposes, under a structured management comprised of the more progressive farmers in the group. . Ownership of the parcels of land remains with agrarian reform beneficiaries

Quality of cocoa beans is impacted by soil status, weather conditions during growing, fermentation and drying as well as storage. If things do not go well with the cacao farming and harvest, all players in the chain are affected especially the giant chocolate manufacturers. There can be no good chocolate without a sufficient cocoa bean quality. Poor quality cocoa beans may be moldy, infected with pests, broken, and have a high percentage of wastes. More

beans per kilogram indicate aged trees or harvest from immature pods. As such, companies such as Mars and Cadbury together with their sourcing agents/integrators are investing on the promotion of sustainable farming practices including research and development.

Cultivation of cocoa is a delicate and labor intensive process, as the trees are susceptible to changing weather patterns, diseases, and insects. The cocoa pod borer (CPB) is the greatest pest threat to cocoa production. Mindanao has once been massively infested by CPB sometime in 1998. This caused the devastation of many plantations and which were subsequently abandoned. The effects of the CPD outbreak was further aggravated by the slump of cocoa prices in 2000 due to oversupply of beans. It is sometimes possible to harvest some beans from an infected pod; but there are fewer beans, and they are of poor quality and should not be fermented. Another disease that plagues cacao farms and even nurseries in Mindanao is the vascular-streak dieback (VSD). VSD is a fungal disease impacting leaves by slowing or stopping the photosynthesis process.

Pruning and phytosantiation and proper application of pesticides can help reduce pest infestations on cacao trees and pods. Phytosanitation involves the removal and burial of diseased cocoa pods, branches, leaves, and weeds. The labor time required to remove diseased matter from the tree is compensated by increased production. However, some smallholders report sanitation as too much work especially because pods infected with CPB cannot be sold. However, pruning and phytosanitation may be the most cost-effective method for reducing pests especially among smallholders with low capacity to purchase inputs. In key cacao producing areas in Davao Region, there are already providers (cacao doctors and masters) of pruning services. To date, main clients are the absentee landowners.

A practice that is also increasingly being adopted by farmers especially in Davao Region and Soccksargen is the use of plastic sleeves to reduce incidence of CPB infestation. Although this poses extra cost for farmers (cost of sleeves and labor), adopters reported a 30% to 50% reduction in the number of pods infested which outweighs the cost and “hard work. These sleeves cost about PhP 2.50/piece.

1. Fermentation and Drying

The pillar of post harvest value addition is fermentation. Proper fermentation and drying remove all unpleasant flavours and start the chemical changes necessary to produce the true cocoa and chocolate flavours that emerge after roasting. Properly fermented beans are brown or dark red while partially fermented beans are purple, and over-fermented beans are very dark in color. The fermentation process reduces the weight of beans by 7% to 8%. Following fermentation, the beans must be dried for four or more days to reduce moisture content as is done with unfermented beans. The whole process takes about 7 to 10 days.

Cacao beans are dried on the ground or in makeshift platforms. Surface contamination is a major source of fungi in fermented and dried cocoa beans. Infestation of cocoa beans starts from the drying mats and continues in storage. During rainy days, drying of cocoa beans is done on prolonged periods and on an intermittent basis. If drying is done too slowly, moulds may develop. This can cause serious problems for the industry because of the off-flavours created if the moulds penetrate the testa. If the drying is too rapid however, the oxidation of acetic acid can be prevented and this leads to excess acid trapped within the beans. This acid content will ultimately adversely affect the flavour of the nib. Storage of beans is also a

constraint especially among smallholders. This traditional method of drying yield inferior quality dried beans, compared to those done in the facilities of consolidators and exporters.

Among the regions in Mindanao, Davao Region has the most number of postharvest facilities. It has about 27 fermentation facilities. These facilities are owned by both the public and private sectors. The postharvest facilities are generally for exclusive use of members or suppliers of the owners/operators of the facilities or are operated as common service facilities. In the Cacao Agribusiness Zone Center in barangay Talandang in Tugbok District – Davao City, for example, growers can have their beans fermented, dried, and sorted for a fee of PhP 15 per kilo which farmers consider to be too expensive. The facility has a 24-ton capacity fermentation boxes and sets of solar dryers and hybrid (artificial and solar) dryers. The whole process of fermenting, drying, and sorting entails about 10 days.

Trading

Davao Region has about 70 to 80 traders. 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).

In the international scene, major trading companies in the international market such as ADM and Cargill have taken over cocoa-exporting operations within origin countries, thus achieving a significant degree of vertical integration in the industry. Their reach extends all the way to the farm level, either directly (cocoa-buying stations) or through agency relationships.

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., Philcocoa Ltd., 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. In 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. KFI has an office in Dipolog City.

TABLE 43. INTEGRATOR – EXPORTERS SOURCING IN MINDANAO

Company	Global Player Affiliated With	Provinces in Mindanao that they are/will be sourcing from
Kennemer Food International (KFI)	Mars Chocolate	Zamboanga del Norte Zamboanga del Sur Zamboanga Sibugay Misamis Oriental (start-up) Misamis Occidental (start-up) Bukidnon (start-up) Davao Region (all provinces) Surigao del Sur Agusan del Sur Basilan Lanao del Sur
CSI Trade Venture	Traden, Poland	Davao del Norte Davao City Compostela Valley Davao Oriental South Cotabato
PhilCocoa	Olam	Davao Region
Seed Core Enterprises	Barry Callebaut	Davao Region
Federation of Cooperatives	ADM Asia	Davao Region

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. The formal enterprises generally have a wider market. Established and known companies like Malagos Farm/Puentespina, Kablon Farms, Maestradp, CSI, Roteo Farms, 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.

According to a news release from FEDCO of Davao Region, a side agreement to the marketing contract between the federation and their buyer, ADM Asia Corporation, is the set-up of a grinding facility as soon as the group has 1.2 million cacao trees solely for ground bean/cocoa powder export. For a processing/grinding plant to be viable, it should be assured of an annual supply of **30,000 to 50,000 MT of cocoa beans.**

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.

Producers of industrial chocolate fall into two broad categories (UNCTAD):

i. Vertically integrated groups which produce their industrial chocolate and mainly use it in-house to make consumer products (integrated chain).
ii. Companies under this category are Nestlé, Mars, Hershey, Cadbury, Kraft Jacobs Suchard, Ferrero and Cemoi. For the most part, they still manufacture couverture for their own use, though there is a trend towards outsourcing even couverture production (and even production of the finished product, one step further along the production chain) to specialized contractors.
iii. Industrial processors that supply most of their output of couverture to third parties (market suppliers).

Companies under this category include leading cocoa-processing companies as Barry Callebaut, Cargill, ADM and Bloomer. In many cases, these companies are also active at the sourcing/trading level (within origin countries and internationally).

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 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 Enterprises (Lala).

TABLE 44. TOP 3 CHOCOLATE PRODUCERS IN THE PHILIPPINES

Company	Description

TABLE 44. TOP 3 CHOCOLATE PRODUCERS IN THE PHILIPPINES	
Company	**Description**
Universal Robina Corporation.	Market leader in chocolates and the leading branded convenience foo and beverage company in the country. Manufactures enrobed chocolates and panned chocolates. Its popul enrobed chocolate brands are Cloud 9, Big Bang, Chooey, and Monst Munch while its panned chocolate, Nips, is the most popular in i category. Also exports chocolates to Thailand, Malaysia, Singapore, Indonesia, and Hong Kong.
Commonwealth Foods, Inc.	Manufacturer of chocolates as well as other products like coffe cookies, biscuits, milk products, coffee beans, flour, and sugar. I chocolate brands are Flat Tops, Curly Tops, Choco Mallows, ar Chocolate Crunchies.
Delfi Foods, Inc.	Delfi Foods Inc bought the manufacturing plant and sales ar distribution assets of Nestle Philippines together with Goya for a aggregate deal of US$5 million in March 2006. Delfi Foods Inc is a whol owned subsidiary of Petra Foods Inc., a Singapore-based manufactur of branded consumer confectionery. Popular Goya products are chocolate coins and eggs
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, The Gift Farm which is based in Davao City, Risa Chocolates, Kablon Farms in Soccksargen, and Choclery Artisan Chocolates. These companies source a greater percentage of their cocoa beans from the Philippines. 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 fermentation and overly bitter beans.[1]

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.

[1]ACDIVOCA Cocoa VCA Report

TABLE 45. TOP 10 GLOBAL CHOCOLATE AND CONFECTIONERY MANUFACTURERS CY 2013	
Company	**Net Sales 2013 (US$ millions)**
Mars Inc (USA)	17,640
Mondelēz International Inc (USA)	14,862
Nestlé SA (Switzerland)	11,760
Meiji Holdings Co Ltd (Japan)	11,742*
Ferrero Group (Italy)	10,900
Hershey Foods Corp (USA)	7,043
Arcor (Argentina)	3,700
Chocoladenfabriken Lindt & Sprüngli AG (Switzerland)	3,149
Ezaki Glico Co Ltd (Japan)	3,018*
Yildiz Holding (Turkey)	2,500
Source: Candy Industry, January 2014	

NATURE OF INTERFIRM RELATIONSHIPS

Horizontal Relationship

It was observed that among farmers who are members of the cooperatives, involvement in collective initiatives is very limited. **Majority of the farmer groups have not fully made use of their organizations as platforms to collectively address constraints, promote economies of scale, andimprove bargaining position.**

It has also been observed that cooperatives are better able to ferment beans than individual farmers because of the following reasons:

a) Cooperatives have higher potential to access fermentation facilities by pooling members' resources, assistance from buyers especially if they can deliver a sizeable volume of beans, and financial support from the government.

b) Farmers with potentials to deliver high volume of cocoa beans can link up firectly with higher level traders (e.g., integrators) or, in the case, of FEDCO, with the Asian office of ADM. By selling to a higher level traders, they have comparatively better margins and, as such, would have the incentive to undertake fermentation. Village traders do not provide premium for fermented beans. If they do so, it is very minimal.

The development of effective horizontal relationships among cocoa farmers has become increasingly important in the light of structural changes in the cocoa bean export supply chain. Exporting companies are generally hesitant to deal with many small farmers due to the high transaction costs involved. The block/cluster farming being promoted by Kennemer and DAR provides an indication of the possible directions that buyers will be increasingly taking in the years to come.

With demand exceeding supply, traders compete on price and on services offered (transportation, credit, etc.). In addition to competing on price, traders compete on different

services offered including leniency in quality control. This type of competition is unhealthy and hinders innovation and upgrading.

Cooperation and collaboration among downstream players appear to be strong. CIDAMI provides the platform for industry players to jointly discuss and find solutions to the various threats and opportunities faced by the industry.

Vertical Relationship and Supply Chain Governance

Transactions between farmers and traders generally consist of spot market sales. Marketing relationships between traders and farmers are informal and characterized by the concept of the "suki" system or personalized economic relations. The "suki" system, which is similar to the preferred supplier-buyer relations, proliferated in efforts to find ways to minimize risks and vulnerabilities to opportunistic behaviour and cheating (both trader and farmer). The depth of the suki relationship differs with each relation but over time, repetitive transactions with the same person develops trust. On both sides, there is reduced search, negotiation, and monitoring costs because the suki lives up to the norms and values of reciprocity and comes close to becoming part of the family mindset. The bonds between people engaged in exchange are determined by informal rules or social institutions and serve to enforce the terms of the exchange.

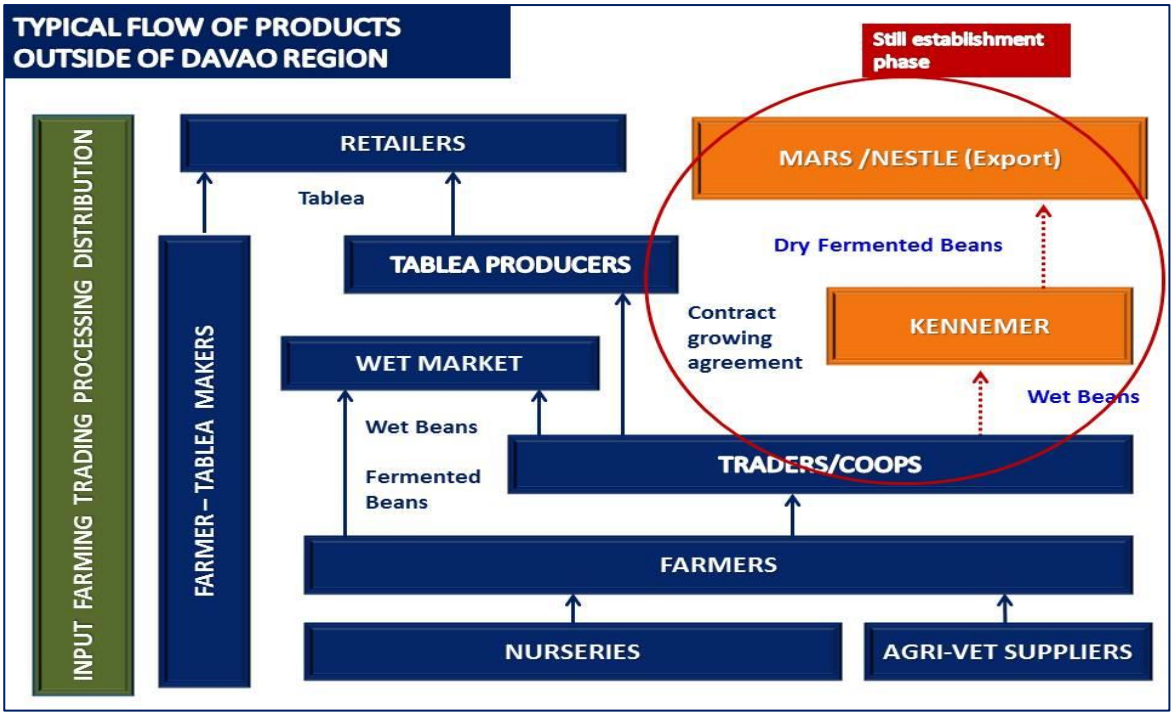
Suki relationships often are strengthened by the provision of credit by buyer to farmer or by lead trader to village buyer. Local traders are the main sources of loans/'cash advances". Farmers who sell their beans on a regular basis to one particular buyer are able to call on that buyer not only for loans for inputs but also for family emergencies, a "in-kind" (basic food commodities from store owned by traders). The extension of loans is a way for buyers to ensure loyalty of suppliers and, consequently, their supply.

TABLE 46. SNAPSHOT RELATIONSHIP ASSESSMENT

Parameters	Description
Farmer - Trader	
Buyer and Supplier Selection/ Procurement Process	Spot selling/Cash and carry Traders secure supply by providing advances in cash or in kind (e.g., rice an canned goods from sari-sari store owned by trader). With the cash advances, farmer and trader develop a semblance of long term relationshi
Information Sharing/ Transparency	Directive. One-way. Limited. Just focused on current transaction.
Quality Control and Inspection	All-in procurement at a lower price Visual inspection and sorting of beans done by trader and price discounts applied accordingly. A handful of cocoa beans are squeezed to hear if the

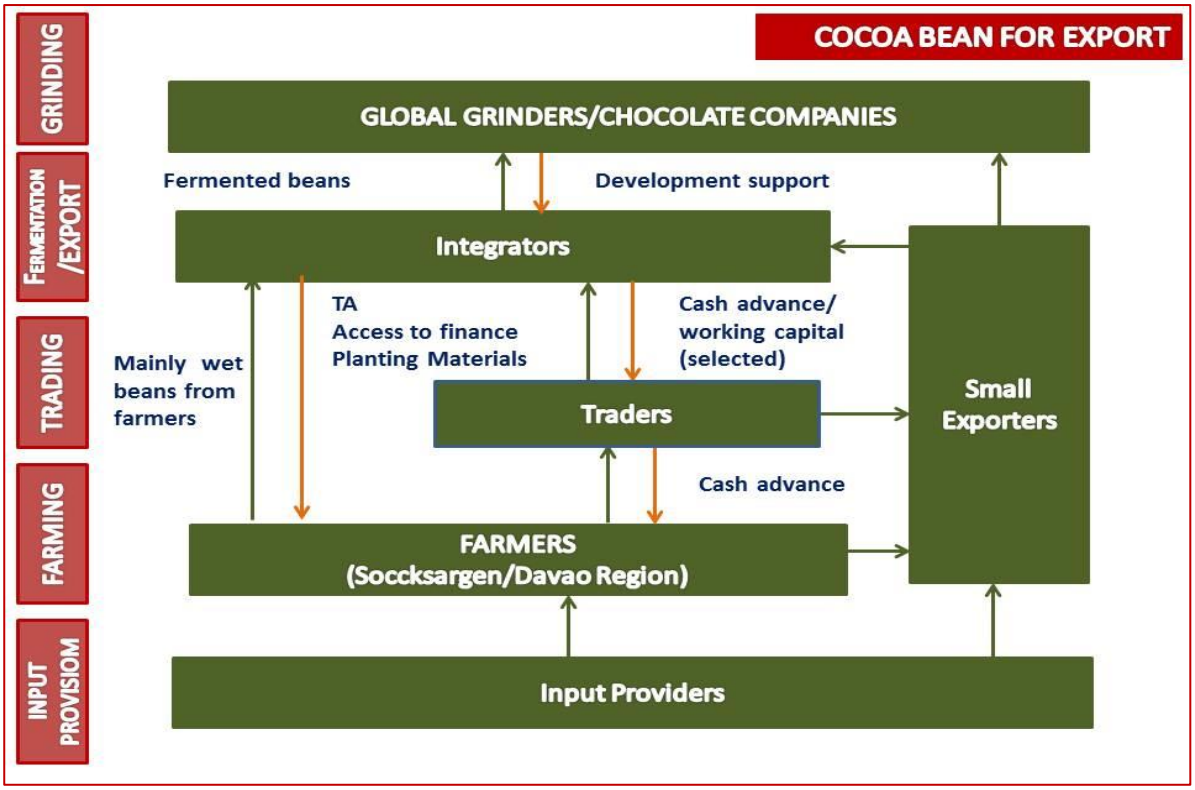
TABLE 46. SNAPSHOT RELATIONSHIP ASSESSMENT	
Parameters	**Description**
	made a cracking sound. Farmer just accept trader's assessment.
Value added service/ Collaboration and cooperation	Pick-up of beans at farm or at a place near the farm Traders provide cash advances – informal source of credit
Basis of Competition/ Offe	Volume
Farmer/Trader – Exporter	
Buyer and Supplier Selection/ Procurement Process	Some semblance of long term relationships. Informal guarantee of busines beyond today.
Information Sharing/ Transparency	Purchasing and pricing decision almost always based on agreed standards Discussions on prices, markets, and quality conducted on adhoc basis.
Quality Control and Inspection	Processor/exporter exercise more stringent quality control. Exporters usually have the bean grading kit.
Value added service/ Collaboration and collaboration	Access to postharvest facilities and seedlings Some learning and skills transfer Adhoc discussions on how both parties can mutually exploit cost, quality, technical, or marketing advantages via their collaboration.
Basis of offer	Volume and quality
Source: KII	

Many of the tablea processors and artisanal chocolate manufacturers are vertically integrated although they also source beans from traders and farmers. The tablea processors are the more established market channels in regions other than Davao. Generally, the tablea industry is fragmented and atomistic.



In chains in Davao Regions where farmers and traders sell directly to exporters cum processors, the product specifications required by end markets dictate the governance and nature of supplier relationships. In these chains, buyersgenerally offer a price differential on quality. Buyers tend to establish a closer and more directed supplier relationships in order to improve the quality and consistency of cacao beans.

With demand outstripping supply and market standards becoming more stringent, there is an increasing tendency for global grinders and chocolate companies to integrate backwards into origin countries. Such tendency is being jumpstarted by Mars through Kennemer Foods, CSI who is working closely with an international trading company based in Thailand, ADM through a direct marketing agreement with FEDCO, Barry Callebaul via Seed Core enterprises as its main consolidator, and Olam who has forged a strategic partnership with PhilCocoa, a newly established trading company. These developments provide the platform for a market driven upgrading. Aside from buying beans, the global companies through their Philippine based partners implement development programs. It has been observed though that exporters are having difficulties in competing with exporter-integrators. Many have shifted to supplying these companies rather than exporting on their own. This is in many ways a reflection of the shifts in international markets which is marked by growing levels of concentration and directed supply chain relationships



The international grinding segment is now controlled by three firms (ADM, Cargill, and Barry Callebaut). The concentration in the grinding sector arises as a consequence of the following developments (Losch, 2002):

- Development of new processing technologies (involving considerable research and development and investment) to enable the processing of different qualities of cocoa bean.
- Development of the ability to buy in large volumes and to source from different countries provided an important impetus to the scale of purchasing
- Developments in transport (bulk shipping) and just-in- time provision to chocolate manufacturers undermined the position of smaller and less sophisticated traders and grinders except those who are buying for their own in-house grinding.

TABLE 47. SUMMARY OF SUSTAINABLE PURCHASING PRACTICES

Sustainable Purchasing Practices	Perceived Benefit/s of Adoption
"Fair" share of export price of cocoa t return to shareholders	To cover production costs and provide a sustainable incom
Longer term contractual commitments	Assist production planning and reduce volatility of prices
Direct relationships	Build trust and stability in the chain Reduce the number of intermediaries
Improved access to affordable credit ar pre-harvest finance	Improve cash flow of farmers to purchase agricultural inpu and cover harvest expenses
Timely payments and communication wi mutually agreed payment terms	Greater trust and clarity; reduce uncertainty at end harvest
Differential pricing and communi	Creation of greater local capacity through small sca

premium payments	investments in appropriate technology, diversificatic initiatives, and community development projects
Source: Philipps, et. Al 2007	

To some extent, initiatives towards Sustainable Purchasing Practices are now being piloted in Mindanao between FFI and ARBOs, cooperatives, and social enterprises. Key features of kFI contract growing agreements include the following:

a) Agreement is for a period of at least 10 years
b) Contract growers are provided with high-yielding, six-month old, clonal cacao seedlings.
c) Training courses for every stage of the growing process, including field preparation, planting, management of the gestation period, harvesting, pest management, on-going care and maintenance and the rehabilitation of older trees. Regular coaching and monitoring by KFI field-technicians is provided to ensure the implementation of good agricultural practices and the proper application of inputs.
d) Growers may avail of inputs at reasonable price. Financial assistance is available for qualified private farms and cooperatives.
e) Guaranteed buy-back of the harvest at a price linked to the world price. Rgular practice of KFI is to buy wet beans from r growers and company takes care of the fermentation, drying and packing. But KFI is also willing to buy fully fermented and dried beans provided these meet their quality standards. Buying prices are always linked to the world price of cacao.

Barry Callebaut, on the hand, prefers to directly work with cooperatives. Firstly, the cooperative is audited, then required to sign a charter, which is signed mutually by Callebaut® and the participating cooperative. Each party then commit itself to a code of conduct that supports sustainable cocoa cultivation. These include mutual commitments to work together and improve the quality of the cocoa, the farms and the living standards of farmers and their families.

PRICE AND COST STRUCTURE

Income and Profit

TABLE 48. COST AND RETURNS – 1 HECTARE CACAO FARM (800 TREES) – FIRST FIVE YEARS
High Input High Yield Production System
Grafted Planting Material

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Income						
Average Wet Bean Production (MT)	-	1.31	3.82	4.91	6.00	16.04
Price of Wet Bean per MT	29,700.00	29,700.00	29,700.00	29,700.00	29,700.00	29,700.00
Gross Income (PhP)	**-**	**38,907.00**	**113,454.00**	**145,827.00**	**178,200.00**	**476,388.00**

TABLE 48. COST AND RETURNS – 1 HECTARE CACAO FARM (800 TREES) – FIRST FIVE YEARS
High Input High Yield Production System
Grafted Planting Material

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Expenses						
Materials						
Tools	5,550.00	-	-	-	-	5,550.00
Seedlings	18,040.00					18,040.00
Dolomite (for soil PH correction)	-	192.00	192.00	192.00	192.00	768.00
Fertilizer 14:14:14	5,400.00	6,264.00	12,960.00	14,256.00	15,682.00	54,562.00
Foliar Fertilizer/Insecticide/Fungicide	4,122.00	8,602.00	6,451.00	6,451.00	6,451.00	32,077.00
Plastic sleeves for CPB control	-	800.00	2,400.00	3,200.00	3,800.00	10,200.00
Subtotal - Materials	**33,112.00**	**15,858.00**	**22,003.00**	**24,099.00**	**26,125.00**	**121,197.00**
Labor						
Land preparation and planting	9,000.00					9,000.00
Weeding/Farm Maintenance	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00	13,500.00
Fertilizer Application	600.00	600.00	600.00	600.00	600.00	3,000.00
Harvesting		900.00	2,600.00	3,000.00	4,100.00	10,600.00
Subtotal - Labor	**12,300.00**	**4,200.00**	**5,900.00**	**6,300.00**	**7,400.00**	**36,100.00**
Total Costs	**45,412.00**	**20,058.00**	**27,903.00**	**30,399.00**	**33,525.00**	**157,297.00**
Gross Profit						
Gross Profit	**(45,412.00)**	**18,849.00**	**85,551.00**	**115,428.00**	**144,675.00**	**319,091.00**
Gross Profit Margin		**48%**	**75%**	**79%**	**81%**	**67%**

Source: DFI (2014 data)

The largest cost elements at about 56% in a high input – high yield production system are the fertilizer, insecticide, and fungicide. The use of fertilizer depends on other factors such as the quality of the soil, the level of pests and diseases, and agronomic practices. In the above table,

farmers are using both organic and inorganic fertilizer. In many cases, smallholders arbitrarily use fertilizer or cut down on the use of fertilizer to save on costs. Oftentimes, the savings on fertilizer result to overall low profitability in the subsequent harvests.

Financial success in setting up a cocoa farm requires a quick return on the initial investment and increasing yields to reduce the unit costs. Productivity of grafted seedlings is higher; yield per tree is more or less uniform and are early bearers. On the other hand, ungrafted seedlings have lower productivity because yield per tree is highly variable and 10-20% of trees are shy bearers which means they will not bear fruits at all.

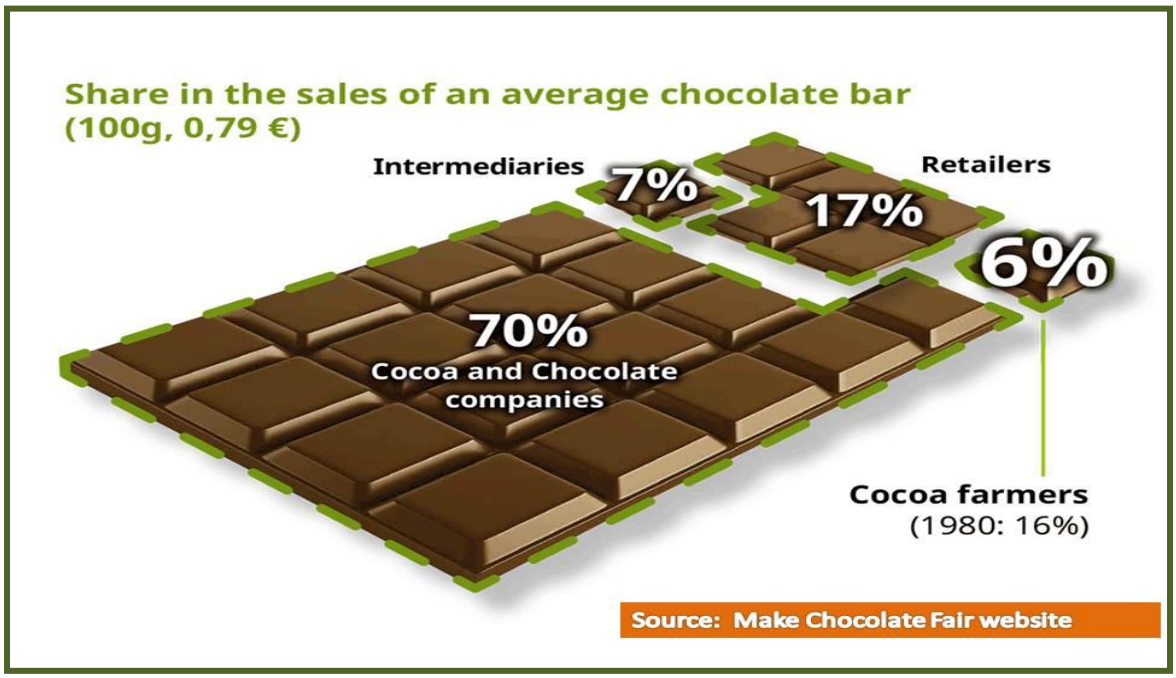
TABLE 49. PERFORMANCE COMPARISON: GRAFTED AND UNGRAFTED PLANTING MATERIALS

Parameters	Ungrafted Planting Materials	Grafted Planting Materials
Average Yield	**0.5 – 0.6 kilos**	**2-3 kilos**
Gestation Period	**24 – 36 months**	**18-24 months**
Source: DFI		

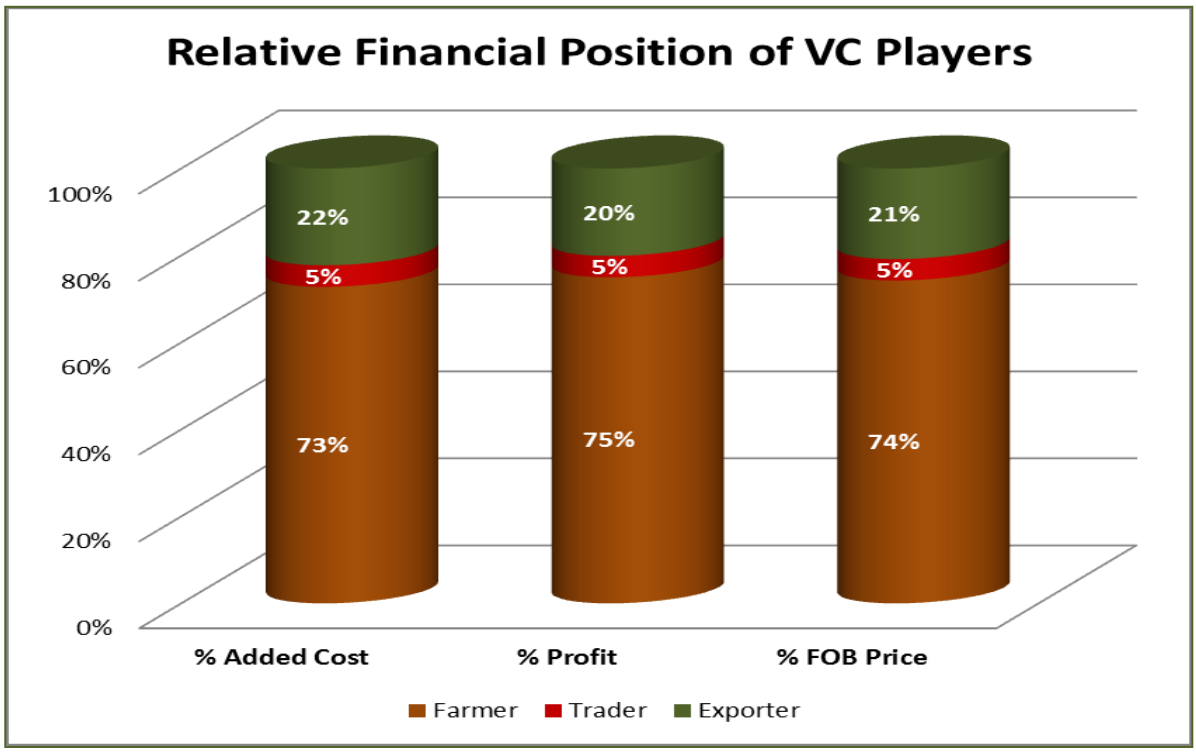
Profitability is most sensitive, as is usually the case in agriculture, to minor changes in market price and marketable yield. Price and yield are the primary sources of risk for the grower. While these risks cannot be eliminated entirely, good agronomic practices, good quality planting materials of high yielding variety, and proper fertilizer management and application enable a cacao grower to avoid what might otherwise be a financially devastating event and to survive a relatively unprofitable year or two.

Relative Financial Position of Players

Cocoa Bean for Export



Farmers in Mindanao under the contract growing agreement are projected to get about 80% of the world market price. Percentage share to world market price can further increase if they undertake the fermentation and drying themselves.



Percentage share to profits depends to a considerable extent on the efficiency and productivity of each of the players. As can be seen from the above graph, farmers account for 73% of the

cost to produce one kilo of dried beans with a percentage share of 75% of the profit. Traders and integrators generally have low profit margin and, thus, need to deal with high volume to make the business viable. The analysis on the relative financial position of players also indicates that price competitiveness of the chain can further be improved through productivity improvement at the farmer's level.

Global grinders, chocolate manufacturers, and integrators are confronted with an end-market demanding high quality cocoa. A challenge for these companies is how to secure the supply over longer periods, knowing that there is an increasing demand all over the world and a decreasing cocoa production due to declining soil fertility and neglected genetic resources. Global players in the cocoa industry increasingly recognize that a fair and decent income for farmers is a precondition to making the chain sustainable and for farmers to invest in upgrading. Long term relationships with farmers and their organizations, and investing in farmer organisations to ensure quality, sustainability claims and sufficient supply in the future, is crucial for their own survival. The 14% gross profit of integrators is partly spent in supporting the development of the cocoa industry in Mindanao. For companies like Mars and Kennemer, sustainability of the cocoa industry is part of the strategy and business practices, with focus on the viability of smallholder farmers and the needs of communities. Lead firms have clear incentives to establish closer, more directed supplier relationships in order to secure their supply of cocoa beans and improve the quality and consistency of their raw materials.

TABLE 50. RELATIVE FINANCIAL POSITION OF VC PLAYERS
Cocoa Beans for Export Value Chain
In Philippine Pesos

Assumptions:
3 kilos of wet beans = 1 kilo dry beans
Costs: Year 5 cost + share of establishment cost (4%)/ Intercropping/Low input farming system
Yield: 672 kilos dried beans or 2016 kilos wet beans
Based on Davao Region scenario

Player	Product	Unit Co	Added Unit Cost		Selling Price	Profit		Share to FOB Pric	
			Value	%		Value	%	Value	%
Farmer	Wet beans	29.43	29.43	73%	89.10	59.67	75%	89.10	74%
Trader	Wet beans	91.10	2.00	5%	95.00	3.90	5%	5.90	5%
Integrator	Fermented Beans	104.00	9.00	22%	120.00	16.00	20%	25.00	21%
Total			40.43			79.57		120.00	

Source: KII/FGD

Tablea

The distribution of costs and profits in the tablea chain is equitable. In the production of 1 kilo of tablea, farmers account for 75% of the cost and 75% of the profit. Likewise, percentage share of farmers to wholesale price of 1 kilo of tablea is 75%. It should, however, be noted that in many cases, tablea processors are set-up as vertically integrated operators

(e.g., a tablea processor sources beans from own farm, coops produce the beans or source the beans from members and then collectively process and sell the tablea).

TABLE 51. RELATIVE FINANCIAL POSITION OF VC PLAYERS

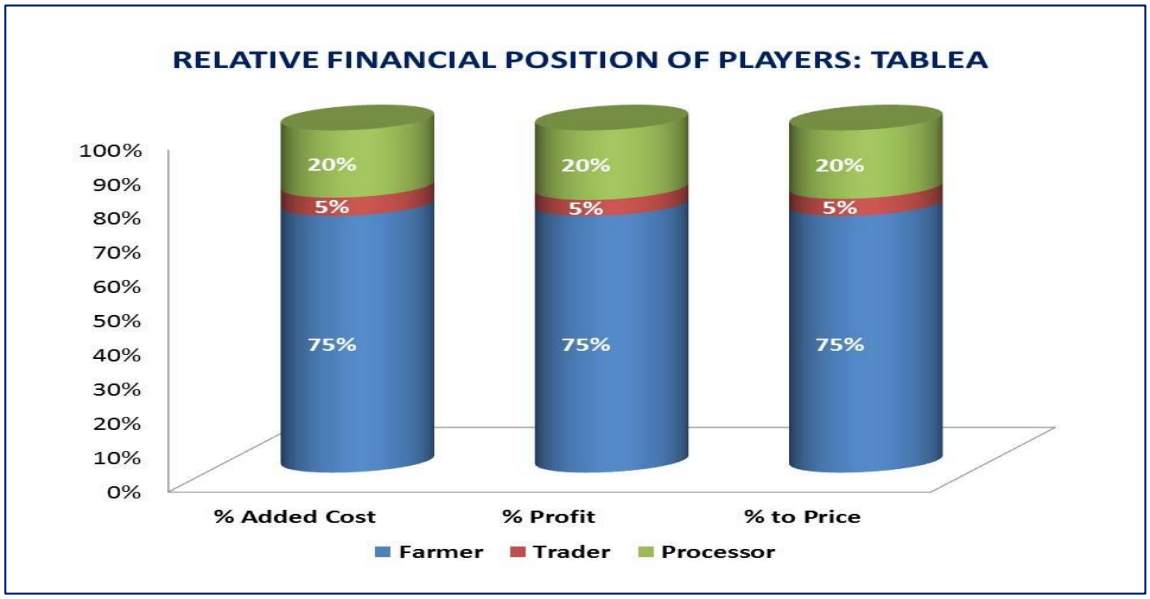
Tablea for Domestic Market

In Philippine Pesos

Assumptions:
2 kilos of dry beans= 1 kilo tablea
Cost of production of 1 kilo beans is PhP 14 --- typical cost of regions other than Davao

Player	Product	Unit Co	Added Unit Cost		Selling Price	Profit		Share to FOB Pric	
			Value	%		Value	%	Value	%
Farmer	Wet beans	84	84	75%	180	96	75%	180	75%
Trader	Wet beans	186	6	5%	192	6	5%	12	5%
Processor	Tablea	214	22	20%	240	26	20%	48	20%
Total			112			128		240	

Source: KII/FGD



Markets and Market Opportunities

The rising demand for chocolate and cocoa in Asia has resulted in an expansion of the cocoa processing industry in Indonesia. Thus, since in 2014 the production of cocoa beans in Indonesia is projected to further decrease to 400,000 MT, cocoa bean imports (mainly high quality fermented beans from West Africa) are expected to increase by 300% (to about 150,000 tons) in order to meet the needs of the industry. Last April 2014, the Indonesian Ministry of Agriculture has removed the 5% import duty on cocoa beans in order to provide the processing industry with the beans it needs and thus avoid a shortage. In Asia,

On the other hand, to respond to the projected demand of cocoa beans, 12 chocolate companies, including Nestle, Mars and Barry Callebaut, have recently signed a joint agreement with the governments of Côte d'Ivoire and Ghana to improve planting and fertilizing methods used by 300,000 farmers. All sides have agreed to safeguard against the use of child labour, which is a black mark on the global chocolate trade.

Netherlands leads in import of beans. As a major producer of cocoa food products, the United States is the top importer of cocoa powder. France, one of the biggest chocolate consumption per capita markets, is the top importer of chocolate preparations.

Table __ describes the characteristics that global buyers tend to look for in suppliers. The characteristics were drawn from interviews with global buyers during a value chain assessment of the Indonesian cocoa industry conducted by AFE, a US based firm specialized in value chain development. In terms of product quality, the market considers cocoa from Ghana as the "gold standard cocoa" against which others are judged and differentials are paid.

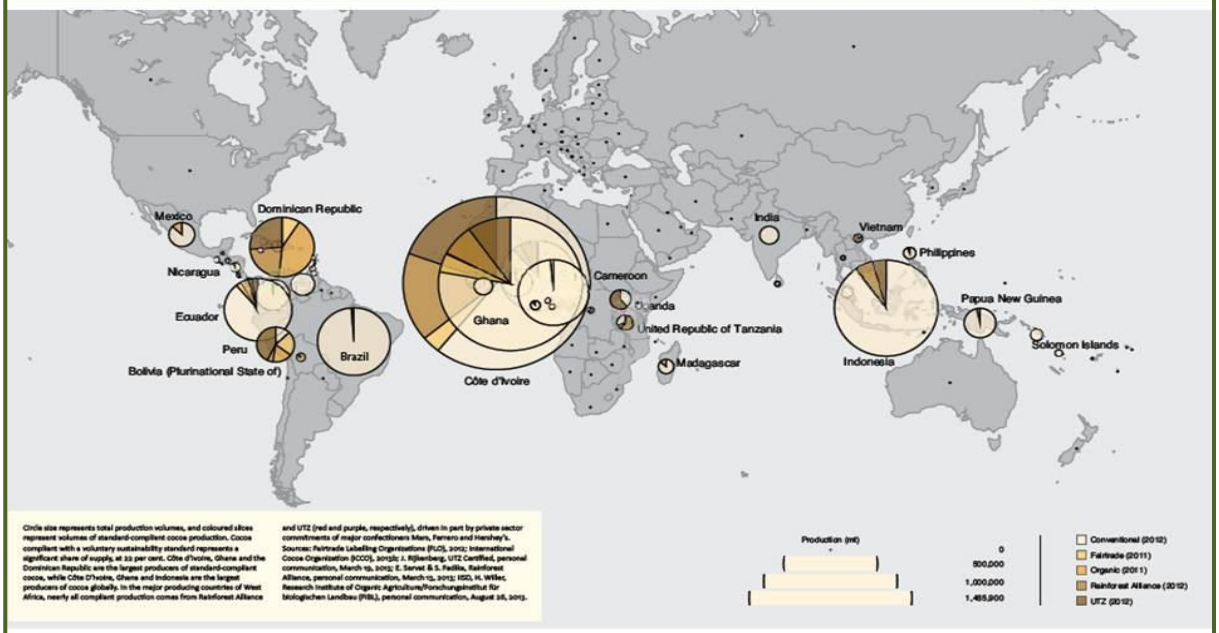
TABLE 52. COMPETITIVENESS CHARACTERISTICS OF THE COCOA BEAN IN THE GLOBAL MARKET

Competitiveness Characteristics	Description
Consistency of Quality	This is based on generally accepted parameters and indicators of coco bean quality used in the trade, including bean count (number of beans pe 100 grams; <110 beans), moisture content (<7.5 p%), and percentage o waste materials (<10 %).
Fat Content	Percentage of fat content refers to the amount of fat or cocoa butter tha can be extracted from the beans during processing. A high fat content preferable.
Flavor	Flavor can be accentuated with proper fermentation. Flavor also depend on the genetic trait of the cocoa bean itself. Stronger flavor beans are required for higher quality food an pharmaceutical cocoa products.
Price	The price per MT of cocoa beans is a strong determinant of value cha competitiveness (though not one that can be looked at in isolation). Price often reflects other characteristics (i.e., a lower price may refle inconsistency of quality, low fat content, etc.), and is not considered isolation by global buyers.
Availability of Supply	This pertains to the volume and reliability of cocoa bean supply
Infrastructure and Logistics	Efficiency and availability of transportation and infrastructure to mov beans from producers to the global buyer

TABLE 52. COMPETITIVENESS CHARACTERISTICS OF THE COCOA BEAN IN THE GLOBAL MARKET	
Competitiveness Characteristics	**Description**
	This also includes the efficiency of port operations, inspection service and other logistical export services.
Legal/Policy Environment	This includes government and public sector policies and regulation (taxation, support and/or interference, standards, contracts, certificatio etc). The legal and policy environment can have a positive or negativ influence on competitiveness.

The demand for certified cocoa used to be limited to niche markets under minor confectionery brands. In response to pressures from consumers for cocoa processors and chocolate manufacturers to be transparent about their chain especially with regards to their environmental footprint, to provide product information (traceability), and to pay fair prices to farmers parallel to the need to increase cocoa bean production to cope with demand, there is an increasing demand for certified cocoa beans. Demand for cocoa that can be traced to a specific origin and in certified production systems that follow certain social and environmental guidelines is expected to reach 50% of total world demand by 2020 (Cocoa Barometer 2012). Early in 2010, Cadbury (which was taken over by Kraft in February the same year) announced that it would use only Fair Trade certified cocoa beans in its best-selling chocolate brand in the UK, Dairy Milk. In 2009, Mars Inc. announced that it would use only Rainforest Alliance-certified cocoa in its popular Galaxy brand, and that by 2020, all cocoa beans would be from sources certified as 'sustainable'. Similarly, Nestle in partnership with cocoa processors such as Cargill and Olam are also increasingly buying only from farms and cooperatives which employ sustainable practices. In Mindanao, only CSI has acquired a Rainforest Alliance certification. The major standard bodies are Rainforest Alliance, FairTrade, UTZ, and Organic Cacao. in order to offer high enough volumes and to make certification - and traceability - feasible, farmers will need to ally themselves in well organized farmer groups.

CONVENTIONAL VS. STANDARD COMPLIANT COCOA PRODUCTION 2011/2012



Source:
SSI, The State of Sustainability Initiatives Review 2014

Domestic Market

TABLE 53. PHILIPPINE IMPORTS OF COCOA AND COCOA PREPARATION (IN US DOLLARS)
CY 2007 – 2011

	2007	2008	2009	2010	2011	% change 2011/07
Cocoa beans	172,37	263,04	49,41	2,451,55	1,071,86	522
Cocoa shell, husks, ar other waste	228,99	199,89	257,78	331,03	278,83	22
Cocoa paste	5,792,93	5,715,97	10,122,36	17,249,69	17,904,10	209
Cocoa butter	325,52	614,07	522,79	865,81	1,531,07	370
Cocoa powder	11,851,33	13,717,78	21,339,09	42,633,95	54,658,04	361
Chocolate and oth preparations	24,410,01	29,484,73	26,689,22	28,647,92	30,850,94	26
Total	**42,781,17**	**49,995,50**	**58,980,67**	**92,179,98**	**106,294,87**	**148**

Source: United Nations Commodity Trade Statistics Database

Local supply of cocoa is not sufficient for the needs of industrial users. Thus, the big users of cocoa and chocolate products have to import cocoa beans and grindings. Statistics also indicate that Philippines has been importing cocoa shell, husks, skin, and other waste. The domestic market with an estimated demand of about 30,000 to 40,000 MT of cocoa beans per year presents a big opportunity for the Davao del Norte.

Between the period 2007 and 2012, Philippine imports increased by 148%. During the same period, country's exports of cocoa products increased only by 11%. Total export value in 2012 was about 5% of total imports. Philippines is a net importer cocoa products and trade deficit is increasing at about 15% per annum.

Philippines is the second-largest confectionery market in Asia, next only to Indonesia. According to Euromonitor International, the Philippines chocolate market is forecasted to grow 13% by 2017 to US $ 306.3 million.

PRICE TRENDS

Cocoa prices are affected by various factors including stock/grind ratios, expectations for future production/demand, global food prices, and consolidation/fragmentation in cocoa trade and processing industries. These components generally set the tone for long-term trends in cocoa prices while trading by investment funds tend to drive movement in the short-term. In the medium term, economies of cocoa consuming countries influence the price.

From 2007 to 2011, there was an overall increase in cocoa price, but it has been prone to volatility from 2008 through 2011, leading to a 30-year high of $3,625/MT in January 2010 and dropping back to $2,200/MT in December 2011. In 2012, cocoa prices were less volatile with fluctuations ranging from 4% to 8% per month. In December 2013, the ICCO daily price averaged US$2,825 per MT, up by 28% over December 2011 average price.

Growth in Asian demand has contributed to a rally in cocoa prices. Last July 2014, price climbed to US $2,958, the highest level since August 2011. Higher prices could help, by potentially persuading farmers to invest more in their cocoa farms.

Domestic Market

..DAVAO REGION	54	70	88	73	63	
....Davao del Norte	37	58	75	59	58	
....Davao del Sur	60	72	92	77	64	
......Davao City						
....Davao Oriental	44	74	85	67	60	
....Compostela Valley	42	63	91	73	64	

It has been observed that oftentimes prices of wet and dry beans in Davao are higher than price set in the terminal market. In 2013, price of dried beans ranged between PhP 88 to 90andkilogram. As of July 2014, price of dry beans was at PhP 40/kilo.

Support Services

Financial Services

Integrators and exporters are the main parties oiling the market chain. The integrators and, sometimes, the exporters provide pre-financing or working capital to their agents. Marketing and contract growing agreements with integrators can facilitate famers' access to loans from banks for planting materials and inputs. In some cases, integrators extend loans for inputs in partnership with corporations (under the Corporate Social Responsibility program – e.g, LBC Foundation, TVIRD, etc.) and global players in the cocoa industry that they are affiliated with.

Farmers' finances tend to be precarious, which makes it difficult for them to invest in inputs making them vulnerable to crop failure, price drops, etc. The financing needs of cocoa farmers fall into three categories: finance for inputs, consumptive credit, and finance for investment. In many cases, these are sourced from traders and informal money lenders. Cooperatives and farmer groups also need short and medium term financing for purchases of cocoa beans and investments in nursery operations, organic fertilizer production, and post harvest facilities to support their members and to promote their own sustainability.

Farmers prefer to borrow from traders/intermediaries over other possible sources due to the following reasons: a) traders do not charge outright interest rates although some embed interest rate on price paid for cocoa beans; b) loans are easy available without any collateral and papers; and c) repayment of loans from collectors is easy, as do not generally have any terms and conditions except for a promise to sell the harvest to them. Traders have good knowledge about the cocoa harvest and if there are times when the output of cocoa is not sufficient, collectors do not force repayment of a loan. However, intermediaries are generally prudent in disbursing the loan amount, as they are aware of each farmer's land area and the status of cocoa cultivation. Likewise, loans from intermediaries are also constrained by the funds that they own and are able to access.

TABLE 54. PROVIDERS OF FINANCIAL SERVICES (FORMAL)	
Agency/Institution	**Description**
Land Bank of the Philippines	Agricultural Credit Support Project (ACSP) for production loan Interest rates: Prevailing comm. rates of interest, short/long term Loan requirements: Collateral can include produce (deed of assignment) *Cacao 100 Program:* Last December 2013, Land Bank approved the Cacao 100 Program, a loan facility targeted for a high value and long gestating crop such as cacao. The loan has a 5 year term with 2 years grace period and lending can be done through 4 platforms; individual loans, clusters, cooperatives and rural banks. The goal of this program is to be able to provide single digit interest rates for individual farmers. Farmers can borrow up to PhP 75,000 per hectare. *Agrarian Production Credit Program (APCP):* APCP is a joint program of Department of Agrarian Reform, the Department of Agriculture and Land Bank. This credit program provides financing for crop production to existing as well as newly-organized Agrarian Reform Beneficiary Organizations (ARBOs) and farmer organizations that are not qualified to avail of loans under regular windows of banks. An agreement was made September last year to extend credit terms to accommodate medium to long gestating crops such as cacao.
Development Bank of the Philippines	Seed High Value Crops Financing Programs Priority crops includes cacao Interest rates: 10-12% Loan requirements: SEC/CDA registration with land title and other business/project documents
ONB	Farm loans Interest rates: 18% Loan requirements: SEC/CDA registration with land title and other business/project documents
Green Bank	Credit, Production loans

The Cacao 100 Program of the Land Bank of the Philippines is aimed at making long term financing accessible to farmers. It is too early though to assess uptake among farmers.

Generally, microfinance institutions and banks face the following challenges in providing finance to smallholders:

a) High cost of funds to provide rural credit especially as the credits are uncollateralized
b) Challenges of verifying cash-flow records, credit history or financial capacity of smallholders for banks to evaluate and mitigate lending risks
c) Nil or negligible cost benefit appeal to fund fragmented, small-holder and widely dispersed farming businesses instead of other formal, well organized and more profitable businesses.
d) High level of default on loan repayment by previous rural credit beneficiaries as a result of diversion or loss of farm produce
e) Lack of formal marketing contracts to guarantee repayment
f) Limited understanding of the cocoa sector to guide the development of financial products appropriate to the needs and cash flow of players

Non-financial Services

Davao Region has a wider range of providers and support services compared to other regions in Mindanao. It has also been observed that entry of integrators in an area spurs development of providers and catalyzes upgrading initiatives among players.

The CocoPal Program in partnership with Mars Inc. has made inroads in developing the demand and supply of business development services in the cacao industry in Davao del Norte and the region as a whole. In line with the Sustainable Cocoa Initiative program that Mars Incorporated is implementing worldwide, three Cacao Development Centers (CDCs) have been established in Mindanao. The main aim of the CDCs is to facilitate access of farmers to good quality planting materials, technology, and training to improve their yield. The CDC is being supported by a pool of Cacao Masters and Cacao Doctors. To date, the model appears to be viable although outreach is limited to areas within the proximity of the CDCs.

Cocoa players in Davao del Norte and the region access business development services through the following means:

1. **Informal:** Information, knowledge and advice are made available to farmers and other VC actors through social relationships. This could include information and advice on price, market and technology trends through social networks or mediation through traditional cultural mechanisms. An example of this is the "informal" on-the-job training provided by parents to their sons and daughters. The weakness though is that "elders" in the community are not generally aware of emerging good practices. On the other hand, they are very much knowledgeable on indigenous practices which are generally low-cost and environment friendly as well as suited to agronomic conditions in the area. Strengthening the capacity of recognized "cacao experts" in the area would enrich the informal learning system.
2. **Embedded:** Services are provided within a buying or selling transaction, whereby the costs of the service provision form part of the overall cost calculation of the supplier, while the service user does not have to pay for service delivery. Embedded services are an added feature to the main business transaction.

   Examples

   Cacao Masters/Doctors: Technical advice and guidance provided to clients (e.g., buyers of planting materials, customers for grafting and pruning services). They also have

demonstration farms which help clients in making informed decisions on planting materials, technology, etc.

Technicians of Integrators: Training and extension services are provided as part of the contract growing agreement.

3. **Commercially sponsored mechanisms:**The Kakao Eskwela, a School-on-the-Air radio program, provides useful information about cocoa farming, crop establishment, crop maintenance and harvest and post harvest operations. Farmers and other individuals interested in cacao farming may enrol and ask questions via SMS. Sometime in June 2013, the Kakao Eskwela TV was launched. Both of these programs were initiated under the CocoPal Program.
4. **Fee-based services:** Services offered to farmers and enterprises as distinct services for which they pay a fee.

   Examples

   Cacao Masters/Doctors: grafting and pruning services

   CIDAMI Training: PhP 350/training module

   Davao City Chamber of Commerce and Industry, Incorporated (DCCCII): market linkages, trade fairs and expositions

   Cacao Foundation Of the Philippines Inc.: Technical Assistance, Market Linkages, Price Trend, organized seminars and conventions, farm demonstration, IEC (multimedia), provides post-harvest facility (combination of fee-based and subsidized services)

5. **Stand alone Free Services:** These are generally provided by government agencies and non-profit organizations such as CIDAMI. The services are generally provided for free.

TABLE 55. SERVICES PROVIDED BY GOVERNMENT AGENCIES AND NGOS

Organization	Services
DA and Attached Agencies	
Department of Agriculture (DA) units/Programs & agencies: • High Value Commercial Dev't. Program (HVCDP) • Mindanao Rural Development Program (MRDP) • Agr'l. Competitiveness Enhancement Fund (ACEF)	- Provision of funds to the RFUs and farmers groups for cacao planting materials, postharvest facilities, small scale processing equipment, research & development, planting materials certification, training, standards, and stakeholders' forums. - Establishment of Production Facility in Strategic Cacao Production Areas through provision of equipment such as fermentaries, drier, cacao roaster, cacao cracker and cleaner, cacao grinder and tablea maker to farmers' groups - Research and Development are being implemented by DA in partnership with various academe across the country

TABLE 55. SERVICES PROVIDED BY GOVERNMENT AGENCIES AND NGOS	
Organization	**Services**
Philippine Coconut Authority (PCA)	Farm diversification program through promotion of intercropping and provision of planting materials
Bureau of Plant Industry (BPI)	Certification and registration of Cacao planting materials (NSIC-Registered and Recommended Cacao Varieties)
Bureau of Agricultural Research (BAR)	- Commercialization of technologies on the processing and packaging - Sustainable cacao production system through its projects funded under the National Technology Commercialization Program (NTCP). - Supports projects that are in line with the National and Regional Integrated Research and Development and Extension (RDE) Agenda and Program. - Provides funding support to studies that address current needs and problems of the agriculture and fisheries sectors. - Organic Agriculture Program - Facilities development program - Knowledge products and services - Agriculture and Fisheries research policy and advocacy
Bureau of Agriculture and Fisheries Product Standards (BAFPS)	- Formulates and enforces quality standards - Provides assistance in establishing scientific basis for food safety, trade standards and codes of practice, and harmonizes them with internationally-accepted standards and practices
Philippine Center for Post-Harvest and Mechanization (PhilMech)	- Support programs for research and development of Drying Systems for Philippine Cocoa Beans - In coordination with DA's regional offices and local government units, provides financial assistance to farmers by providing 85% subsidies in acquiring farm equipment and machineries such as hand tractors, threshers, transplanters and water pumps for rice and high-value crops such as coffee, cacao, cassava and bio-ethanol.
National Agricultural and Fishery Council (NAFC)	- Monitoring and evaluation; IEC/Advocacy materials - Facilitates the conduct of regular consultations and dialogues between government and private sector in agriculture and fisheries, by providing technical and administrative assistance to the members of its nationwide consultative and feedback network leading to the creation of Committee on commercial crops.
Agricultural Training Institute (ATI)	- Conducts training on production technology such as cacao production technology (training of trainers/ training of farmers)

TABLE 55. SERVICES PROVIDED BY GOVERNMENT AGENCIES AND NGOS	
Organization	**Services**
Other Government Agencies	
Department of Agrarian Reform (DAR)/ARP	ARC development support
Department of Science and Technology (DOST)-PCARRD/ SMARDEC through FITS	IEC materials, technical references, design and fabrication of equipment for the production of local cocoa products Technological Support for the Upgrading of Local Cacao and Cocoa Industry a) Improving the quality of solid cocoa liquor including molded cocoa nibs and developing the capability of Small Scale Processors in the Manufacture of Intermediate Cocoa Products b) Microbial Community and Biochemical Profiling for Microbial Augmentation and Development of Quality Indicators for Cacao Fermentation and Processing c) Development and Evaluation of Improved Drying Technologies for Fermented Cacao/Cocoa Beans in the Philippines d) Design and Fabrication of Equipment for the Production of local cocoa products
Department of Trade Industry (DTI), Export Pathways Program	- Industry cluster convener, provision of shared service facilities for cacao fermentation among MSMEs - Served as industry cluster convener to bring together all stakeholders and enablers of the industry - Export Pathways Program wherein business and technical assistance on product development, productivity enhancement, and domestic and international marketing assistance.
Department of Labor and Employment (DOLE)	Farmer's organizational strengthening, postharvest facilities, processing equipment
Cooperative Development Authority (CDA)	Support to cooperative formation and organizational strengthening
TESDA	Vocational skills development
Local Government Units (LGUs)	Extension services, production support
University of Southern Mindanao (USM)	Research on varietal/clone improvement

The Mindanao Rural Development Program (MRDP) assisted some cooperatives to improve their cacao production and tablea businesses. About 4,000 hectares of cacao plantation in the Municipality of San Isidro – Davao del Norte have benefited in this program.

Objectives of sustainability and increased depth and breadth of outreach of services may be achieved by facilitating the development of markets for support services. Functioning markets can offer services through a range of formal and informal sources, as separate services or embedded within other products. This shifts the focus of public intervention away from direct provision and subsidies at the level of support services transaction towards the facilitation of a sustained increase in the demand and supply of services. This will entail the following complementary strategic directions:

- Development of a range of intermediary organizations and individuals that can provide services to enterprises in transactional, business-like relationship and without the need for long-term subsidy
- Increase effective demand for business development services by enhancing enterprises' understanding and valuation of the benefits of services ;
- Facilitate the development and delivery of a wide variety of services that are profitable to both the enterprises and the providers.

Enabling Environment

FORMAL RULES, REGULATIONS, AND POLICIES

The following are the key policy issues that affect the economic playing field for sustainability in the cocoa industry:

1. Cocoa is characterized by a volatile world market price during the year, varying between weeks and months. The various factors affecting price are quite difficult to control as these emanate from different points across the globe. Mindanao stakeholders led by the Cacao Industry Development Association of Mindanao (CIDAMI) are pushing for a "marketing board" that would control the price of cacao in both local and international markets to help local farmers and growers. According to the group, the marketing board will decide on the prices so that the farmers will not be at the mercy of buyers and consolidators.

2. For more than a decade, most government efforts to expand access to agricultural credit have been channeled through the Agricultural Competitiveness Enhancement Fund (ACEF) and Agro-Industry Modernization Credit Finance Program (AMCFP). Outreach, to date, of the two programs have been limited. The Agri-Agra Reform Credit Act of 2009 (Republic Act 10000) signed in February 2010 has not also been effective in facilitating smallholders' access to financial services.

   There is a need for government to put in place a sound risk management framework to address the issues that are at the core of private sector reluctance to lend and farmers' hesitation to avail of formal financial services. . Likewise, most of the policies that govern agricultural credit facilities for farmers are biased towards short-term crops. The cocoa sector needs long-term financial services. Parallel to this, there is a need for a tree crop

insurance program and safety net arrangements given the growing vulnerability of Mindanao to natural disasters brought about by climate change.

3. The imperative of moving towards more sustainable agriculture practices that respect local ecosystems within broader landscapes is gaining momentum. Regulation may force buyers to be more accountable for social and environmental responsibilities, especially in the light of ever toughening EU regulation. For example, the ICCO predicts that the EU is likely to increasingly focus Maximum Residue Level (MRL) legislation on cocoa. More than just striving for firms and farming enterprises to be certified (Rainforest Alliance, Fairtrade, UTZ, etc), there is a need to institutionalize the conditions for sustainable production at a national level. As Mars Incorporated puts it: "If certification continues to reach only farmers working in cooperatives, it will not achieve the target of mainstream sustainability. Certification needs a critical mass to make it the new norm, to set a new benchmark. So far only cooperatives trained personnel manage ICS system; therefore it is very difficult for a trader to engage in certification. In order to reach unorganised farmers it is important to outsource ICS system management. This would allow about 30/40 per cent of traders interested in engaging in certification to hire ICS trained managers and in turn to reach a much higher number of unorganised farmers".

   To ensure that certification does not exclude smallholders and micro businesses, reform in the delivery of extension services to facilitate compliance will require the adoption of a multi-provider model and market-based delivery mechanisms including partnerships with lead firms. Access to financial services and improved infrastructure are also important in achieving certification status and sustainable production as a whole.

4. The Association of Southeast Asian Nations (ASEAN) and its six trading partners are targeting to sign by 2015 the Regional Comprehensive Economic Partnership (RCEP), a free trade agreement that is expected to further open up new and bigger markets for local businesses. On the other hand, this will increase competition among cocoa producing countries in the ASEAN region. This implies more than ever the need to improve competitiveness both in terms of quality and volume.

INFORMAL RULES AND SOCIO-CULTURAL NORMS

1. Norms of civic cooperation reduce enforcement costs by leading individuals to internalize the value of standards and regulations even when the probability of detection for violation is negligible.

2. The major sources of social capital among Filipino farmers are kin networks, home neighborhood, farm neighborhood, and membership in a farmer's association. Harnessing the kinship/interpersonal relations factor can reduce transaction cost in the sharing and diffusion of farming technology

3. Another value related to loyalty is utang na loob or debt of gratitude. It is expected that those who are helped in their time of need will return the favor when the opportunity comes.

TABLE 56. PROFILE OF THE BUTUAN CACAO INDUSTRY (INCLUDING PRESENT AND EXPANSION)

No.	Barangay	Total number of seedlings Planted	Number of hectares Planted (Existing)	Number of Farmers	Expansion Programs		
					PCA = 2017 200 has. to be considered as Corporate Farms	DAR/Private	LGU
1	Amparo	350	.58 8/2013	2			
2	Anticala	25,604	21.45 (8/2013) 21.22 (3/14)	98			
3	Antongalon	2,894	3.19 8/2013 1.63 3/2014	13			
4	Basag	500	.833 8/2013	2			
5	Bilay	8,888	10.48 3/2014 4.33 8/2013	73			
6	Bitan-agan	3,608	6 4/2014	22			
7	Bit-os	1,733	2.88 4/2014	26			
8	Bugsukan	731	1.218 8/2013	3			
9	Camayahan	470	.783 8/2013	3			
13	Dankias	1,233	1.26 8/2013 .792 4/2014	11			
15	Dulag	45,887	63.33 2015 10.34 8/2013 2.80 3/2014	87			

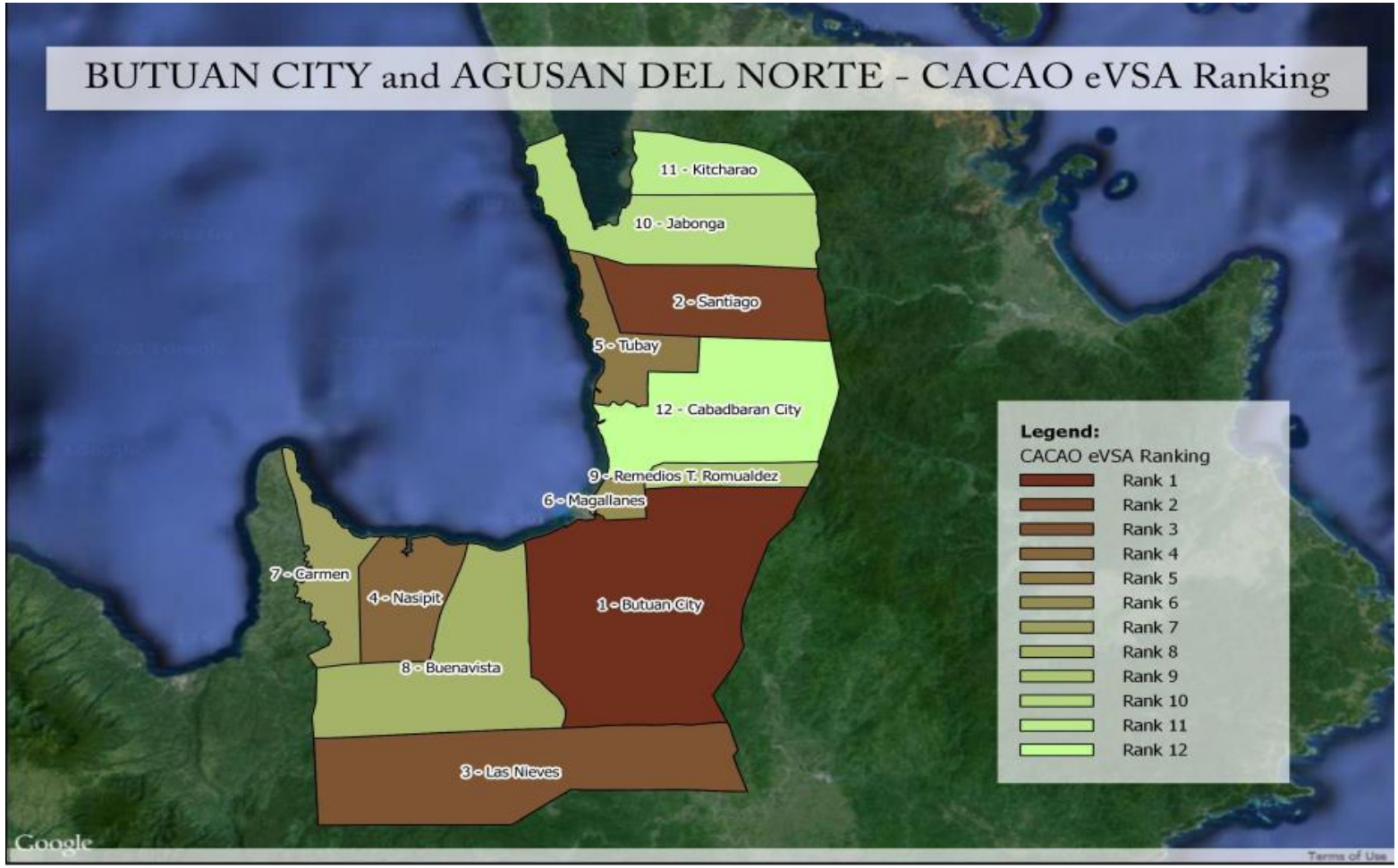
16	Dumalagan	3,814	6.35 4/2015	39			
17	Florida	776	1.29 8/2013	1			
18	M.J. Santos	5,504	5.675 4/2014 3.49 8/2013	71			
19	Maguinda	4,308	5.85 4/2014 1.32 8/2013	85			
20	Maibu	673	.513 8/2013 .608 4/2014	21			
21	Mandamo	1,467	2.445 8/2013	9			
22	Manila de Bugabos	5,861	9.768 4/2014	105			
23	Nongnong	3,294	5.49 3/2014	15			
24	Pianing	1,461	2.435 8/2013	10			
27	San Mateo	2,843	2.44 3/2014 2.3 8/2013	43			
29	Sumile	5,428	3.62 8/2013 5.43 4/2014	38			
31	Taguibo	48,460	43.26 9/2015 37.50 5/2016	70			
32	Taligaman	984	1.64 8/2013	5			
34	Tungao	3,486	3.25 3/2014 2.55 8/2013	11			
TOTAL			**300.34**				

TABLE 57. EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT (E-VSA)

Butuan City ranks number 1 in Cacao from among the municipalities of Agusan del Norte using the parameters below.

PROVINCE	MUNICIPALITY	NUMBER OF FARMERS (15%)	VOLUME OF PRODUCTION (MT) (15%)	AREA PLANTED (HA) (10%)	POVERTY INCIDENCE (10%)	VSA RANK (50%)	COMPOSITE INDEX	E-VSA RANK
AGUSAN DEL NORTE	BUTUAN CITY	1	0	509	28	1	0.60393	**1**
AGUSAN DEL NORTE	SANTIAGO	1	1	2	48	12	0.59706	**2**
AGUSAN DEL NORTE	LAS NIEVES	0	0	2	53	6	0.34684	**3**
AGUSAN DEL NORTE	NASIPIT	0	0	165	28	4	0.34305	**4**
AGUSAN DEL NORTE	TUBAY	0	0	0	39	3	0.34189	**5**
AGUSAN DEL NORTE	MAGALLANES	0	0	0	29	2	0.33992	**6**
AGUSAN DEL NORTE	CARMEN	0	0	0	41	5	0.33371	**7**
AGUSAN DEL NORTE	BUENAVISTA	0	0	0	38	7	0.3041	**8**
AGUSAN DEL NORTE	REMEDIOS T. ROMUALDEZ	0	0	4	41	9	0.30035	**9**
AGUSAN DEL NORTE	JABONGA	0	0	5	46	11	0.29852	**10**
AGUSAN DEL NORTE	KITCHARAO	0	0	20	40	10	0.2907	**11**
AGUSAN DEL NORTE	CABADBARAN	0	0	0	28	8	0.27703	**12**

MAP 18: EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT (E-VSA) MAP



Cacao Commodity Development Plan

Generally, the promotion and development of the local cacao sub-sector will adopt the following strategies namely:

1. Establishment of a grafted cacao production facility which would be the source of quality cacao planting materials for the establishment and development of cacao expansion areas.
2. Promotion and development of the coconut-cacao (cococao) farming system in the more or less 7,634.45 hectares of coconut production areas. The adoption of the cococao farming system aims also to increase the productivity of more or less 522,362 bearing coconut trees benefiting 9,409 farmers.
3. Upgrading the existing farm to market road networks of the existing major cacao producing areas and the proposed expansion areas to wit:

    1. Anticala
    2. Taguibo
    3. Dulag
    4. Antongalon
    5. Bugsukan
    6. Pianing
    7. Sumilihon
    8. Cabcabon
    9. Bilay
    10. Salvacion

    This would require a funding requirement of more or less P 200.00 M. The requirement can be sourced from the FMR Devt. Program of the Philippine Coconut Authority, Department of Agriculture and probably from the Road Users Fund.

4. Increasing the capacity of the Antongalon Farmers Association Caraga Inc. assemble and consolidate the fresh cacao beans produced by 30% of the existing cacao farms (90 has.) on the first year, 60% of the existing cacao farms on the second year (180 has.) and the production of 300 has. cacao farms by the 3rd year. This requires the provision of a consolidation building and support facilities (such as warehouse, office), hauling facility , processing building and facilities (dryers – both mechanical and solar, fermentation facilities, tableya processing building and others) and the marketing funds.
5. Strengthening the capacity of the Antongalon Farmers Association Caraga Inc. in the provision of development services to absentee landowners who have available lands that are kept idle.
6. Setting up of a cacao development fund to finance the expansion areas either from external sources (MINDA) or internal sources (AFACI). This will include funding assistance to cacao growers charged to crop that would cover tools and equipment (pod breakers, mobile solar dryers, plastic cover installers and organic fertilizers.

TABLE 58. GAPS AND PROPOSED INTERVENTIONS

Value Chain Segment	Key Gap/Constraint in VC Development in Butuan City	Brief Description of Potential Intervention	Target Result / Outcome	Target Areas To be Covered	Proposed Lead Player	Estd. Project cost in P ,000	Risk and Risk Management	Rank
Input Supply	High dependency on the integrator on the supply of quality cacao planting materials of the recommended varieties/strains Low willingness on the part of farmers/farmers groups to invest in the production of quality planting materials	Capacitating interested farmers' groups in the production and commercialization of quality grafted cacao planting materials	Local capacity to produce quality grafted cacao planting materials established	All coconut producing areas in Butuan City, All interested cacao producing barangays in Butuan City	Km. 7 Tungao Farmers Producers Cooperative/ MINDA	1,500	The financial grant to be provided to km. 7 Farmers Producers Cooperative to establish a cacao nursery shall be guided by the principles of equity and participation. The cooperative shall be made to provide a certain number of cacao seedlings for dispersal to the cacao farmers.	5
	Limited availability and commercial distribution of organic fertilizers and inputs for cacao High cost of chemical inputs both to farmers and environment	Increasing the capacity of interested farmers'group in the production and commercialization of organic inputs specific for cacao Institutionalization of an organic cacao production program in Butuan City	Increased supply and distribution of organic inputs for cacao Reduced production costs and cacao production technology	Tungao, Taguibo, Pinamanculan, Kinamlutan	Organic fertilizers producers of Butuan City	**2,000**	AFACI will partner with an investor to put up equity funds for the provision of organic fertilizers and tools and equipments charged to crop A transition period for the adoption of a protocol on organic cacao production	1

			adopted is environmentally friendly				installed and agreed between the integrator-buyer to cushion negative impacts on production volume requirement	
Production	No established good cacao production practices for replication	Establishment of a leaning center cum techno demo that will establish and package the Butuan City cacao production protocol	Adoption of a Butuan City condition cacao production protocol	Exisitng cacao production areas in Butuan City	Office of the City Agriculturist, DA 13	**100**	The learning center cum techno demo will be established in existing and productive cacao farms in Butuan City. Inputs will be provided by the Agricultural Training Institute/Dept. Of Agriculture while the labor will be provided by the farmer-cooperator. Production will be owned by the farmer while the knowledge generated is to be packaged for learning process of the cacao growers.	2
	Lack of skilled farm workers/laborers that can provide development services	Establishment of a training and certification program for agri-farms development (cacao	Pool of certified professional cacao doctors/workers is established	Exisitng cacao production areas in Butuan City	DA-ATI, TESDA, Office of the City Agriculturist, Academe,	**100**	People's organizations in major cacao producing barangays would be engaged	1

		development)			Marketing Partner			
	Low productivity in existing cacao production areas due to lack of technical knowledge and information	Provision and distribution of cacao techno guides	Increased understanding by potential local cacao growers on the basics of cacao production and marketing	Butuan City	Office of the City Agriculturist	**50**	Context and contents on the agreed production protocol are location specific	1
	Lack of other infrastructures support to increase capacity towards establishment of expansion areas and production of planting materials	Provision of water system to provide the irrigation water requirement and also the potable water requirement of the farmers	Enhanced capacity of the growers in nurturing their cacao plantations and establish expansion areas Increased quality of cacao pods	Dulag and Pianing	Barangay Dulag Organic Farmers Association Inc.	**4,500**	To ensure sustainability of the project, project is to be driven by alternative sources of energy	
	Increasing quality standards requirement by global buyers	Institutionalization of the good agricultural practices program	Foundation for sustainable cacao farms certification established	Existing cacao production areas in Butuan City	Office of the City Agrciulturist	**50**	Marketing agreements should also be incorporated in the Cacao Farms Certification Program	2

Value Chain Segment	Key Gap/Constraint in VC Development in Butuan City	Brief Description of Potential Intervention	Target Result / Outcome	Target Areas To be Covered	Proposed Lead Player	Estd. Project cost in P ,000	Risk and Risk Management	Rank
Assembly	No established local commodity champion to assemble and consolidate cacao products to spur the growth of the local commodity	Provision of a warehousing facility, hauling facility and the corresponding capitalization to consolidate and assemble fresh cacao beans	Increased leverage to demand better prices, established a mechanism to ensure quality standards requirement	Antongalon	AFACI	**4,500**	Counterpart funds for the establishment of this enterprise should be coming from the lead proponent itself	
	Weak capacity among farmers to organize themselves into structured groups No capacity of the local cacao sector to implement the local cacao development plan Weak coordination and collaboration among local cacao sector players	Strengthening the barangay based cacao growers association which would be the core of the commodity development council Professionalization of the Butuan City Cacao Industry Development Council Establishment of cooperation mechanisms between and among	Institutionalization of the Butuan City Cacao Industry Development Council Increased efficiency and effectiveness of the local cacao sector in the development planning process Vertical and horizontal relationship established	All existing cacao producing barangays with their corresponding people's organizations	Office of the City Agriculturist	**50**	Articles of Cooperation and individual association by-laws are formally structured to prevent being politicized. Adoption of a management tool to ensure transparency in the implementation of the cacao development plan, establish accountability and ownership mechanisms and clarity of the vision and mission in the promotion and development of the local cacao industry The cooperation mechanism should be based on sound business principles and etiquettes	

	resulting to slow promotion and development of the sector	the barangay based cacao growers association and the Butuan City Cacao Industry Development Council						
Transformation	Low efficiency and effective capacity to value adding activities	Provision of pre-processing, processing and packaging facilities	Increased value of the fresh cacao beans	Antongalon	AFACI	**3,500**	An Implementation Management Agreement shall be executed between the City Government of Butuan , the Lead Proponent Group and the Department of Agriculture to ensure that the enterprise is sustainably managed	1
	Lack of technical knowledge to produce quality value added cacao products	Conduct of consultation towards the formulation of an operations manual on cacao fermentation processes, tableya processing	Operations Manual on Cacao processing formulated for distribution	All cacao beans producing barangays in Butuan City	Office of the City Agriculturist , DA 13, Project Management Office	**50**	The protocol on processing must be based on the Butuan City condition and includes good practices of the existing cacao processors	3
Marketing	Poor condition of farm to market road resulting to high cost of transportation	Upgrading through concreting of the farm to market road serving the nucleus cacao farms	Reduced transportation costs of the products resulting to increased savings, Reduced perishability of the cacao products	Taguibo FMR Anticala FMR Antongalon FMR Dulag FMR Bilay FMR	DA, PCA, CGB		The development of the support road infrastructures shall be sourced from the Regular FMRDP of DA and PCA	1

Financial	Low capacity of the proponent groups to put up the required counterpart funds and enhance its financial condition	Provision of non-financial services to the identified producer groups to strengthen and enahnce itss financial position	Sustainability plan developed with farmers associations and its members committed to put up the additional equities for thee operation of the identified enterprises	All Pos in the clustered banana production areas	DA	50	To increase the adoption rate of the farmer-members of the barangay based associations, handholding by extension workes are recommended	
Extension	The context of the local extension delivery system is not oriented to promoting and developing cacao as one of the economic drivers	Improving the delivery of extension works towards the promotion and development of cacao	The promotion and development of the local cacao industry would drive agricultural transformation	Cacao producing areas of Butuan City	Office of the City Agriculturist ,		The provision of extension services must be packaged corporatively. This would be in the context that the promotion and development of agriculture is to be private led.	1
Enabling Environment	The lack of understanding resulting to the lack of support to the initiatives towards cacao development	Development of a system where the Butuan City Commodity Investment Plan is automatically enrolled in the Butuan City Investment Development Plaan and allocated yearly budget	Increased technical, financial and legislative support to the Office of the City Agriculturist to undertake the agricultural transformation of Butuan City	Butuan City	City Developme nt Council		The basis for the installation/establishment of an enabling environment are the commodity road maps/investment plans formulation which are the basis for coss-overs between the technical, financial and the legislative support services	1

3. Banana Commodity Value Chain Development

OVERVIEW OF THE INDUSTRY

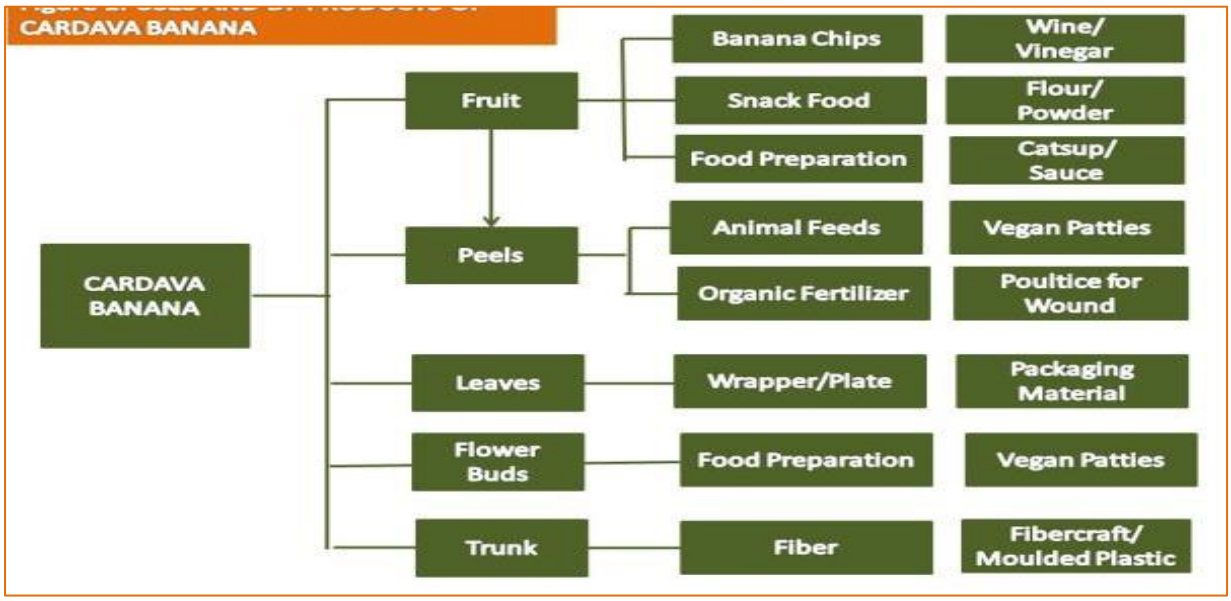
Product Description

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.

Unlike the Cavendish which is cultivated primarily by large plantations, Cardava is grown in backyards of rural households and in small farms. It 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.

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.

FIGURE 9. USES AND BY-PRODUCTS OF CARDAVA BANANA



Same as with the dessert banana, Cardava is rich in carbohydrates. It is, however, less valued as a fresh product even when mature, as it still contains starch at this stage. The Cardava is consumed necessarily cooked, whether green or ripe. In some cases, Cardava is consumed as an alternative staple food in lieu of rice.

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 such as the “pochero”.

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.

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.

Other by-products of the Cardava banana are the catsup, vinegar, and flour. In Lanao del Norte, one agrarian reform cooperative is engaged in the manufacture of catsup. Production though is still low and market is currently limited within the locality and neighboring provinces (via trade fairs).

The “puso” or the dark red inflorescence of the banana is also edible. Aside from cooking the “puso” into the traditional “ginataan” or “kilawin”, it can also be made into vegetarian patties.

Banana peels are traditionally used as feeds or converted into organic fertilizer. Another alternative use of banana peels is as meat substitute and extenders. It can also be utilized as a material for making paper and paper boards. The leaves are used as packing materials in markets and traditional wrappings of native dishes.

While Davao Region is the main producer of banana chips, Northern Mindanao is the largest supplier of fresh Cardava for the retail markets and local Cardava based snack food in key urban areas in the Philippines. Although SOCCSKSARGEN has companies engaged in banana chips, a greater percentage of its production is sold fresh either to banana chips exporters or to traders dealing with the fresh retail market. Caraga also produces banana chips with a significant percentage geared for the export market. Maguindanao in ARMM is a key supplier of fresh banana for banana chips companies in Davao. Production in other provinces of ARMM is sold fresh in the local market. All of the regions in Mindanao have thriving Cardava-based snack food businesses consisting mainly of street vendors --- from ambulant vendors selling boiled bananas in bus stations to turon and maruya stalls near schools, parks, and malls.

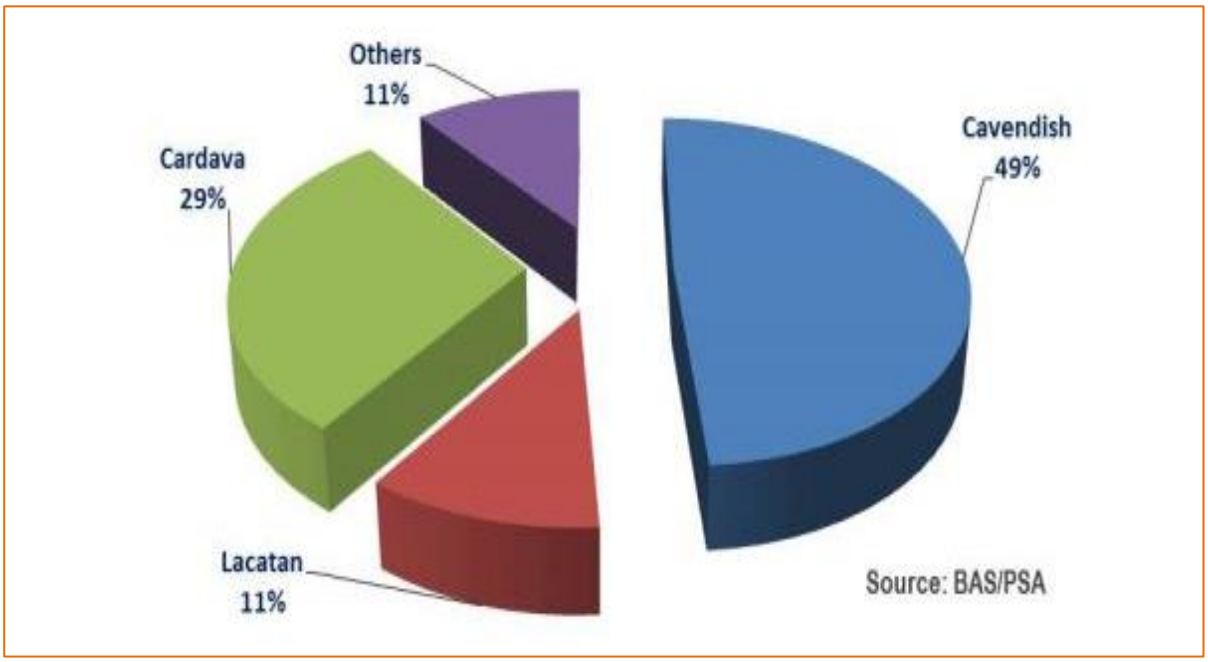
TABLE 59. KEY CARDAVA PRODUCTS TRADED IN MINDANAO				
Region	Fresh Banana for Retail Market	Banana Chips	Snack Food (Local Market)	IQF Cardava Snacks (for Export)
Zamboanga Peninsula	●	○	●	
Northern Mindanao	●	○	●	subcontractor
Davao Region	○	●	●	○
SOCCSKSARGEN	●	○	●	
Caraga	○	●	●	
ARMM	●	○	●	
Legend				
●	Dominant	○	Secondary	
Source: VCA Mindanao				

PRODUCTION TRENDS

Domestic Production

Based on BAS data, the country produced 8,645,748.66 MT of cardava in 2013 in 445,934.67 hectares of land, with Cardava accounting for about 29% of national banana production, Cavendish (49%) and Lakatan (11%). Latundan and other cultivars accounted for about 11%.

FIGURE 10. BREAKDOWN OF BANANA PRODUCTION IN THE PHILIPPINES BY GENOTYPE, 2013



Total national production was reported at 2,556,986.07 MT. The top three Cardava producing regions in the Philippines in 2013 were Davao Region, SOCCSKSARGEN, and Northern Mindanao.

TABLE 60. CARDAVA PRODUCTION IN THE PHILIPPINES BY REGION RANKED ACCORDING TO VOLUME, 2013

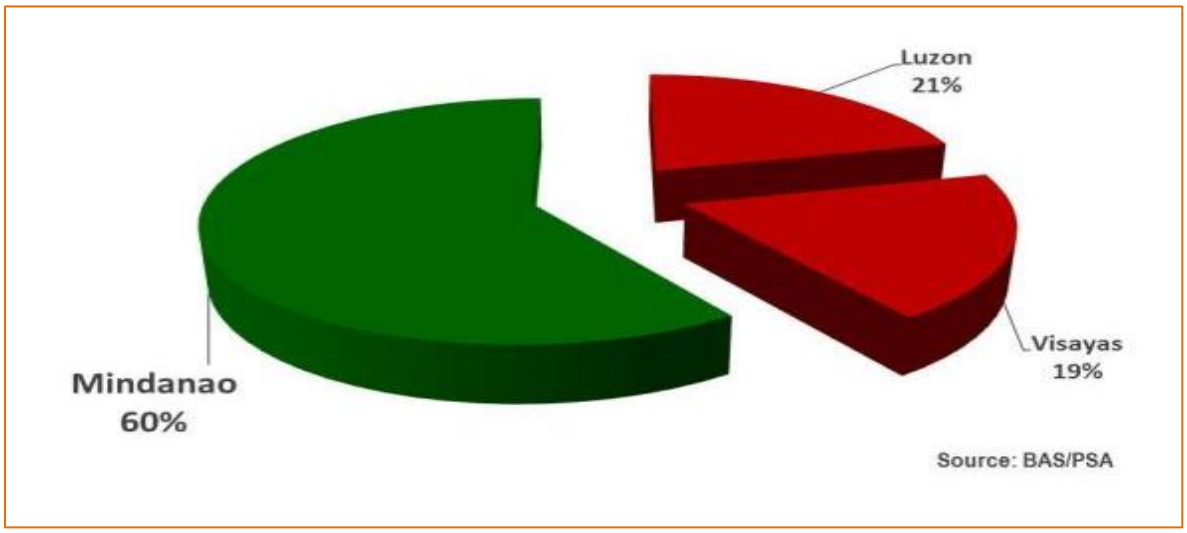
Region	Volume (MT)	Area (Ha)	Yield (MT/ha)	% Share to RP Volume
Philippines	**2,556,986.07**	**183,479.01**	**13.94**	**100%**
Davao Region	**487,433.13**	**20,136.00**	**24.21**	**19.1%**
SOCCSKSARGEN	**356,727.43**	**9,702.00**	**36.77**	**14.0%**
Northern Mindanao	**295,655.65**	**13,076.00**	**22.61**	**11.6%**
Cagayan Valley	255,377.19	15,792.00	16.17	10.0%
Western Visayas	203,869.72	18,929.00	10.77	8.0%
Eastern Visayas	169,426.82	14,646.80	11.57	6.6%
ARMM	**145,612.72**	**15,173.50**	**9.60**	**5.7%**
Zamboanga Peninsula	**138,878.30**	**8,540.00**	**16.26**	**5.4%**
Central Visayas	123,176.13	12,941.00	9.52	4.8%
Caraga	**101,025.42**	**8,671.43**	**11.65**	**4.0%**
Mimaropa	98,915.44	11,848.71	8.35	3.9%
Calabarzon	77,558.71	17,582.33	4.41	3.0%
Bicol Region	43,196.36	9,514.00	4.54	1.7%
Central Luzon	29,128.29	2,429.00	11.99	1.1%
Ilocos Region	21,451.93	3,144.23	6.82	0.8%
CAR	9,552.81	1,353.00	7.06	0.4%

Source: BAS/PSA

National average yield in 2013 was 13.94 MT per hectare. The top 3 high yielding regions in Philippines are SOCCSKSARGEN (36.77 MT/ha), Davao Region (24.21 MT/ha), and Northern Mindanao (22.61 MT/ha). Except for Caraga and ARMM, regions in Mindanao had higher productivity than the rest of the Philippines. It is possible for farm yields to be from 50 to 80 kilos/bunch with the combination of improved pest control management, use of clean planting materials (tissue-cultured) and appropriate fertilizer application.

Mindanao regions accounted for 60% of the national Cardava production. Cardava comprised about 21.7% of Mindanao overall banana production. In Zamboanga Peninsula and Caraga, Cardava comprised a higher percentage of the banana production while in ARMM, quantity of Cavendish and Cardava production in 2013 was almost of the same level. Davao Region, Northern Mindanao, and SOCCSKSARGEN produced more Cavendish than Cardava in 2013. It would seem that areas with significant number of Cavendish banana plantations had higher yields than areas that were predominantly producing Cardava.

FIGURE 11. PERCENTAGE BREAKDOWN OF BANANA PRODUCTION IN MINDANAO REGIONS BY GENOTYPE, 2013



During the period 2009 to 2013, Cardava production in Northern Mindanao increased by an average of 2.76% per year. Although still small, Cardava production consistently increased from 2009 to 2013. Misamis Occidental had the highest average growth rate at 10.84% followed by Misamis Oriental at 8%. Production in Lanao del Norte and Bukidnon seemed to have reached a plateau during the last 5 years. On the other hand, production from Misamis Occidental increased by an average of 18% per year.

Lanao del Norte was the highest producing province at 153,414 MT accounting for 51% of the total production. Misamis Oriental ranked second with a total production of 70,491.00 MT or 24% of region's production. Misamis Occiental accounted for 16% of the region's production. Bukidnon and Camiguin produced 20,770.00 MT and 4,252.54 MT respectively.

In terms of average yield, Northern Mindanao ranked 3rd with 22.61 MT/ha, which is still quite low compared against the 36.77 MT achieved SOCCSKSARGEN. Lanao del Norte had the highest average yield at 39 MT per hectare. Misamis Occidental had the highest average annual growth rate in yield at 10% followed by Misamis Oriental at 7%. This was attributed to improvements in agronomic practices. Between the period 2009 and 2013, yield in Lanao del Norte and Bukidnon slightly decreased by about 1%. Camiguin had the lowest average yield at less than 5 MT per hectare.

CARAGA

Caraga is also in the process of rehabilitating the Cardava damaged by successive typhoons during the last two years. The region has also been hit by the Panama disease that affected all types of bananas in Mindanao. Land Bank of The Philippines has opened a window designed to help farmers fund the rehabilitation and/or expansion of their production areas.

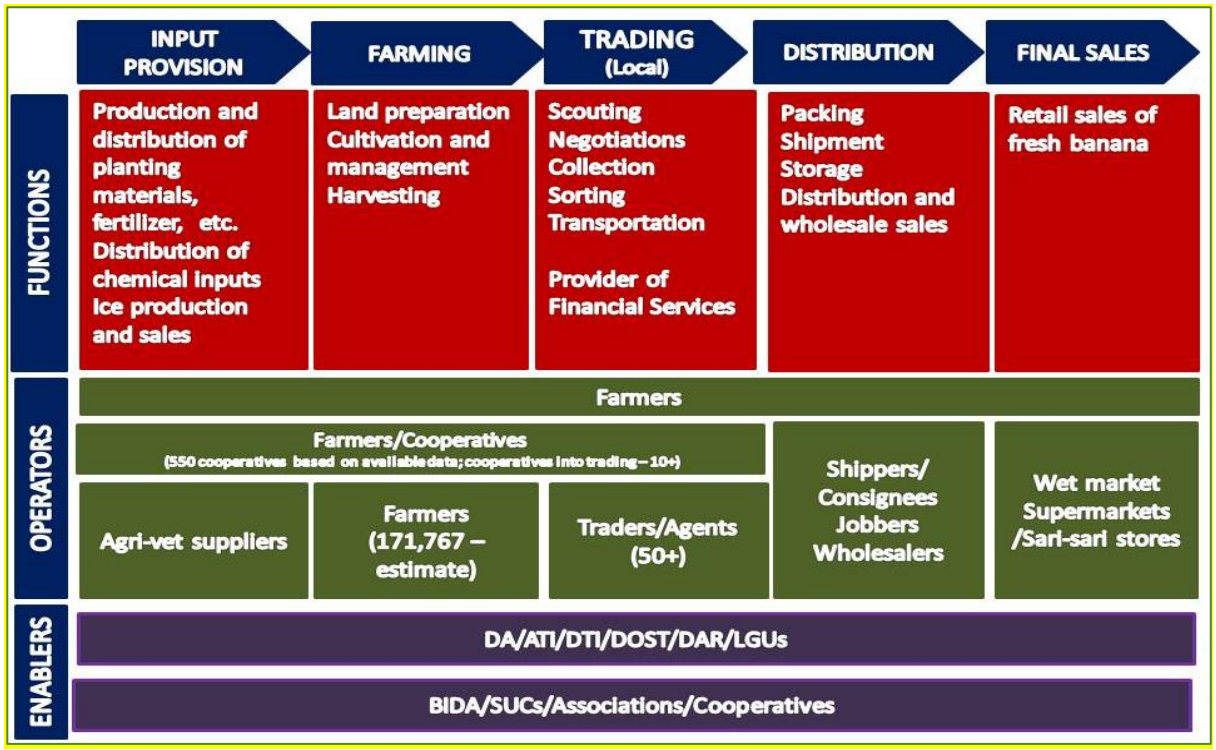
Agusan del Norte is the top producer of cardava in the region followed by Agusan del Sur and Surigao del Sur. Surigao had the highest average yield at 20.30 MT per hectare.

TABLE 61. CARDAVA PRODUCTION TRENDS IN CARAGA, 2009 TO 2013						
Indicators	2009	2010	2011	2012	2013	Annual % Growth Rate
CARAGA						
Volume	109,531.	114,201.	111,910.	108,041.	101,025.	-1.5
Area Planted	9,394.	9,417.	8,800.	9,030.	8,671.	-1.5
Average Yield	11.	12.	12.	11.	11.	-0.0
Agusn del Norte						
Volume	58,564.	54,645.	503	43,486.	39,176.	-6.6
Area Planted	3,315.	3,305.	3,300.	3,275.	2,750.	-3.4
Average Yield	17.	16.	15.	13.	14.	-3.8
Agusan del Sur						
Volume	16,432.	23,784.	29,030.	35,321.	31,249.	18.0
Area Planted	3,570.	3,575.	3,585.	3,545.	2,950.	-3.4
Average Yield	4.	6.	8.	9.	10.	26.0
Surigao del Norte						
Volume	6,787.	7,483.	6,842.	5,204.	6,541.	-0.7
Area Planted	804.	802.	680.	680.	1,786.	24.4
Average Yield	8.	9.	10.	7.	3.	-11.3
Surigao del Sur						
Volume	27,747.	28,287.	25,673.	24,030.	24,059.	-2.6
Area Planted	1,705.	1,735.	1,235.	1,530.	1,185.	-6.1
Average Yield	16.	16.	20.	15.	20.	4.9
Source: PSA/BAS						

VALUE CHAIN MAPPING

FRESH CARDAVA FOR RETAIL MARKET

FIGURE 12. VALUE CHAIN MAP FOR FRESH CARDAVA FOR RETAIL MARKETS



Marketing channels for fresh banana can be further subdivided into the following:

a) Cardava for retail markets in Metro Manila, Cebu, and other key urban centers

Northern Mindanao is the dominant player in this chain along with Davao Region and SOCCSKSARGEN. 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 and jobbers who, in turn, distribute these to wet markets and supermarkets. In the wet markets, the greater percentage goes to the banana cue/turon/ and other Cardava-based snack food vendors.

FIGURE 13. FLOW OF CARDAVA FROM MINDANAO TO KEY URBAN CENTERS

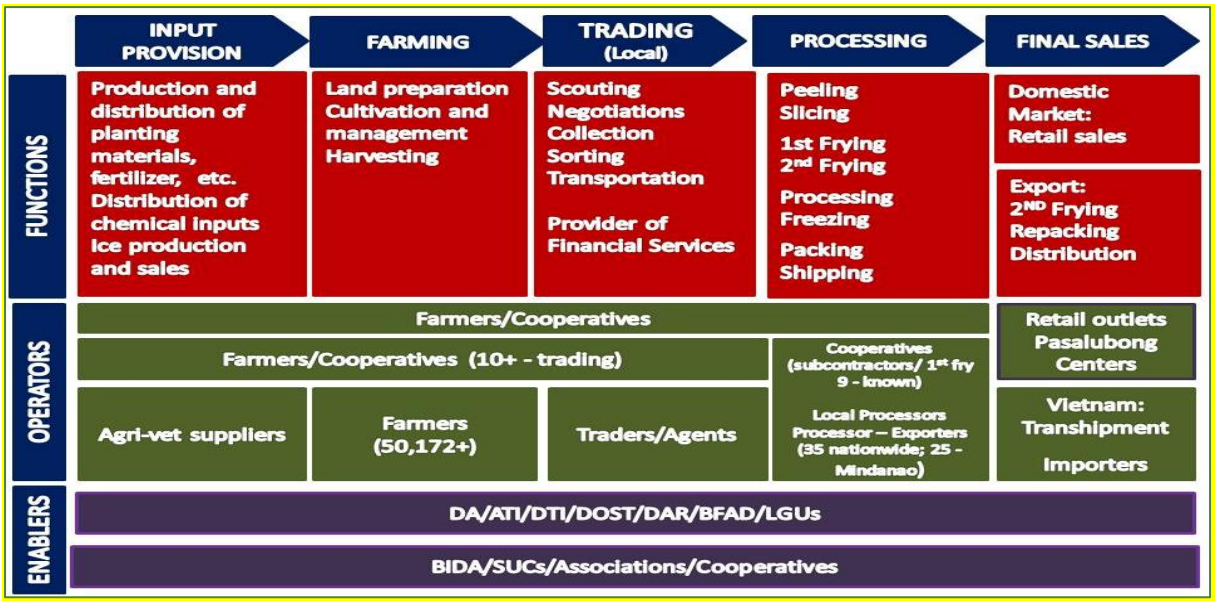
b) Cardava for retail markets within the locality/province

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.

PROCESSED BANANA (BANANA CHIPS/IQF SNACK FOOD)

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.

FIGURE 14. VALUE CHAIN MAP FOR PROCESSED BANANA

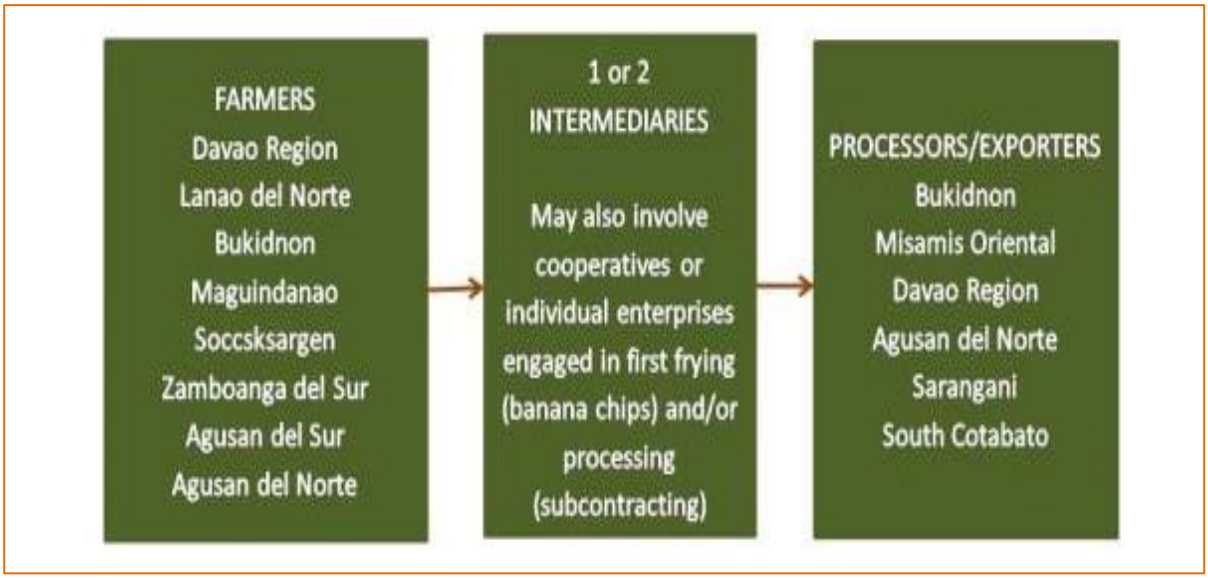


The processed banana supply chains can be categorized as follows:

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.

FIGURE 15. FLOW OF CARDAVA TO PROCESSOR - EXPORTERS

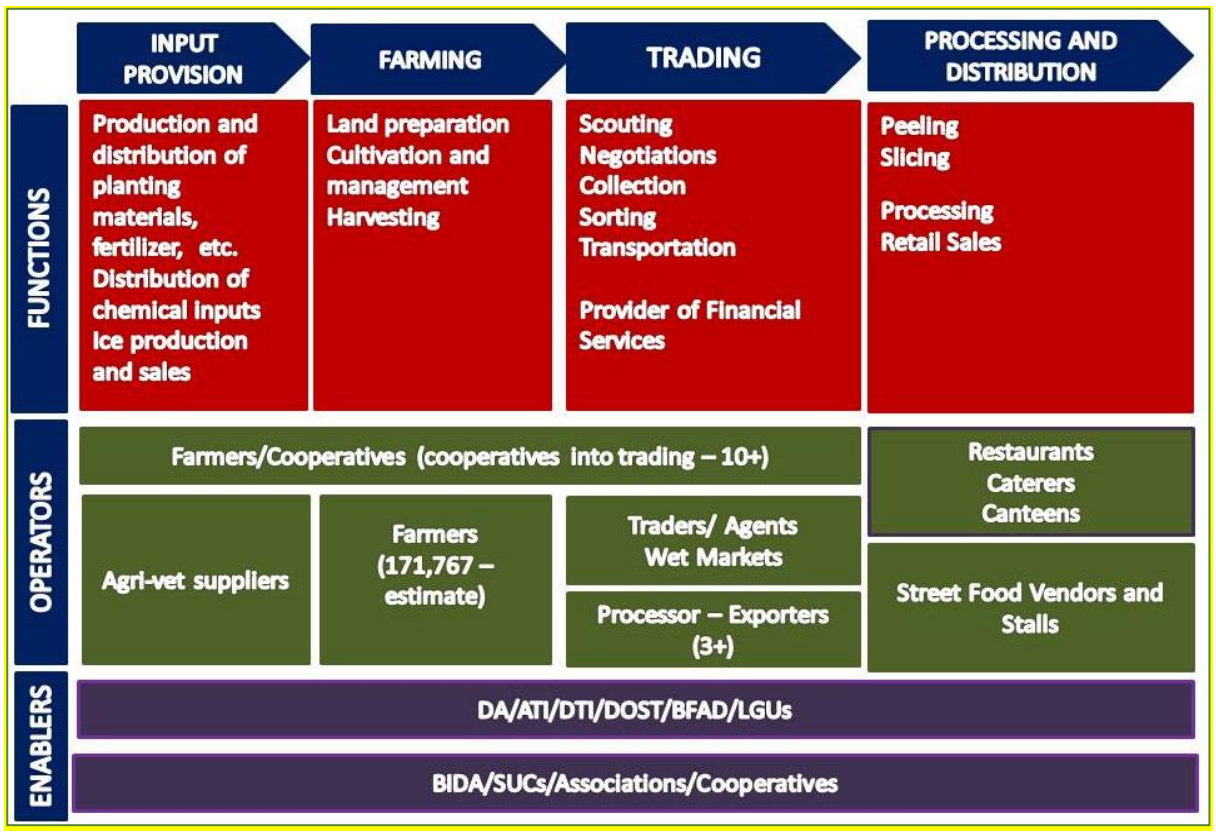


b) Banana Chips for Local Market

Processors selling to the local market get their supply directly from farmers (for agrarian reform cooperatives), local agents, and from the wet market. Volume required by individual processors is relatively low. The banana chips are mainly sold in pasalubong outlets.

CARDAVA SNACK FOOD

FIGURE 16. VALUE CHAIN MAP FOR CARDAVA SNACK FOOD



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. With the all-in procurement system, many of the medium and large scale processors sell the non-process grade banana to vendors at PhP 8-12/kilo (fluctuates depending on procurement price of bananas for chips). Non-process grade are either undersize, or oversize and over 90 days maturity.

As can be seen from the different marketing channels, there is a vibrant trade of Cardava between and among Mindanao regions. Figure 14 shows the flow of products within and outside Mindanao.

FIGURE 17. GEOGRAPHIC FLOW OF CARDAVA

KEY PLAYERS AND FUNCTIONS

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 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 Region 10, only Bukidnon has a functioning tissue culture laboratory. In recent years, an increasing number of farmers are planting the Giant Cardava..

Farming

There are basically two types of Cardava production system in Mindanao. The first one is the backyard production, which is the more prevalent system in Mindanao. Under this system, Cardava banana is grown in backyards of rural households and in small farms. Size of farms under this system ranges from 0.25 to 1 hectare. Farmers generally use suckers or culms from their own farms.

The second system employed by farmers is the intercropping or mix crop production. In this system, Cardava banana can be a primary or secondary crop or planted together with dessert bananas. Farms classified under this system range from 1 to 3 hectares.

Good Agricultural Practices (GAP) is not widely adopted. There are Cardava farmers though who are already applying GAP in their farms. The first and only GAP certified Cardava farm is located in Sulop – Davao del Sur. It is owned and managed by Cardava Integrated Inland Farming, a cooperative composed of agrarian reform beneficiaries.

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.

Current average bunch weight is about 20 kilograms except in Tubod – Lanao del Norte, 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.

"Bugtok" disease, which is manifested by the discoloration and hardening of the fruit even when ripe, 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.

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.

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.

Traders in Northern Mindanao usually carry other banana varieties such as Latundan and Lakatan to fill up a 10 footer container van. From the collection point to the port, the bananas are transported in a truck. Loaded bunches are closely packed and layered with green banana leaves or sliced banana trunks to prevent shaking and bruises and to protect from heat and rain during transport.

Consignee: They source from several assemblers from different regions. The shipper and consignee are the key players in the supply chain for they handle the biggest volume of bananas. The greatest risk occurs during sea transport for 2 days because of high transit temperatures and the bulk-loading practice. This can result in over ripening since a week has already elapsed since harvesting.

Jobbers/Wholesalers: distribute the bananas to retailers. Manila-based jobbers and wholesalers generally get bulk of supply from consignees. For wholesalers in the region, they get from local traders and directly from farmers.-

Processing

Processors cum Exporters

TABLE 62. BANANA CHIPS EXPORTERS IN MINDANAO
Note: This is not a complete list.

Region	Company
Zamboanga Peninsula	Alviar's Banana Crackers
Northern Mindanao	B-G Fruits and Nuts Manufacturing Corporation
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

TABLE 62. BANANA CHIPS EXPORTERS IN MINDANAO Note: This is not a complete list.	
Region	Company
	See International
	Snap Snax Ventures, Inc.
	Tagum Commodities Corporation/El Coco
	Tropical Synergy
SOCCSKSARGEN	Greenville Agro Corporation
	South Cotabato Agri, Inc.
Caraga	Celebes Agricultural Corporation
	BGC Worldwide/Basic Fruits Corporation

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.

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 has already started selling to the United States, Middle East and Canada. The company sources some of its raw materials and semi-processed products from Bukidnon. 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. Profood has also launched its IQF Cardava products.

In line with the growing demand for natural food products, exporters are increasingly shifting to using bananas grown with minimal chemical inputs. Celebes Agricultural Corporation, a company based in Butuan City, specializes in the production of organic banana chips. Some companies like Koki Foods International went for the Kosher certification to differentiate their products. Four Seasons promotes its banana chips and snack food as all natural food products.

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. Table 13 presents a list of some of the companies engaged in first frying and production of semi-processed/intermediate Cardava products.

TABLE 63. FIRST FRY FACILITIES AND SUBCONTRACTORS IN MINDANAO
Note: This is not a complete list.

Region	Company
Northern Mindanao	NM Enterprises - Supplies to NM Enterprises - Also produces banana chips and other Cardava based snack food for local market
Davao Region	Kooperatiba sa Nagkahiusang Mag-uuma sa San Isidro
	UFFAP-IMCOOP
	SITARBA Multi-Purpose Cooperative
	Mampising CARP Beneficiaries Cooperative
	Kabayugan Magamay Atipolo Solar Power Association (KAMASPA)
	Mayo ARB Multi-Purpose Cooperative
SOCCSKSARGEN	Magpet Agro Industrial Resources Cooperative
	Pigcawayan Fruits Association (newly established facility)

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.

FIGURE 18. CARDAVA SNACK FOOD INDUSTRY

NATURE OF INTERFIRM RELATIONSHIP

Horizontal Relationships

More farmers especially in Davao Region and SOCCSKSARGEN are taking on more functions in the chain such as collective marketing and training services. The more established cooperatives have ventured into first frying operations. Agrarian reform communities are generally into the production of banana chips for the local market.

Cooperatives linked to lead firms (e.g., processors, assemblers) appear to be more successful in scaling up their operations than those who are trying to penetrate on their own the banana chips retail market. Success in fresh banana collective marketing and first fry operation hinges on capacity to consolidate large volume of bananas and access to capital and transport facilities. Linkages with lead firms and secure markets also jumpstarted the upgrading process.

Cooperation and collaboration among exporters is via the banana chips exporters association which is based in Davao. The association holds a banana congress annually. Most of the activities of the association are geared towards improvement of supply base, tariff and market access issues, and market development.

Vertical Relationship and Supply Chain Governance

The shortage of Cardava and the entry of Manila buyers after a typhoon hit Luzon sometime in 2007 served as an impetus for Davao-based processors and traders to search for alternative options to ensure that they are able to get their Cardava supply requirements at a price that still allowed them to operate at a profit. To date, there is now openness among processors to develop longer-term and more collaborative relationships with farmers. The big processors are

incrementally integrating backwards into farming communities especially those who can offer them specific advantages such as big volume, organic/natural farming, and consistent quality. Banana chips companies like See's International, Celebes, G and L, and Four Season have gradually shifted their approach to supply chain development from an exclusively price offer and compliance point of view to a capacity building perspective with a focus on improving productivity, efficiency, and quality. See's International and Celebes seem to be sourcing from Malitbog and their focus is primarily on the production of organically grown banana. Sagrex International is working with communities in Bukidnon interested to expand their production of the giant Saba.

PRICE AND COST STRUCTURE

Income and Profit

TABLE 64. INDICATIVE COSTS AND RETURN FOR 1 HECTARE OF CARDAVA BANANA
Assumption: 625 hills/hectare
High input farm: a greater percentage of the inputs – organic inputs

	Amount (in PhP)	
Items	**Low Input – Low Yield Farm**	**High Input – High Yield Farm**
Farm Establishment		
Planting Materials	1,000	10,125
Fertilizer	1,000	6,000
Pest Control		5,000
Weed control	1,000	4,000
Land Preparation/Planting/Labor	5,000	8,000
Total Establishment Cost	**8,000**	**33,125**
Annual Production Cost		
Bagging	2,500	10,000.00
Fertilizer	1,000	4,000.00
Weed control		2,000.00
Pest control		2,000.00
Labor: Farm Maintenance	5,000	12,500.00
Harvesting	5,000	20,000.00
Transportation	5,000	20,000.00
Establishment cost	800	3,312.25
Total Production Cost	**19,300**	**73,812**
Yield (in kilograms)	**10,000 kilograms**	**40,000 kilograms**
Unit Cost/kg	**1.93**	**1.85**
Income		
Unit Price/kg	5.00	5.00
Gross Income	50,000	200,000
Net Income	30,700	126,188

TABLE 64. INDICATIVE COSTS AND RETURN FOR 1 HECTARE OF CARDAVA BANANA Assumption: 625 hills/hectare High input farm: a greater percentage of the inputs – organic inputs		
Profit Margin	61%	63%
Input/output Ration	2.59	2.71
Source: KII/FGD		

The high input farms used as basis in the above costing use more of organic inputs than chemical inputs. These farms invest in farm maintenance and, more or less, practices are aligned with GAP. Yields of these farms range from 40 MT to 60 MT per hectare. Harvest is done usually twice a week. On the other hand, the low-input is the typical farm where labor and input investments are very minimal.

For low input farms, annual net income would only be about PhP 30,000 to PhP 35,000. Yield is generally between 8 to 10 tons per hectare. In many cases, farmers do not buy planting materials and use suckers from their own farm or from neighbors.

For both types of farms though, transportation cost comprise a big chunk of the expenses. The cost indicated is for roads that are relatively good --- gravel roads, not so many potholes, and not so muddy.

Table 14 also shows that the output: input ratio is higher for high input farms compared to the low maintenance farms. This demonstrates better profitability and efficiency in enterprise management amongst the high input farms as compared to the low input farms. Evidently, there is good scope to increase income of farmers by increasing varietal performance and improving production practices through appropriate use of inputs as well as use of clean planting materials.

Relative Financial Position of Players

Fresh Banana for Manila Market

FIGURE 19. RELATIVE FINANCIAL POSITION OF VC PLAYERS: FRESH CARDAVA TO MANILA MARKET

The consolidator incurs the highest percentage of added cost which is comprised mainly of transportation, ice, and labor costs. Given the perishability of Cardava, consolidators face the highest risk. Main concern of consolidators is to be able to move the products as fast as possible from the farm to the consignee in Manila. While consolidator gets the highest percentage share of the profit, it is not proportionate to his/her percentage share of the added cost. To improve their profitability, consolidators aim for high volume and send a mix of Lakatan, Latundan, and Cardava per shipment (at the minimum 20 footer container).

Farming accounts for 12% of the production and distribution costs. Percentage share to profit is 43%. Although farmers generate the highest profit, the amount or absolute value that actually accrues to an individual farmer is small for the following reasons:

a) Volume is spread thinly among the farmers: there are about 50 consolidators' vis-à-vis more than 50,000 Cardava farmers in Mindanao. A consolidator typically sources from 5 to 10 traders. Each trader sources fresh Cardava from hundreds of farmers.
b) Smallness of operations; lack of economies of scale
c) High post-harvest losses estimated at 20% to 40% which erodes profit margin
d) Unstable yields

TABLE 65. RELATIVE FINANCIAL POSITION OF VC PLAYERS: 1 KILO OF FRESH BANANA

Assumptions:
Harvesting and transportation costs shouldered by trader
Based on Northern Mindanao costing

Player	Product	Costs			Profit			Margins	
		Total Unit Cost	Added Unit Cost	% Added Unit Cost	Unit Price	Unit Profit	% Profit	Unit Margin	% to Price
Farmer	Fresh	1.00	1.00	12%	4.00	3.00	46%	4.00	27%
Trader	Fresh	5.50	1.50	18%	7.00	1.50	23%	3.00	20%
Consolidator	Fresh	13.00	6.00	71%	15.00	2.00	31%	8.00	53%
Total			8.50			6.50		15.00	

Source: VCA Mindanao

TABLE 66. RELATIVE FINANCIAL POSITION OF VC PLAYERS: 1 KILO OF BANANA CHIPS

Assumption:
4 kilos of fresh Cardava needed to produce 1 kilo of banana chips
Based on Davao Region costing

Player	Product	Costs			Profit			Margins	
		Total Unit Cost	Added Unit Cost	% Added Unit Cost	Unit Price	Unit Profit	% Profit	Unit Margin	% to Price
Farmer	Fresh	7.60	7.60	19%	22.00	14.40	47%	22.00	31%

TABLE 66. RELATIVE FINANCIAL POSITION OF VC PLAYERS: 1 KILO OF BANANA CHIPS

Assumption:
4 kilos of fresh Cardava needed to produce 1 kilo of banana chips
Based on Davao Region costing

Player	Product	Costs			Profit			Margins	
		Total Unit Cost	Added Unit Cost	% Added Unit Cost	Unit Price	Unit Profit	% Profit	Unit Margin	% to Price
Trader	Fresh	27.00	5.00	13%	32.00	5.00	16%	10.00	14%
First Fry	Chips (1st fry)	50.00	8.00	45%	53.00	3.00	10%	21.00	30%
Exporter	Chips	62.00	9.00	23%	70.00	8.00	26%	17.00	24%
Total			9.60	100%		30.40		70.00	

Source: KII

A kilogram of banana chips requires more or less 4 kilograms of fresh banana. From the indicative FOB price of PhP 70/kilo of chips, the first fryers and exporters contribute the highest added cost at 45% and 25% respectively. First fryers contribute the biggest share of the production cost as labor is more intensive, and more oil is consumed in first frying than in 2nd frying done by processors. Traders, on the other hand, contribute 13% of the added cost which is comprised primarily of transportation and hauling costs. Farming accounts for 19% of the added cost.

Gross profit per kilo of chips is about PhP 30.40. Of the estimated PhP 30.40 profit generated per kilo of chips, farmers have the highest percentage share at 47% followed by exporters at 26%. Profit that accrues to first fryers is only about PhP 3 to 5 per kilo. For a first frying facility to be financially viable, it has to have the economies of scale, access to coconut oil and sugar at wholesale prices, and efficient production and procurement system. Most exporters though do their own first frying.

Markets and Market Trends

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 2.

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 .

TABLE 67. 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: PNS		

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.

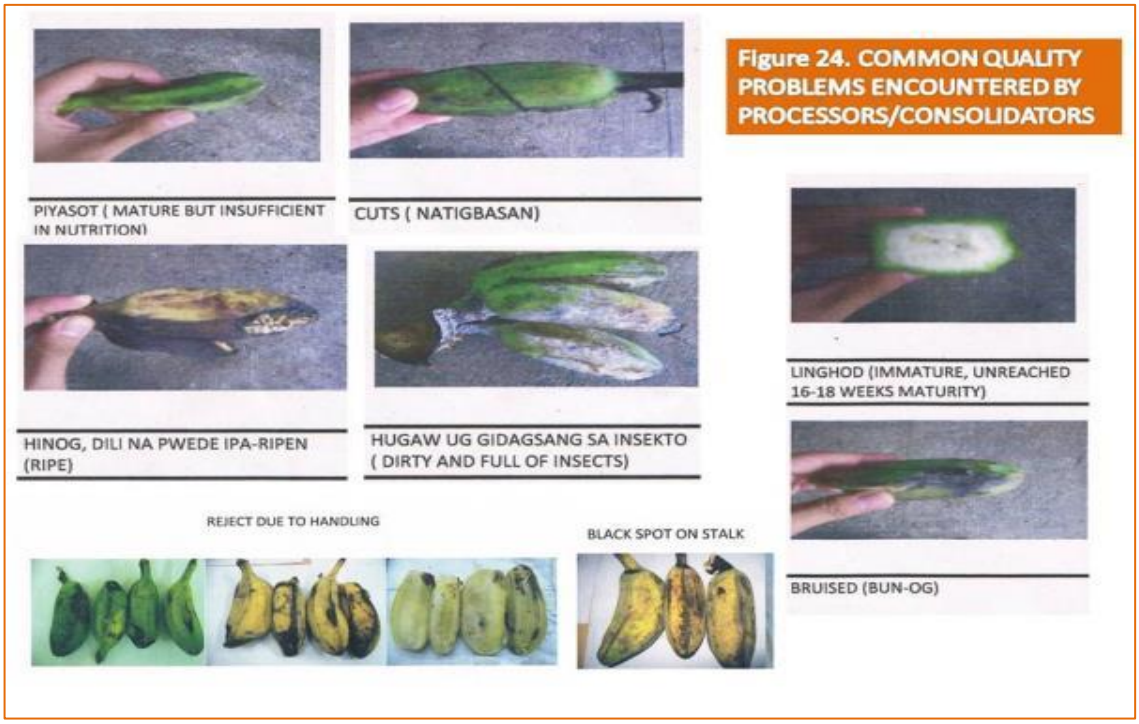
Traders generally do not provide premium prices for Extra Class and Class 1 bananas but they do not accept bananas that do not meet the minimum requirements. In the retail market, prices are oftentimes aligned to the classification system.

Total available supply of Cardava in Mindanao is generally just about 60% to 70% of its total production. Postharvest losses are estimated to be about 30% to 40% of total production. About 32% of available supply (production less postharvest losses/feeds) is utilized for banana chips and other processed products. The largest bulk goes to the processing companies geared for the export market. Industry players estimate that processing companies are able to source an average of 350,000 MT of Cardava per year. Total annual requirement of processors/exporters in Mindanao is estimated to be about 450,000 MT. The processors selling to the local market consume an aggregate of 15 to 20 MT of Cardava per year.

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.

FIGURE 20. COMMON QUALITY PROBLEMS ENCOUNTERED BY PROCESSORS/CONSOLIDATORS



In the 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.

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.).

About 62% of total available supply or an average of 600,000 to 800,000 MT are sold in the domestic market. Mindanao banana (all types) production for the domestic market goes to Cebu and Metro-Manila largely through ports in Cagayan de Oro, Agusan, Ozamis, Iligan, and Surigao. Based on 2009 data, about 73% of the banana shipped out of Mindanao seaports originated from the port in Cagayan de Oro, an additional 15% came from the port in Nasipit, Agusan, while about 4% were loaded in Sasa Wharf in Davao City. One of the advantages of Northern Mindanao aside from quality is that it takes only 30 hours for shipment to reach Manila from Cagayan de Oro. It takes 56 hours to reach Manila from General Santos and 48 hours from Davao.

TABLE 68. BANANA SHIPMENTS FROM MINDANAO, 2009			
Port of Origin	Quantity (in MT)	% Share to National Banana Shipment	Destinations
Iligan City	1,233.05	0.49	Cebu, Siquijor
Ozamis City	4,959.32	1.99	Cebu, Manila
Cagayan de Oro City	182,381.23	73.04	Cebu, Manila, Iloilo, Tagbilaran, Bacolod, Butuan
Sasa Wharf, Davao City	10,229.81	4.10	Manila, Cebu, Iloilo, Zamboanga
TEFASCO, Davao City	1,489.47	0.60	Manila
Makar Wharf, General Santos City	673.54	0.26	Cebu
Nasipit, Agusan del Norte	39,430.14	15.79	Manila, Cebu, Iloilo, Bacolod, Bohol
Surigao del Norte	4,251	1.70	Southern Leyte

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.

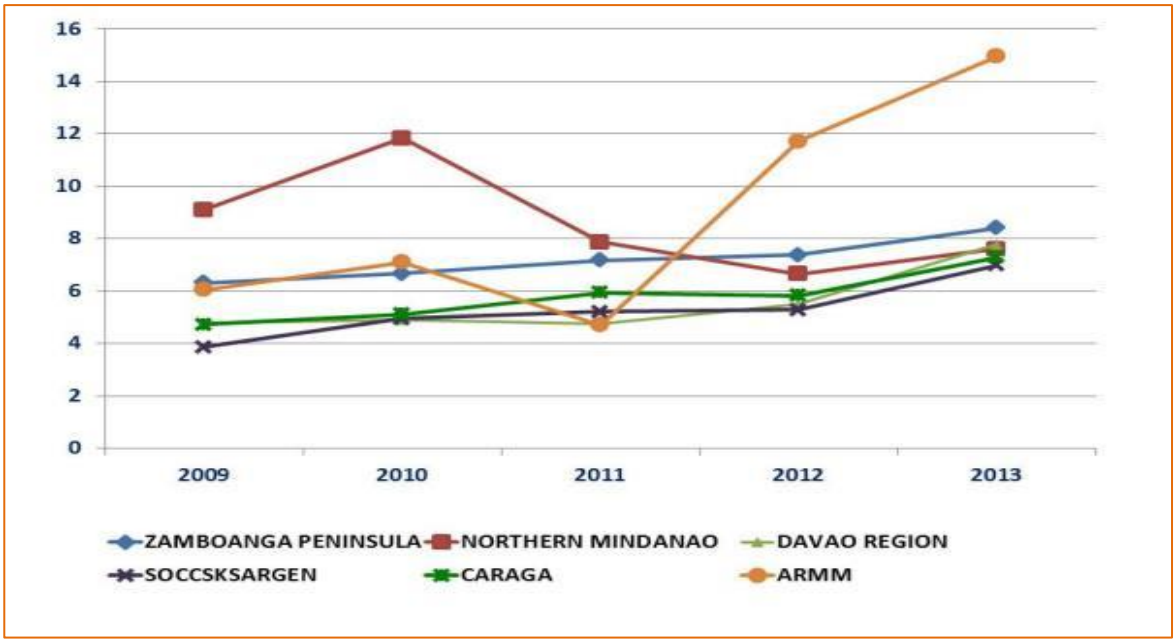
Cardava-based dishes and snack food are also mainstays in the menu of many of the hotels, restaurants, and caterers. Cardava bananas sold in supermarkets are usually the Extra Class and Class I. In Metro Manila supermarkets, a piece of Cardava banana costs from PhP 3 – 5 per piece of PhP 30/kilo.

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 are usually the students.

PRICE TRENDS

Domestic Market

FIGURE 21. AVERAGE FARM GATE PRICE OF CARDAVA IN MINDANAO REGIONS, 2009 TO 2013



Based on interviews, farm gate price of Cardava fluctuates between PhP 4 to 7 per kilo. At the time of interview, the farm gate price hovered between PhP 4.00 to 5.00 even in Maguindanao. Based on BAS data, average price in Maguindanao was at PhP 17.78. Unfortunately, farmers interviewed were not aware of this significantly high price. The highest price enjoyed by farmers in Mindanao was about PhP 10 to 12 per kilo sometime during the end of 2013 to March 2014. The farm gate price of Cardava for local consumption is primarily based on supply and demand. This is usually determined by the consignees. As bananas ripen, the price becomes lower.

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.

TABLE 69. FARM GATE PRICE OF CARDAVA IN MINDANAO REGIONS, 2009 TO 2013

Region	Price per Kilo (PhP/kg)					Annual Growth Rate
	2009	2010	2011	2012	2013	
Philippines	6.19	6.87	6.51	7.01	8.35	6.98%

Mindanao	5.81	6.76	5.94	7.06	8.84	10.44%
Zamboanga Peninsula	6.32	6.66	7.17	7.37	8.41	6.61%
Northern Mindanao	9.1	11.83	7.87	6.64	7.61	-3.27%
Davao Region	4.78	4.89	4.76	5.51	7.77	12.51%
Soccsksargen	3.86	4.94	5.2	5.29	6.99	16.22%
Caraga	4.72	5.12	5.94	5.83	7.28	10.85%
ARMM	6.05	7.1	4.7	11.71	14.95	29.42%
Source: BAS/PSA						

SUPPORT SERVICE

Financial Services

Demand side barriers that limit the access of smallholders to financial services can be summarized as follows:

a) Weak producer organizations/ High risk aversion among farmer groups: many of financial products are anchored on cooperatives/associations
b) Dominance of spot transactions which make it impossible for smallholders to present marketing agreement as collateral (e.g., for LBP-DA Food Supply Chain Program)
c) Low financial literacy and financial management skills
d) Low productivity, margins, and cash flow for servicing loans

Non-Financial Services

Support services are available to assist processors in the different areas of their businesses. The Department of Trade and Industry (DTI) through the Product Development and Design Center of the Philippines (PDDCP) offers package and label design services. DTI has also been working with processors in the development of new variants of the banana chips. DTI, DA, and local government units have been active in supporting the participation of enterprises and farmer groups in domestic and international trade fairs. Likewise, the Department of Science and Technology (DOST) and DTI provide training on Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP).

ENABLING ENVIRONMENT

Formal Rules, Regulations, and Policies

Key policies that are relevant to the banana chips industry are:

1. Policy and implementing guidelines for food safety are in place but implementation has been constrained by:

    - Lack of providers to provide assistance and assess GAP/GMP compliance

- Too technical presentation creating immediate resistance among farmers and enterprises
- Farmers and enterprises lack awareness and knowledge on its benefits and scopes
- Stakeholders lack capability to comply with market requirements in terms of quality standards, competitive prices and food safety
- LGU extension officers generally not equipped and trained to enforce food safety regulations
- Lack of harmonization between private and public GAP/GMP/HACCP audit requirements.

Implementation of food safety policies has to be addressed alongside policy harmonization and capability building.

2. For more than a decade, most government efforts to expand access to agricultural credit have been channelled through the Agricultural Competitiveness Enhancement Fund (ACEF) and Agro-Industry Modernization Credit Finance Program (AMCFP). Outreach, to date; of the two programs have been limited. The Agri-Agra Reform Credit Act of 2009 (Republic Act 10000) signed in February 2010 has not also been effective in facilitating smallholders' access to financial services. There is a need for government to put in place a sound risk management framework to address the issues that are at the core of private sector reluctance to lend and farmers' hesitation to avail of formal financial services.

TABLE 70. E-VSA PRIORITIZATION RESULTS AND RANKINGS FOR BANANA

MUNICIPALITY	Number of Farmers	Volume of Production	Area Planted	Poverty Incidence	OLD_COMPOSITE_INDEX	OLD_RANK	NEW_COMPOSITE_INDEX	NEW_RANK
BUENAVISTA	1011	12781.53	896.95	30.8	0.4648	7	0.70833	1
JABONGA	760	0	675	48.1	0.4215	11	0.47692	2
LAS NIEVES	270	2674.44	115	59.4	0.4929	6	0.38019	3
SANTIAGO	320	642	307	40.5	0.4122	12	0.34782	4
CARMEN	111	0	147	37.7	0.5127	5	0.33184	5
MAGALLANES	3	2	5	25.9	0.5704	2	0.30843	6
TUBAY	0	0	0	42.7	0.5366	3	0.30424	7
BUTUAN CITY	0	0	0	0	0.6022	1	0.3011	8
NASIPIT	30	7	10	20.7	0.5156	4	0.2805	9
CABADBARAN	126	7	44	24.9	0.4484	8	0.26751	10
KITCHARAO	120	0	44	40	0.4226	10	0.26665	11
REMEDIOS T. ROMUALDEZ	30	7	10	20.7	0.4444	9	0.2449	12

MAP 19. E-VSA MAP FOR BANANA

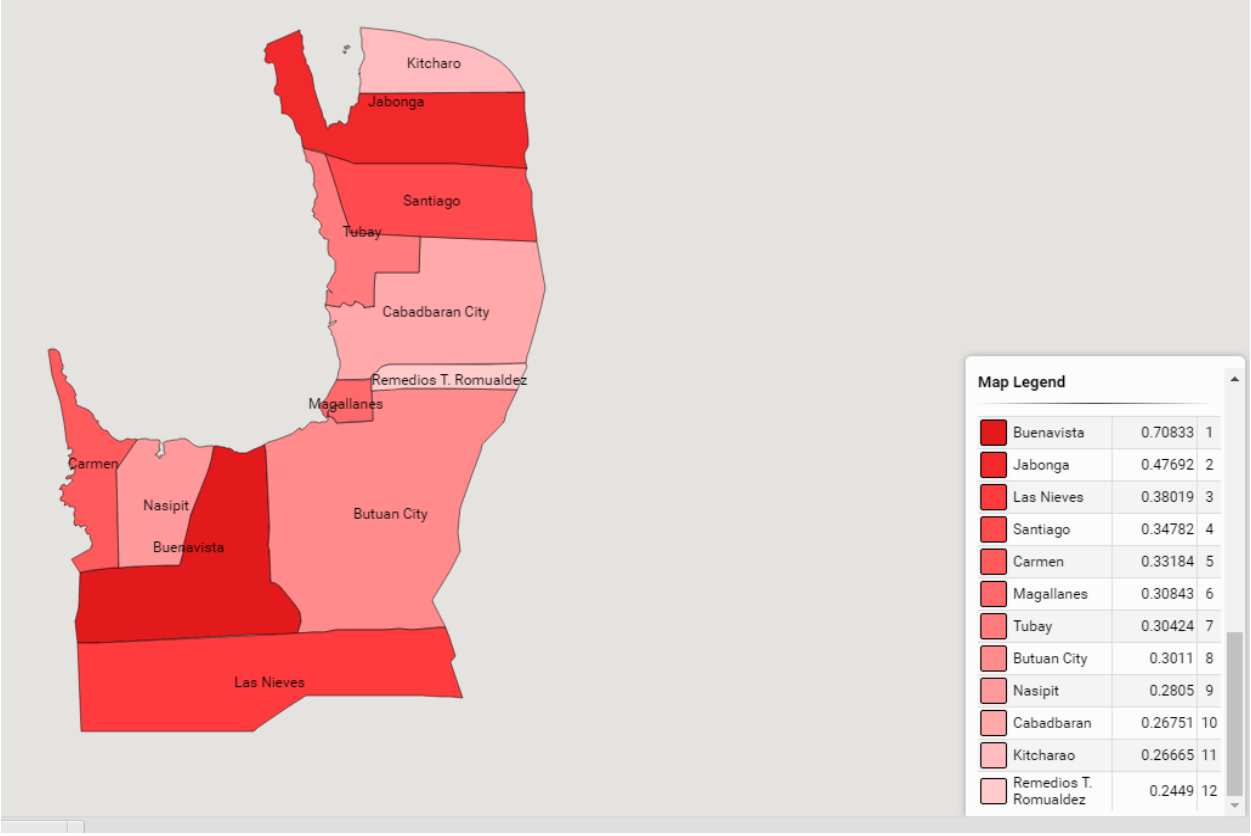


TABLE 71. GAPS AND PROPOSED INTERVENTION FOR BANANA

Value Chain Segment	Key Gap/ Constraint in VC Development in Butuan City	Brief Description of Potential Intervention	Target Result/ Outcome	Target Areas to be covered	Proposed Lead Player	Estimated Project Cost (000)	Risk & Risk Management/	Rank
Input Supply	Limited supply of good quality disease free planting materials	Setting up of community based nurseries to strengthen local capacity to commercially produce and distribute disease free planting materials of local cultivars. This will be done thru clusters.	Each targeted banana producing clustered barangays has now the capacity to ensure the supply of banana planting materials to	Cluster 1 Amparo Bitan-agan Nongnong MJ. Santos Dulag Mla. De Bugabus San Mateo Tungao Cluster 2 Taguibo Pianing Anticala Cluster 3 Don Francisco Bilay Maibu Sumile Maguinda Salvacion Aupagan Cluster 4 Basag Taligaman Bugsukan De Oro	Butuan City Federation of Banana Growers Inc.	**1,000**	A mechanism will be established to govern the production of banana planting materials. This is to regulate the production and distribution of the planting materials.	1

	High cost of chemical inputs	Promotion and development of organic banana production program	Shift to organic banana farming	Same 4 banana clusters	Butuan City Federation of Banana Growers Inc.		To mitigate the risk of low production which affect farmers income, shift to organic banana farming is recommended to be gradual	
	Limited availability for commercial distribution of organic fertilizer and inputs	Establishment of community based plants for organic technological inputs	Proximity of supply to the farmers and its availability and affordability is ensured	Tungao, Kinamlutan, Pinamanculan and Taguibo	Organic practitioners in Butuan City assisted by DA/OCA		Agreement shall be forged among these producers to settle issues on pricing, volume and distribution	
Production	Old age practice of traditional growing of cardava with minimal investments on farm maintenance Low use of fertilizers among smallholders due to lack of understanding on costs and benefits of proper and efficient use of fertilizers	Provision of leaflets, brochures and bulletins on banana production as a profitable enterprise	Farmers practices, farm testimonials will open up farmers perspectives Promotion of banana farming as a profitable business enterprise	4 Banana Clusters	Office of the City Agriculturist	**75**	Testimonials from farmers shall be properly documented and backed up by an actual banana farm	2

	resulting partly to low yield							
	Farmers practices on banana production are not aligned to the principles of good agricultural practices	Packaging and development of banana production protocol based on good agricultural practices	Farmers are now guided in their farming systems	4 Banana Clusters	Butuan City Federation of Banana Growers Inc. and the Office of the City Agriculturist		Developing the local banana production protocol should be consistent with PhilGaps or other certified GAPs	
	Lack of other infrastructures that would ensure sustainable operations amidst adverse weather conditions	Provision of water system that would ensure sustainable supply of irrigation and potable water supply for the farms and the farmers	Increased yield and enhanced quality of banana	Aupagan	Aupagan Banana Growers	**3,500**	To be sustainable, proposed water system project must be driven by alternative energy sources such as micro hydro and solar power	
Assembly	No established local commodity champion to assemble and consolidate banana products to spur the growth and development of the industry	Provision of a warehousing facility, hauling facility and the corresponding capitalization to consolidate and assemble banana products	Increased leverage to demand better prices, established mechanism to ensure quality standards and adequacy of volume	4 Banana Clusters	Cluster 1 Bitan-agan PG Cluster 2 Pianing PG Cluster 3 Bilay PG Cluster 4 Bugsukan PG	**50**	Local commodity champions shall be by clusters due to the geographical distribution of banana farmers in Butuan City	**1**
	Weak coordination and collaboration among the different stakeholders	Establishment of a cooperation mechanism between and among the barangay based banana growers	Vertical and horizontal relationship established between the banana stakeholders	4 Banana Clusters	Butuan City Federation of Banana Growers Inc. Office of		The cooperation mechanism should be based on sound business principles and etiquettes	

	resulting to the slow promotion and development of the local banana industry	association and the Butuan City Banana Industry Development Council			the City Agriculturist			
	Weak capacity among farmers to organize themselves into structured groups	Strengthening of the barangay based banana growers association which would be the core of the banana commodity development council	Institutionalization of the Butuan City Banana Industry Council				Operating and management principles of the Butuan City Banana Industry Council should be formally agreed by all stakeholders to prevent it from being politicized	
	Low capacity of the banana sector to chart and implement its development plan	Professionalization of the Butuan City Banana Industry Council	Increased efficiency and effectiveness of the local banana sector in the development planning process				The planning process of developing the local banana industry should be consistent with elements of governance to generate trust and confidence from the farmers	
Transformation	Lack of capacity to add value to the banana products	Provision of first frying facilities	Increasing/adding value to rubber products Improves resilience of	Pianing	Pianing Farmers Assn.		A joint venture enterprise between investor and the Butuan City	5

			farmers to price fluctuations				Federation of Banana Growers Inc. on the presumption that 4 MT of fresh bananas is produced sustainably on time	
	no traceability and authenticity mechanism	Development of a local product certification program that includes traceability and authenticity of the products	Product specifications required by market are met to include quality and safety	All banana production areas in the clusters	Office of the City Agriculturist and the Butuan City Federation of Banana Growers Inc.	**50**	Banana farmers/associations may find it very difficult to adapt to this program and may opt for domestic market which does not ensure sustainability for the industry and low income for the farmers in the long run. Provision of incentives/premiums on adopters would be highly considered.	1
	Poor farm tomarket road resulting to increased costs of marketing and transaction costs	Improvement through concreting of the existing farm to market road serving the production areas	Increased movement of goods to intended market , Reduced transport time and costs of products	Bilay FMR Bitan-agan FMR Aupagan FMR Salvacion FMR Basag FMR Anticala FMR Taligaman FMR	City Government of Butuan and DA RFO-13	**200,000**	The capacity of the City Govt. of Butuan to submit proposals/fs on time can be enhanced if it engages external writers.	1

Marketing	Absence of long term contracts, farmers governed by spot transactions resulting to volatility of price	Facilitate market matching, study missions to secure longer term marketing contracts/arrangements	Insulation of banana farmers from price fluctuations and manipulations	All production areas in the clusters	Butuan City Federation of Banana Growers	**25**	Preconditioned to the forging of marketing contracts is the assurance and commitments of the farmers/farmers' association in the clusters	1
	Insufficiency of production volume to warrant the engagement of institutional buyers/firms	Institutionalization of the banana production protocol to increase yield and secure adequate volume requirement	Enhanced capacity to meet the market demand in terms of volume requirement				Monitoring and evaluation tools and mechanisms are properly emplaced to ensure that the required volume are effectively met	1
Support Services								
Financial	Low capacity of the proponent group to put up the required counterpart funds and enhanced its financial conditions	Provision of non-financial services to the identified producer group to strengthen financial position	Sustainability plan developed with farmers association and its members committed to put up additional equities to operate the identified enterprises	All POs in the clustered banana production areas	Development services providers	**50**	To increase the adoption rate of the farmer-members of the barangay based associations, handholding of the farmers associations by extension workers are to be recommended.	2

Extension	The context of the local extension delivery system is not oriented to promoting and developing banana as one of the economic drivers	Improving the delivery of extension works towards the promotion and development of banana	The promotion and development of the local banana industry would drive agricultural transformation	Butuan City	Office of the City Agriculturis t		The promotion and development of the local extension delivery system should always consider that agricultural transformation must always be private led and that the function of the government is to provide an enabling environment	1
Enabling Environment	The lack of understanding resulting to the lack of support to the initiatives towards the promotion of the local banana industry	Development of a system where the Butuan City Commodity Investment Plan is automatically enrolled in the Butuan City Investment Development Plan and allocated yearly budget allocations	Increased technical, financial and legislative support to the Office of the City Agriculturist to undertake the promotion and development of the local banana industry	Butuan City	City Developme nt Council		Fund sourcing mechanism must be adequately established in the SP Resolution approving the Butuan City Investment Plan	1

4. Coconut Commodity Value Chain Development

OVERVIEW OF THE INDUSTRY

Product Description

Coconut, as a commercial crop is one of the major sectors of the Philippine Agriculture, others being rice, corn, and sugar. Coconut comprises almost 30% of the total agricultural land of the country which is stretched-out in 68 of 79 provinces consisting of 1,195 municipalities. With over 338 million bearing trees, its annual average production is 15.344 billion nuts or 43 nuts per tree every year but its main interest is producing copra, manufacturing virgin coconut oil, an desiccated coconuts. The coconut husks are often discarded; more or less fifty percent (50%) of these are used to fuel in drying up produced copra while therest left rotten or wasted. Since these fiber dusts will take at least 20 years to decompose its disposal can become a problem. While these husks are rejected, they can have variety of uses, such as ropes, geotextiles which are being used for engineering construction and erosion netting, binder-less fiber boards, doormats, baskets, and other handicrafts. Fiber dusts or coco peats are used as organic fertilizers, rooting media, horticulture pots, fillers, pads or liners, and mattresses among others.

A full grown coconut fruit weighs an average of 1.2 kg, while its husks compose up to 0.4 kg of the total weight. Thirty percent (30%) of the husk are long fibers and seventy percent (70%) are fiber dusts or peats. The extractable fibers consists of forty percent (40%) bristle fibers and fifty percent (50%) mattress fibers which are both raw materials for processing ropes, geo-textiles, and handicrafts. Value-added products developed from the fiber dusts (peat) had turned into a growing business to other countries and to some provinces in the Philippines for its inherent water-holding characteristics, it has been used primarily for agricultural purposes and even as alternative material for synthetic fibers.

According to the Bureau of Agricultural Statistics data of 2013, from the website of the Philippine Coconut Authority (PCA), there is a total 3.55 million hectares of area planted to coconut. The total number of coconut trees accounted is 338 million bearing trees. One coconut tree has an average yield of 43 nuts per tree per year. And it will take atleast 5,241 nuts to produce one metric ton of copra. Taking from these data, we can calculate that the average number of bearing trees per hectare is atleast 95 coconut trees, which can produce 755 kg of copra annually. With the assumption that the price of copra is at 20 pesos per kilogram, the average annual gross income of a farmer is Php 15,104.54 per hectare which is way below the poverty line.

Utilizing around 50% of the husks into coco fiber and coco peat instead of wasting it is another agricultural business activity that will enhance the small coconut farmers' income and help lift them out below the poverty line. Employing locals and adopting small-scale technologies would

increase the value of each coconut from four pesos (Php 4.00) to atleast forty pesos (Php40.00) which would mean potential additional annual gross income of almost Php 164,000.00 per hectare per year. With the increasing demand world wide for the alternative ecological material and environment friendly alternative to synthetic and hazardous materials, highly industrialized nations are looking for the potentials of the natural materials such as cocofiber and cocopeat.

There are two ways to extract fibers from the husk. The manual process called wet-milling process, where the husk is crushed and then soaked in a pond for a minimum of three days before the fiber is extracted using specially customized equipment called drum. The other one is the dry milling process, where a special machine called down decorticator separates the fiber from non-fibrous material, and no soaking is required. The dry milling process is considered as the more efficient way of husk defibering.

Fibers and Fiber Dusts produced from coconut husks varies and classified according to its qualities- strength, cleaning, and color. Those fibers with length of up to 5 inches with more fibers, good to fair cleaning and light brown in color are most likely to be the highest grade of all these fibers and should have no or less pulp content. Strands of fibers with atleast 2.5 inches are considerably being used as pads and mattresses and other industrial uses like packing and fiber boards. Those strands with less than 2.5 inches are considered fiber dusts and generally being used for agricultural applications. The white fiber extracted from young or immature coconuts are used for ropes, handicrafts, and fishnets.

Enumerated below are the value added products processed from coconut husk:

TABLE 72. COCONUT HUSKS BY-PRODUCTS FOR INDUSTRIAL USE

Product	Description
Bristle Fiber	It is a fiber of good cleaning, with considerable or no pulp content, light brown color, and length of 5 inches or more. Primarily it is being utilized to make coconets or geotextiles and bio-logs or fascines which are widely used for soil erosion control. These are also being used to make brush, air filters, humidifier pads, evaporative cooler pads, ropes and twine, carpets rugs, doormats, bags, sacks, fishnets, and other handicrafts.
Mattress Fiber	Consists of short crumpled fibers with a length of less than 5 inches but not less than 2.5 inches. Commonly used as padding for mattresses, upholsteries, car seats, and automotive breathers. It is also used for insulation materials, caulking material for boats, filtration pads and briquettes, filtering materials for drainage, wall boards and panel boards for home and high rise buildings.
Mixed Coir (bristle and mattress)	This is a mixture of bristle and mattress fibers, mostly crumpled and tangled off air cleaning with light or dull brown in color. This is being utilized to make rubberized coir sheet which is suitable for packaging electronic and other delicate products that require safety and protection.
Fiberdusts (Cocopeat)	Consists of coir dusts with a length of less than 2.5 inches and not fitted as regular coir. Primarily used for agricultural processes such as organic fertilizers, horticultural purposes such as plant liners, pots, plant pads, soil conditioners, and material fillers.
Mat or Yarn Fiber	Usually known as the white fiber which is extracted manually after retting the husks of a green/immature coconut. Retting is a process where immature coconuts are suspended in a pond or a river, or any pit filled with water for up to ten months to loosen the fibers surrounding the husk's tissues. It is used to make rope,mats,and woven coir fiber. It is also utilized to make fish nets because of its strong resistance to salt water.

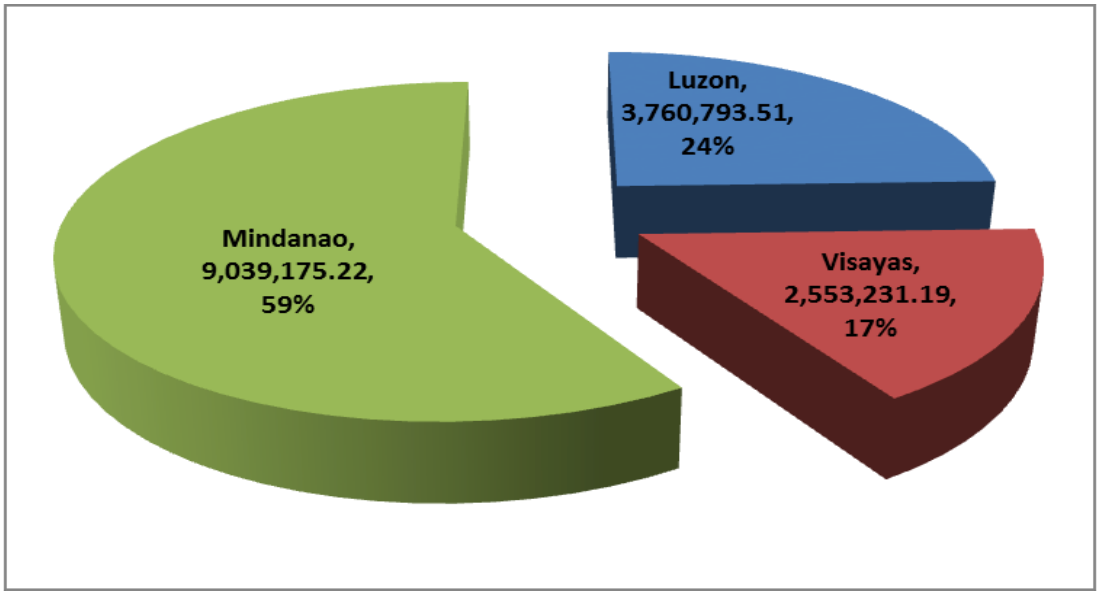
TABLE 73. HUSKS BY-PRODUCTS PRODUCED AND TRADED IN MINDANAO REGIONS

Region	Coco Fiber	Coco Fiber Dusts
Zamboanga Peninsula		
Northern Mindanao	3	
Davao Region	3	3
SOCCSKSARGEN	3	
CARAGA	3	3
ARMM		

PRODUCTION TRENDS

Domestic Production

FIGURE 22. PHILIPPINE COCONUT PRODUCTION,2013



Philippines: 15,353,199.92MT
59%of coconut production came from Mindanao
Mindanao:9,039,175.22 MT

Of the 15,353,199.92 metric ton of coconut produced in 2013, 59% came from Mindanao. Between 2009 and 2013, coconut production in Mindanao decreased by 2.92% because of the series of typhoon that hit Davao Region and CARAGA wherein 20% of the coconut farms in the area were devastated. Davao Region's production was decreased by 15.45% and CARAGA recorded a decreased of 15.47%. SOCCSKSARGEN increased by 16.26% in 2013 compared to its production in 2009.

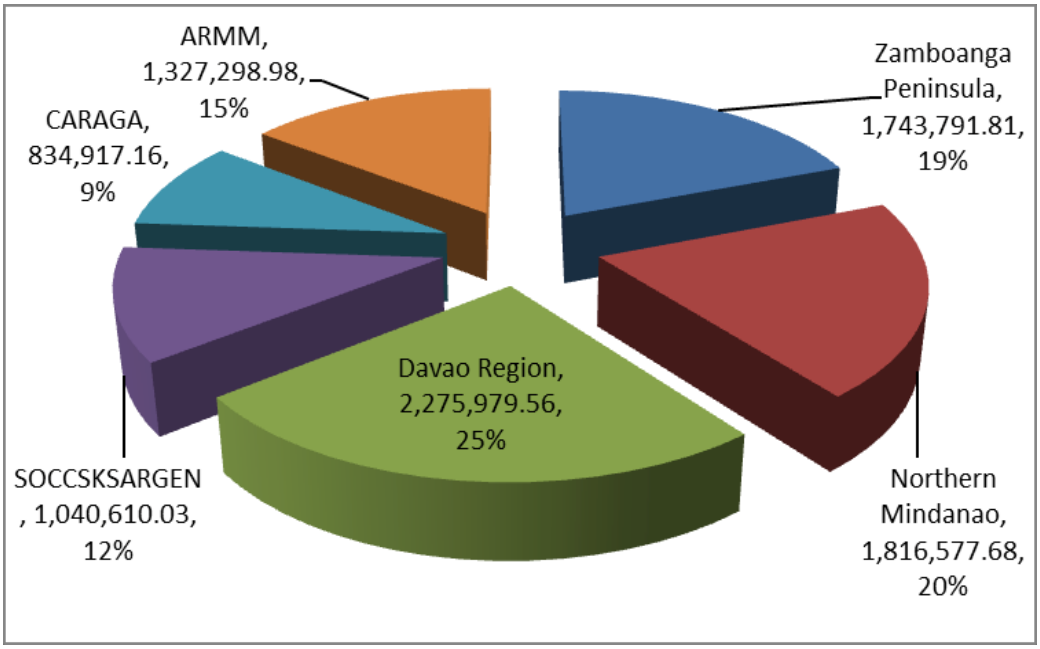
TABLE 74. RP COCONUT PRODUCTION: CY 2013

Region/Island Group	Production Volume(MT)	% to RP Production
Luzon	**3,760,793.51**	**24**
Visayas	**2,553,231.19**	**17**
Mindanao	**9,039,175.22**	**59**
Zamboanga Peninsula	1,743,791.81	1
Northern Mindanao	1,816,577.68	1
Davao Region	2,275,979.56	1
SOCCSKSARGEN	1,040,610.03	7
CARAGA	834,917.16	5
ARMM	1,327,298.98	9
Philippines	**15,353,199.92**	**10**

Source: Bureau of Agricultural Statistics

Three of the six regions in Mindanao specifically Davao Region, Northern Mindanao, and Zamboanga Peninsula accounted for 64.5% of the Mindanao production and topped the coconut production in regional level.

FIGURE 23. COCONUT PRODUCTION BY REGION IN MINDANAO



Even with a decreasing trend of Davao Region's coconut production, it is still the top coconut producing region in the Philippines which accounted for 14.8% of the total production countrywide. The other region comprising the top 5 producing regions in the country are Eastern Visayas and CALABARZON.

At the provincial level, the top producing province is Quezon in CALABARZON which accounted for 7.8% of the production in 2013. Four of the provinces in Mindanao completed the top 5 lists specifically Davao del Sur, Zamboanga del Norte, Davao Oriental, and Maguindanao with a combined production percentage of 19.3% of the total production in the country.

TABLE 75. TOP COCONUT PRODUCERS IN THE PHILIPPINES (REGION),CY 2013

Top		
Region	**Volume**	**% to RP Production**
Davao Region	**2,275,979.56**	**14.8%**
Northern Mindanao	**1,816,577.68**	**11.8%**
Zamboanga Peninsula	**1,743,791.81**	**11.4%**
Eastern Visayas	1,623,585.95	10.6%
CALABARZON	1,434,803.72	9.3%
Source:BAS		

In 2013, total land area planted to coconut was 3,550,490.83 hectares of which 48.7%

TABLE 76. TOP COCONUT PRODUCERS IN THE PHILIPPINES (PROVINCE), CY 2013

Top 5 Provinces

Provinces	Volume	% to RP Production
Quezon	1,190,719.40	7.8%
Davao del Sur	912,016.89	5.9%
Zamboanga del Norte	766,339.75	5.0%
Davao Oriental	693,413.95	4.5%
Maguindanao	590,191.35	3.8%

Source:BAS

were in Mindanao. National data reveals that it grew by 4% compared to 2009 but production was decreased by 2%. In Mindanao however, land area planted with coconut decreased by 5% or 18,780.64 hectares while volume decreased by 4%. These was primarily due to the Typhoon "Pablo"that struck last 2012 wherein top coconut producers of Mindanao specifically CARAGA and Davao Regions were affected significantly decreasing fruit bearing coconut trees by 14% or 8,434,024 trees. The need for replanting of coconut in the affected areas will be the main concern or issue to be resolved.

With regards the average yield per hectare (Table11A), Mindanao recorded a 5.21 MT production per hectare which is above the national average of 4.32 MT per hectare. At the regional level, Central Luzon has the highest average yield at 7.46 MT per hectare, followed by Davao Region at 6.53 MT/ha, Northern Mindanao at 6.51 MT/ha, and then SOCCSKSARGEN at 5.63MT/ha. The other regions of Mindanao also joined the top 10 highest average yield: Zamboanga Peninsula at 4.58 MT/ha, CARAGA at 4.37 MT.ha, ARMM at 4.11 MT/ha who got the number 6^{th}, 7^{th}, and 8^{th} place respectively. Of all the regions in Mindanao, only ARMM recorded an average yield lower than the national average.

TABLE 77. DOMESTIC PRODUCTION OF COCO COIR, 2004-2008 (IN MT)

REGION	2004	2005	2006	2007	2008	% Share
S. Mindanao	2,002	1,673	4,764	7,963	7,415	74.3%
S. Tagalog	2,755	2,467	2,998	1,540	2,510	25.1%
Bicol	174	62	17	3	0	0.0%
W. Visayas	0	0	15	30	0	0.0%
C. Visayas	0	0	0	15	0	0.0%
E. Visayas	0	41	0	84	58	0.6%
W. Mindanao	186	106	132	106	0	0.0%
N. Mindanao	0	0	0	221	0	0.0%
CARAGA	0	0	0	57	0	0.0%
Total	5,117	4,349	7,926	10,019	9,983	100.0%

Source: Road Map of the Philippine Coconut Coir Industry, PCA, March 2009

Table 77 shows that Southern Mindanao (Davao Region and SOCCSKSARGEN Region) is the top coir producing region in the Philippines, with 7,415 MT of coir, accounting for 74.3% of total local production. The Southern Tagalog Region was second, producing 2,510 MT of coir, contributing 25.1% of total coir production in the Philippines. The Bicol Region used to produce 174 MT of coir in 2004, but many of the decorticating facilities in the region were permanently or temporarily stopped operations. Others are now only operating intermittently. Despite having the largest area planted with coconuts, production of coir in the region is considered to be very small. On the other hand, all regions in Mindanao except ARMM used to produce coco coir products in 2007 but had no records on production in 2008. The same with the case in Bicol Region, other decorticating plants permanently and/or temporarily stopped its operations. Some factors that attributed the declining trend areas follows: High production costs and low buying prices, intermittent market, DPWH's payment will reached for months which causes the plants to stop its operations due to lack of operational capital, and mostly lack of raw materials to process such as coconut husk

TABLE 78. VOLUME OF PRODUCTION,COCONUT WITH HUSKS- 2009,2013

Region/Province	2009 Volume of Production (MT)	2013 Volume of Production (MT)	Annual Growth Rate (%)	*2013 Estimated Volume of Husks (MT)
PHILIPPINES	**15,667,564.85**	**15,353,199.94**	**-0.40%**	**4,264,777.76**
MINDANAO	**9,311,464.46**	**9,039,175.22**	**-0.58%**	**2,510,882.01**
..ZAMBOANGA PENINSULA	**1,744,738.04**	**1,743,791.81**	**-0.01%**	**484,386.61**
....Zamboanga del Norte	735,758.55	766,339.75	0.83%	212,872.15
....Zamboanga del Sur	567,790.45	562,416.82	-0.19%	156,226.89
....Zamboanga Sibugay	211,026.50	206,066.73	-0.47%	57,240.76
......Zamboanga City	230,162.54	208,968.50	-1.84%	58,046.81
..NORTHERN MINDANAO	**1,743,337.77**	**1,816,577.68**	**0.84%**	**504,604.91**
....Bukidnon	46,369.22	53,259.02	2.97%	14,794.17
....Camiguin	109,718.99	106,670.80	-0.56%	29,630.78
....Lanaodel Norte	570,076.67	579,225.68	0.32%	160,896.02
....Misamis Occidental	509,893.20	562,117.18	2.05%	156,143.66
....Misamis Oriental	507,279.68	515,305.00	0.32%	143,140.28
..DAVAO REGION	**2,691,904.84**	**2,275,979.56**	**-3.09%**	**632,216.54**
....Davao del Norte	234,468.01	228,096.23	-0.54%	63,360.06
....Davao del Sur	855,456.82	912,016.89	1.32%	253,338.03
....Davao Oriental	1,079,989.60	693,413.95	-7.16%	192,614.99
....Compostela Valley	282,906.46	176,457.37	-7.53%	49,015.94
......Davao City	239,083.93	265,995.12	2.25%	73,887.53
..SOCCSKSARGEN	**895,085.87**	**1,040,610.03**	**3.25%**	**289,058.34**
....North Cotabato	183,438.80	194,869.74	1.25%	54,130.48
....Sarangani	395,909.20	450,243.05	2.74%	125,067.51
....South Cotabato	157,215.92	178,316.48	2.68%	49,532.36
....SultanKudarat	158,521.95	217,180.76	7.40%	60,327.99
..CARAGA	**985,426.87**	**834,917.16**	**-3.05%**	**231,921.43**
....Agusan del Norte	162,215.98	159,448.52	-0.34%	44,291.26
....Agusan del Sur	43,208.46	37,552.27	-2.62%	10,431.19

....Surigao del Norte	327,906.25	235,309.58	-5.65%	65,363.77
....Surigao del Sur	452,096.18	402,606.80	-2.19%	111,835.22
..ARMM	**1,250,971.08**	**1,327,298.98**	**1.22%**	**368,694.16**
....Basilan	215,464.48	193,180.00	-2.07%	53,661.11
....Lanao del Sur	171,482.10	171,246.73	-0.03%	47,568.54
....Maguindanao	502,427.50	590,191.35	3.49%	163,942.04
....Sulu	209,470.00	207,882.90	-0.15%	57,745.25
....Tawi-tawi	152,127.00	164,798.00	1.67%	45,777.22

Source of Primary Data:PSA/BAS

**-2013* Estimated *volume of coconut husks were computed based on the following assumptions below*
Assumptions:Average weight of matured coconut with husks=1.2kg
Average weight of husks=0.4kg (approximately 1/3 of the whole coconut)

TABLE 79. ESTIMATED VOLUME OF COCO FIBER AND COCO PEAT PRODUCTION 2013

Region/Province	Estimated Numberof Nuts	Estimated Volume of Husks (MT)	Estimated Volume of Fiber (MT)	EstimatedVolume of Peat (MT)
PHILIPPINES	**12,794,333,283**	**4,264,777.76**	**1,279,433**	**2,985,344**
MINDANAO	**7,532,646,017**	**2,510,882.01**	**753,265**	**1,757,617**
..ZAMBOANGA PENINSULA	1,453,159,842	**484,386.61**	145,316	339,071
....Zamboanga del Norte	638,616,458	212,872.15	63,862	149,011
....Zamboanga del Sur	468,680,683	156,226.89	46,868	109,359
....Zamboanga Sibugay	171,722,275	57,240.76	17,172	40,069
......Zamboanga City	174,140,417	58,046.81	17,414	40,633
..NORTHERN MINDANAO	**1,513,814,733**	**504,604.91**	**151,381**	**353,223**
....Bukidnon	44,382,517	14,794.17	4,438	10,356
....Camiguin	88,892,333	29,630.78	8,889	20,742
....Lanao del Norte	482,688,067	160,896.02	48,269	112,627
....Misamis Occidental	468,430,983	156,143.66	46,843	109,301
....Misamis Oriental	429,420,833	143,140.28	42,942	100,198
..DAVAO REGION	**1,896,649,633**	**632,216.54**	**189,665**	**442,552**
....Davao del Norte	190,080,192	63,360.06	19,008	44,352
....Davao del Sur	760,014,075	253,338.03	76,001	177,337
....Davao Oriental	577,844,958	192,614.99	57,784	134,830
....Compostela Valley	147,047,808	49,015.94	14,705	34,311
......Davao City	221,662,600	73,887.53	22,166	51,721
..SOCCSKSARGEN	**867,175,025**	**289,058.34**	**86,718**	**202,341**
....North Cotabato	162,391,450	54,130.48	16,239	37,891
....Sarangani	375,202,542	125,067.51	37,520	87,547
....South Cotabato	148,597,067	49,532.36	14,860	34,673
....Sultan Kudarat	180,983,967	60,327.99	18,098	42,230
..CARAGA	**695,764,300**	**231,921.43**	**69,576**	**162,345**
....Agusan del Norte	132,873,767	44,291.26	13,287	31,004
....Agusan del Sur	31,293,558	10,431.19	3,129	7,302
....Surigao del Norte	196,091,317	65,363.77	19,609	45,755
....Surigao del Sur	335,505,667	111,835.22	33,551	78,285
..ARMM	**1,106,082,483**	**368,694.16**	**110,608**	**258,086**

....Basilan	160,983,333	53,661.11	16,098	37,563
....Lanao del Sur	142,705,608	47,568.54	14,271	33,298
....Maguindanao	491,826,125	163,942.04	49,183	114,759
....Sulu	173,235,750	57,745.25	17,324	40,422
....Tawi-tawi	137,331,667	45,777.22	13,733	32,044

Estimated volume of coco fiber and peat is based on the number of nuts produced. Ten coconut husks can generate one (1) kilogram fiber which is 30% of the total husks. The other 70% of the husk is the cocopeat. Based on the estimated data above, we only need at least 7.8% of the total estimated volume of 1.2 million MT in 2013 to produce 100,000 MT of coco fiber which is way above our target of 83,000 MT of exports by 2016 *(Philippine Coco Coir Roadmap, 2012-2016)*

NorthernMindanao

From 2009 to 2013, Northern Mindanao recorded as light increase in its production, area planted, and its average yield. All provinces showed increase in production and average yield except Camiguin and Lanao del Norte which had decreased in its average yield but posted an increase in its production.

TABLE 80. PRODUCTION TRENDS:NORTHERN MINDANAO
CY2009 -2013
Volume:Metric Tons Area Planted:Hectares Average Yield:MT/hectare

	2009	2010	2011	2012	2013	Annual% Growth Rate
NORTHERN MINDANAO						
Volume	1,743,337.77	1,757,164.52	1,745,949.54	1,816,501.47	1,816,577.68	0.84%
Area	300,575	301,257	301,697	301,660	302,433	0.12%
Yield	5.80	5.83	5.79	6.02	6.01	0.72%
Bukidnon						
Volume	46,369.22	49,188.65	44,556.17	53,637.35	53,259.02	2.97%
Area	9,500	9,500	9,500	9,500	9,500	0.00%
Yield	4.88	5.18	4.69	5.65	5.61	2.99%
Camiguin						
Volume	109,718.99	103,557.33	103,152.72	108,006.43	106,670.80	(0.56)%
Area	14,859	14,859	14,860	14,860	14,872	0.02%
Yield	7.38	6.97	6.94	7.27	7.17	(0.57)%

CARAGA

In the last 5 years, average decrease of 3.05% per year in CARAGA Region was also brought upon by destructive typhoons that hit the region. Typhoon "Pablo" also slashed millions of coconut bearing trees in the province of Surigao del Norte. Another reason is the cutting of trees and diversification of area that used to be devoted to coconut into some other

crops like Oil Palm Tree. In 2009 to 2013, an average annual decrease of 2.56% of area planted relatively decreased the average yield by 0.58% per year.

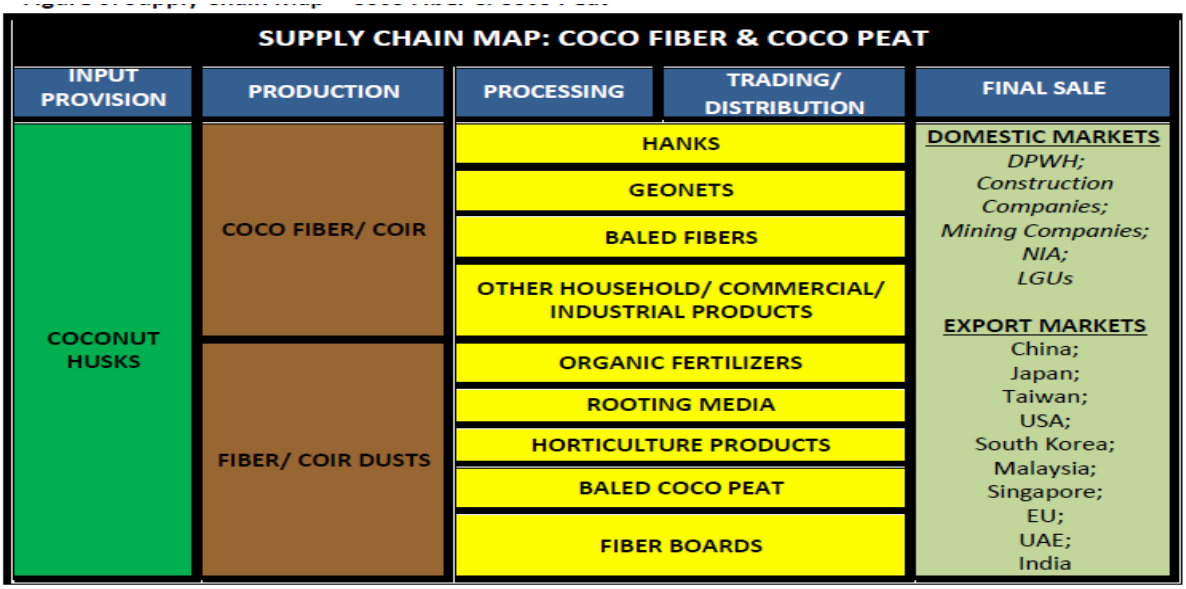
TABLE 81. PRODUCTION TRENDS:CARAGA
CY 2009 -2013
Volume:Metric Tons Area Planted: Hectares Average Yield: MT/hectare

	2009	2010	2011	2012	2013	Annual% Growth Rate
CARAGA						
Volume	985,426.87	974,213.35	879,399.51	880,883.08	834,917.16	(3.05)%
Area	219,107	219,121	218,613	215,285	191,107	(2.56)%
Yield	4.50	4.45	4.02	4.09	4.37	(0.58)%
Agusan del Norte						
Volume	162,215.98	161,984.87	152,914.22	154,737.61	159,448.52	(0.34)%
Area	26,700	26,700	26,700	33,486	33,486	5.08%
Yield	6.08	6.07	5.73	4.62	4.76	(4.34)%

Table 81: Production Trends:Caraga
CY 2009 -2013
Volume:Metric Tons Area Planted: Hectares Average Yield: MT/hectare

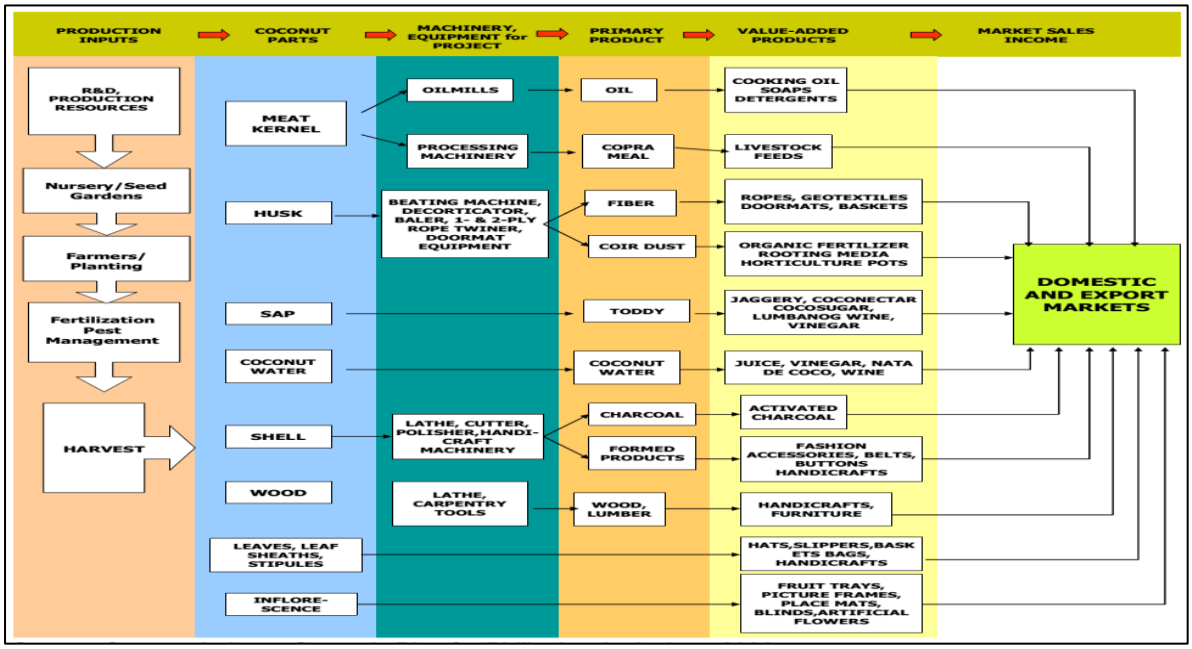
	2009	2010	2011	2012	2013	Annual% Growth Rate
Agusan del Sur						
Volume	43,208.46	42,205.25	40,950.02	43,360.83	37,552.27	(2.62)%
Area	12,555	12,561	12,561	14,884	14,884	3.71%
Yield	3.44	3.36	3.26	2.91	2.52	(5.35)%
Surigao del Norte						
Volume	327,906.25	317,371.85	265,307.56	265,752.64	235,309.58	(5.65)%
Area	90,000	90,000	89,500	89,500	65,322	(5.48)%
Yield	3.64	3.53	2.96	2.97	3.60	(0.22)%
Surigao del Sur						
Volume	452,096.18	452,651.38	420,227.71	417,032.00	402,606.80	(2.19)%
Area	89,852	89,860	89,852	77,415	77,415	(2.77)%
Yield	5.03	5.04	4.68	5.39	5.20	0.68%
Source:BAS						

FIGURE 24. SUPPLY CHAIN MAP – COCO FIBER AND COCO PEAT



The complexity of the industry was presented by PCA as shown in Figure 3.1 below showing the flow of the industry's supply and value chain utilizing eight (8) parts of the coconut tree which are processed into several value-added products using specific equipment and machinery for each project.

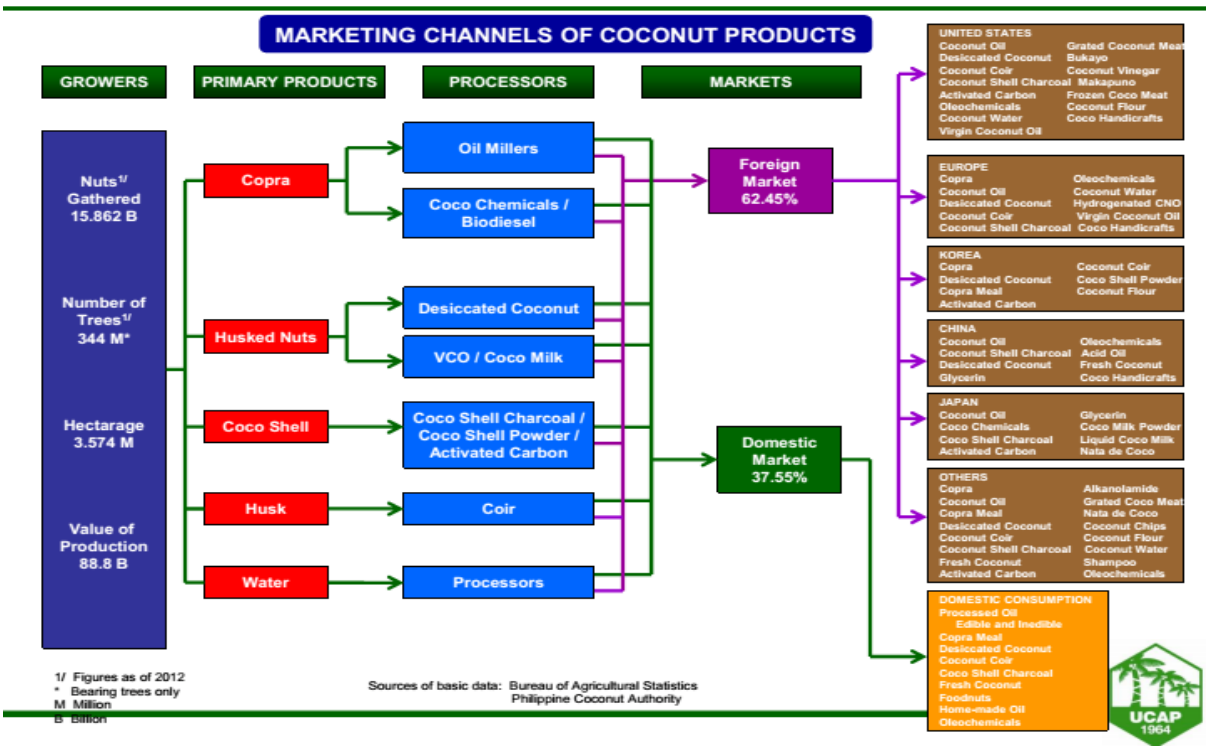
FIGURE 25. FLOWCHART OF SUPPLY AND VALUE OF COCONUT AND COCONUT PRODUCTS IN THE PHILIPPINES



SOURCE:Coconut Industry Strategic Plan for Philippine Agriculture 2020

Another illustration of the Philippine coconut industry was presented by Ms.Yvonne Agustin, the Executive Director of the United Coconut Associations of the Philippines (UCAP) during the 46th APCC Cocotech Meeting held in SriLanka last July 7-11,2014. In her presentation entitled *"THE SUPPLY CHAIN OF COCONUT PRODUCTS IN THE PHILIPPINES IN SUPPORT OF GLOBAL SUSTAINABILITY OF THE COCONUT INDUSTRY",* the illustration in Figure 26 below, she presented the whole industry according to its marketing channels.

FIGURE 26. MARKETING CHANNELS OF COCONUT PRODUCTS IN THE PHILIPPINES



Source: UCAP

Key Value Chains and Market Channels

In Davao Oriental, the presence of DOCHSEI, a Non-Government Organization, a coco fiber processing plant and a product consolidator helps the neighboring small coconut farmers who do not have access in the market by buying the cooperative's produce. Davao City's main market channel is the Reg will Industries, inc. With the existence of new and old small coconut farmers' cooperative in Davao City particularly those recipients of the SSF from DTI, Reg will Industries found allies in augmenting their production to meet the volume requirement of both domestic and export markets. Davao del Sur's Pointman Resources,Inc. is the main market channel in the province and act as the consolidator of the coco coir based products traded in both local and domestic markets.

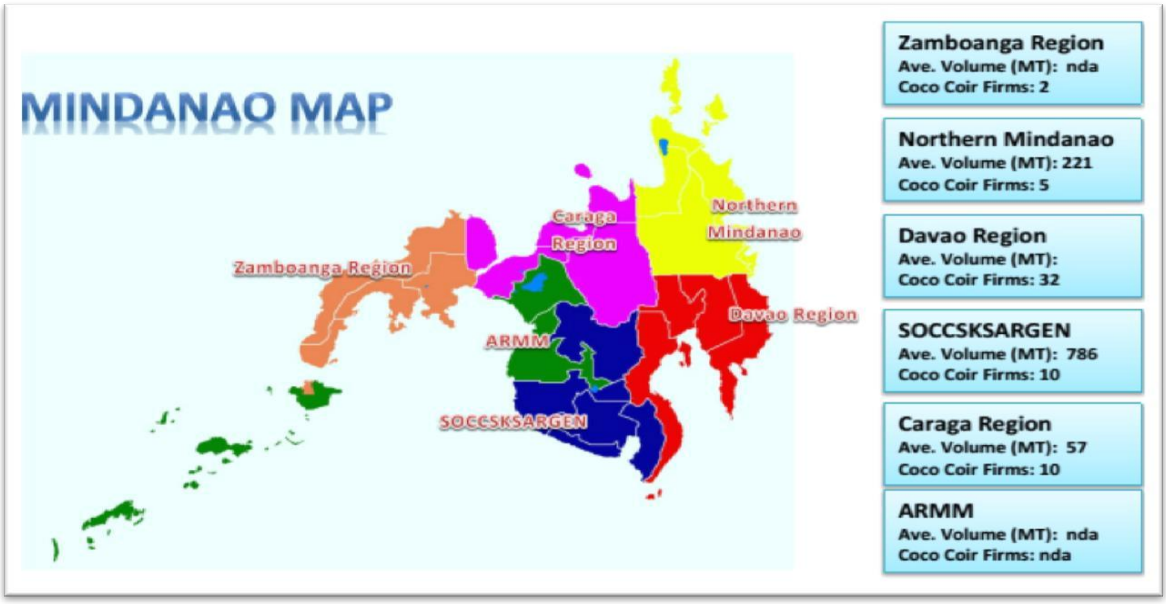
In Northern Mindanao, Buenavista Coco Coir Enterprise is operating a coco coir processing plant in Agusan del Norte but its main office is located in Quezon City, baled coco coir is its

main line of product being exported also to China, United Kingdom, and Taiwan. Malingao Community Multi- Purpose Cooperative (MCOCO) who just operated its coco coir processing plant made their first successful trade of 480 rolls of geotextile to Coco Technologies Corporation(formerly Juboken Enterprises), the coco-based bio-engineering solutions pioneer in the country, with which the product is bound to China. In Zamboanga Region, WS Coco Product Cooperative and WDW126 Coco Fiber Enterprise are the market channels in the region. Baled CocoCoir is their primary product.

While there are presence of the local market channels in the region but some enterprises traded their products in Luzon-based coco coir processing plants particularly Coco Technologies,inc./ Juboken Enterprises, Pilipinas Ecofiber Corporation, and FSSI/Cocobind,inc. Due to the supply and demand gap, some other market channels in the country particularly the PhilFIDA Grading and Baling Establishments, traders and exporters, PhilCoir members, members of the Philipine Coconut Brokers Association are looking for reliable suppliers of cococoir and cocopeat in Mindanao.

Geographic Flow of Products in Mindanao and Synergies within the Provinces/Regions

MAP 20. MINDANAO MAP WITH NO. OF COCO COIR FIRMS AND AVE.VOLUME OF COCO COIR, 2010-2014

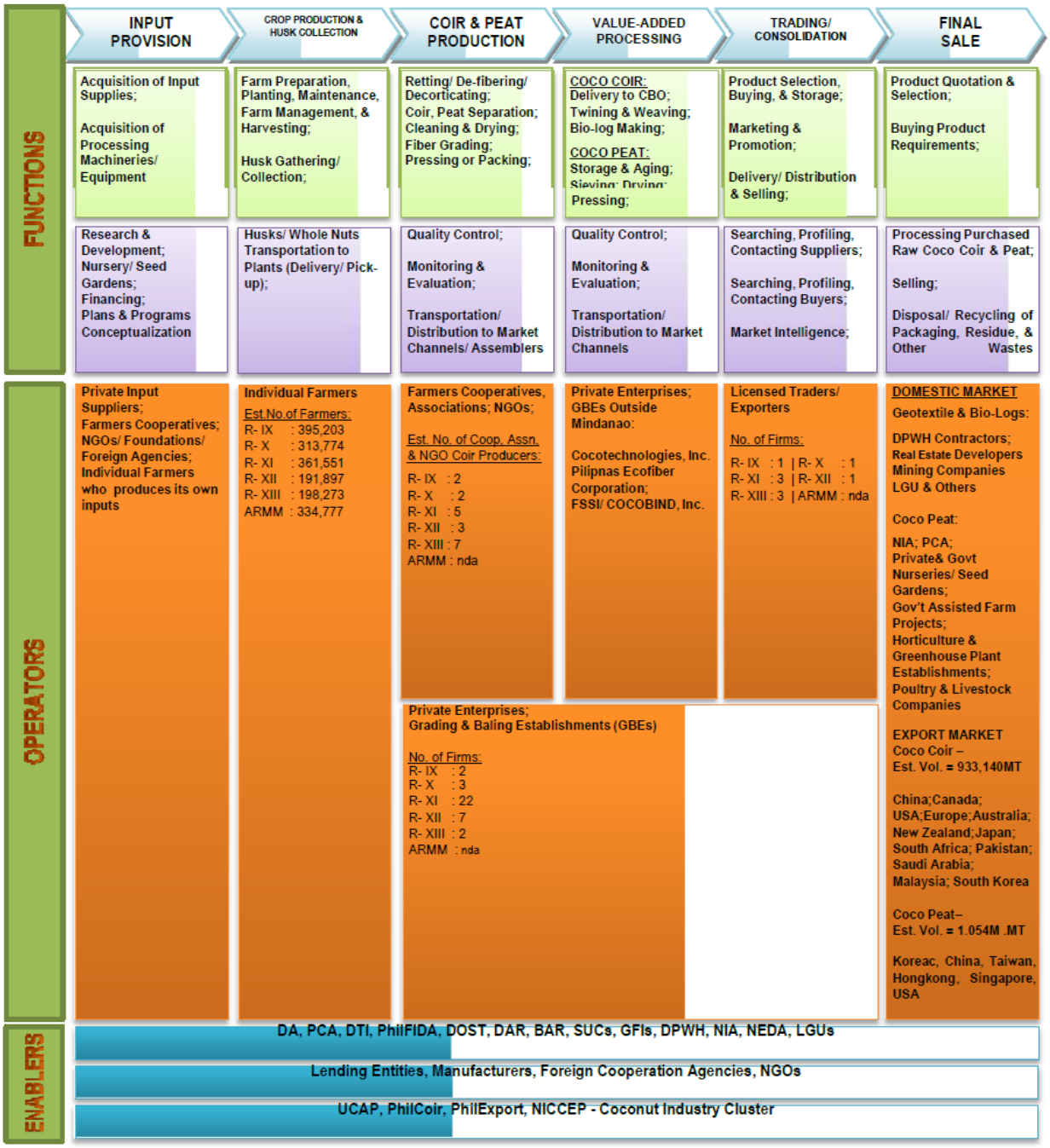


Source of Primary Data: PCA, and FGD

Known firms include Reg will Enterprises,Inc. in Davao City,KAAGAPMUCO in San Francisco, Agusan del Norte, and DOCHSEI in Davao Oriental, Sarangani Cocotech Corporation and Jags Lucky Fiber in SOCCSKSARGEN, and Point main Resources,Inc in Davao del Sur. Some processing plants are delivering their products to some other traders in the province or within the region, and some to large firms based in Luzon particularly Coco Technologies, inc. (formerly Juboken Enterprises), Pilipinas Eco fiber Corporation, and FSSI/Cocobind,inc. Those with access to local market are directly delivering their products to their clients. While export markets are shipped out through the Ports of Davao, General Santos, or Cagayan de Oro depending also to the proximity between the portand their facility and shipping rate to reduce transportation costs. Domestic markets for coco coir and coco coir value-added products include construction companies for erosion control, mining companies undergoing mining site rehabilitation, real estate and infrastructure developers, and government agencies such as DPWH (i.e.road, bridges, riverbank embankments, infrastructure in mountainous slopes) , NIA (for projects needing waterholding agents), and LGUs (local construction projects). For coco peat, top domestic markets include forest nurseries, horticulture, agriculture, and, livestock and poultry industries. On the other hand, international market'stop importer of Baled raw coco fibers (coco coir) is China wherein these products are further processed into rubberized mattress, car upholstery, and geo-nets among others. Raw cocopeat' stop importers are South Korea, Japan, and Taiwan which is used mostly as water holding agent, animal beddings, and later became organic fertilizers as it naturally mixed with animal manure/dungs.

Coconut coir sector has enormous economic potentials but has remained relatively under developed and underutilized particularly in Mindanao which comprises more than 59% of the country's total volume of coconut production. The utilization of coconut husks which were processed into cococoir fiber and fiber dust remains very low which is recorded at less than 5% of the available raw materials.

FIGURE 27. VALUE CHAIN MAP: COCO FIBER AND COCO PEAT



Input Provision

Enablers include the PhilFIDA, DOST, DTI, PCA, and several other State Colleges and Universities (SUCs) who are doing scientific research and development of the product. As of now, the DOST is tapping several machine fabricators to develop a 2-pass decorticating machines in lieu of the 3-pass decorticating machines. This should decrease electricity and/or fuel consumption during operation. Mechanized twining machines which has produces higher quality hanks in lesser time are now being certified. The Davao Oriental State College of Science and Technology has developed a fertilizer from coco peat. The technology in producing such fertilizer was adopted by DOCHSEI Enterprise and they are now selling cocopeat product

at much higher prices. PCA and DOST is improving the mixing of guano and cocopeat for a more effective and efficient organic fertilizer and soil conditioner.

Production

Fiber extraction is carried out by the following players in the chain:

a) Farmers-Coconut husks are sold by farmers to Cooperatives/Organizations, under which they eventually become members for decortications. Farmers are still price-takers on this scheme: they just accept prices offered by the Coops. This is somehow cushioned by the benefits they will eventually gain from it being members of the Coops. Coops already have their own strategic plans on the pick-up point of farms then will bring it to the decorticating center of the Coop.

b) *Cooperatives/Organizations (decorticators)* –These coops are assisted by the project providing them decorticating, bailing, twining and sieving machines.They buy coconut husks from the farmers and eventually process it into bailed fiber and twined fibers. Coco peat (considered as waste during decortication) can still be sold out to the processor. When the desired volume is attained, they deliver to the assemblers/trader

TABLE 82. LIST OF COIR PROCESSORS IN MINDANAO AND ITS CAPACITY

Plant Name	Location	Capacity (no.of husks /day)	Equipment
KAAGAPMUCO	San Francisco	20,000	1Decorticating Machine 12 weavingmachines 150twining machines
DOCHSEI Enterprises	San Isidro,Davao Oriental	20,000	1Decorticating Machine 7weavingmachines 120twining machines
	Gov.Generoso, Davao Oriental	20,000	1Decorticating Machine 7weavingmachines 120twining machines
	Manay, Davao Oriental	20,000	1Decorticating Machine 7weavingmachines 120twining machines
Malingao Commur Multi- Purp Cooperative	Tubod, Lanaodel Norte	10,000	1Decorticating Machine 2weavingmachines 100twining machines
TaguiboMPC	Butuan City	10,000	1Decorticating Machine 2weavingmachines 10 twiningmachines

c) Traders/Assemblers – There are identified and arranged markets like Regwill Industries, KAAGAPMUCO, and DOCHSEI Enterprises (the latter with with a rated capacity of 20,000 husks each machine per day). The plant however is operating below rated capacity due to limited supply of husks. This problem can be attributed to poor road network where farms are simply inaccessible to transport and also to the cost of transporting husk up to plant site. The buying price in each region for husks is at follows P0.25 per piece or Php 15-20 per cubic meter.

The waste during decortications which is coco peat can still be sold at P 100 per bag but if processed through vermicomposting, it can be sold up to Php300 per bag. The conversion factor of whole nuts to husk is 33% which means that a kilo of husks would need 3 whole nuts. From husk to fiber, 10pcs. Of husks are required to produce 1 kg. fiber. Traders/Assemblers have different markets for decorticated fiber,nets and peat. It has market all over the Philippines (for nets), 30 companies in China (for raw fiber) and markets also in 6 companies in Japan(for dust)and Australia (for dus t)

Notable players for the coco coir sector in Mindanao includes the following regions:

ZAMBOANGA

1. WDW126 Coco Fiber Enterprise in Zamboanga Sibugay, and
2. WS Coco Product Cooperative in Zamboanga del Norte

NORTHERN MINDANAO

1. Asiapac International Cocotechnologies in Tangub City,Misamis Occidental
2. Malingao Community Multi-Purpose Cooperative (MCOCO) in Tubod,Lanao del Norte
3. Misamis Oriental Multi Fiber Cluster, Incin Cagayan de Oro City, and
4. Philippine Coco Products Enterprise, Inc

DAVAO

1. RegwillIndustries, Inc. inDavaoCity,
2. Davao Oriental Coco HuskSocialEnterprise, Inc. (DOCHSEI) in San Isidro, Governor Generoso and Manay, all in Davao Oriental
3. PontmainResources, Inc. inDavaodel Sur;

SOCCSKSARGEN

1. Sarangani Cocotech Corporation with three (3) plants located in Kiamba,Sarangani Province, Polomolok South Cotabato,and General Santos City,
2. HingYi Coconut Husk Processing Plant in General Santos City,
3. Mindanao Coco Fiber INGlan, Sarangani Province
4. Jags Lucky Fiber in Glan, Sarangani Province,and
5. Fleischer Estate Integrated Multipurpose Cooperative (FEIMCO) in Maitum, Sarangani Province.

CARAGA

1. Kaagap Development Multi-Purpose Cooperative (KAAPGAPMUCO) in SanFrancisco,Agusan del Sur,
2. Celebes Oil Mill who now ventures in coco coir processing both in Butuan City and Agusan del Norte,
3. Florland Ventures in Bislig City, and
4. Taguibo Multi-Purpose Cooperative in Butuan City

Processing

The fibers produced by the decorticating plants are distributed to twiners to produce hanks then distributed to weavers to produce coconets orgeo-textiles, which are proven as effective and ecologically sound materials for soil erosion control.

Major processors deliver baled coco fiber to assemblers/agents then the latter distribute to their group of twiners. The twiner, in return remit bundles of hanks to his assembler/agent, then the agent informs these major processors and arrange the schedule of pick-up for the hanks. Once picked-up, major processors delivers collected hanks to the agent of weavers to produce geonets. The finished product will be pick-up by these major processors every week or as scheduled from the assembler/agent.

Some processors sources its baled fiber from coco fiber producers and farmer's cooperatives/associations then only does its twining and weaving.

Trading/Distribution

Trading and distribution are carried out by traders or agents, private assemblers, and/or cooperative-assemblers. Majority of those engaged in trading are also into fiber production and many of the traders and assemblers also have their own coconut arms.

Traders seek to the domestic and export market for fiber, nets, and peat. Some traders in Davao, Butuan, and Lanao del Norte have committed to supply China, Taiwan, EU, UAE, USA and South Korea with raw fiber, fiber dust and geo-nets to Japan. Demand for nets in Mindanao averages at 200,000 squaremeters per region. This is to be used by the Department of Public Works and Highways (DPWH) for their slope repairs. Still, the processors have problems of unmet and committed demands due to low supply of coconut husks in Mindanao region.

Based on a 2010 AusAID report, 48,450 kilometers of FMRs are required to be constructed in the Philippines. As of 2013, a total of 34,477 kilometers have already been constructed that the only remaining balance to be built is 13,873 kilometer stretch of FMR. In 2014, a total of 12 billion Is being budgeted to construct additional FMRs with a cost standard at Php12 million per kilometer. Roads from Coops to Processor and transport facilities are established already. Coops were provided with trucks as part of the agreement and assistance by processors/assemblers/ traders. With proper negotiation, processor/trader can be requested

to pick up baled fiber depending on the volume traded by the Coop but buying price will change (usually lower). One cooperative has this pricing scheme,that for every truck load of the said product if being delivered they will be paying at Php4.00 to 4.75 per kilogram, while if it is requested to be picked up they will only be paying Php 3.00 to 3.75 per kilogram for every truckload. Processor/traders have large storage facilities for the different forms of coconut fiber products. Regwill Industries,Inc., KAAGAPMUCO, and DOCHSEI Enterprises are the major buyers as consolidators of the cocofiber and cocopeat in Mindanao.

Final Sale

The existing markets for geonets in the locality are the government agencies like DPWH, the Mines and Geo Sciences Bureau, as well as the LGUs. For the DPWH their estimated requirement is at 196,086.74sq.m for 2014. While the list of mining companies that might need cocofiber matting per data from the Mines and Geosciences Bureau, estimated requirement for 125 hectares or 1,250,000 sq.m. of geo-nets. Construction companies and subdivision developers require an estimated total of 2,500,000 sq.m of geo-nets.

NATURE OF INTERFIRM RELATIONSHIPS

Horizontal Relationship

The trader/processors have arrangements with markets which can be local or international markets for geonets, fiber mats and other cococoir by-products. For instance, the KAAGAPMUCO is buying fibers, hanks, and even geo-nets in the emerging cooperatives and enterprises in Davao City, Agusan del Norte, and SOCCSKSARGEN Area. DOCHSEI Enterprises on the other hand tapped several small coconut farmer cooperatives to sell their products to the mas they have contacts in China. PCA however is helping newly operating decorticating plants of some coconut farmers' cooperatives and associations in CARAGA Region by buying their products and act as the consolidators of the products and then being sold to mining and construction companies as they were accredited and accepted by DPWH to supply geo-nets to some DPWH initiated projects.

Decorticators

No relationship and information sharing exist between those main decorticating plants. Although some large processors initiated and established the technology for coco coir and geo-nets production.

Assemblers, Twiners and Weavers

The main decorticators have each own set of assemblers for twining and weaving. There is no established relationship between each group. Assemblers act as consolidators and financier of their twiners and weavers.

Traders/Exporters

In Mindanao the identified traders/exporters are Regwill Industries,Inc. Local market traders identified are KAAGAPMUCO and DOCHSEI Enterprises. Emerging local market and export traders include TagoAgro-Industrial Development Cooperative, and Malingao Community Service Multi- Purpose Cooperative.

Vertical Relationships and Supply Chain Governance

Husk Suppliers and Decorticators

Cooperative consolidators act as the market intermediary of the farmers produce collecting the products and selling in bulk of processing in fiber/nets.(i.e. San Francisco,Agusan del Norte, and Davao del Sur)

There is a high degree of collaboration among member-suppliers and the cooperative since the members are assured of a market for their produce while supply of husks is available for the cooperative to process.

Non-members also find the collective marketing and value added processing offered by the cooperative attractive such that it has become a means to expand its membership to other suppliers in the area.

Decorticators and Assemblers/Twiners/Weavers

Decorticating plants have their own set of assemblers for twining and weaving. These decorticators also provide the technical know-how of the assemblers,as initially they were twine makers and weavers who become assemblers later. KAAGAPMUCO is putting up a small twining and weaving area in nearby municipalities as long as it will reach up to 30 households to do the twining. With this the assemblers were created when more people were needed to do twining and weaving. The assemblers also act as consolidators of the finished products, facilitating the easy collection by large processors. These twiners and the weavers are being supplied with coco fibers/hanks by the large processors through their respective assemblers.

Decorticatorsand Traders/Exporters

In a special case experienced by some cooperatives, the lead firm who was also the supplier of the equipment assisted in the start-up operations of the baled fiber processing. Information was provided interms of equipment maintenance, quality specifications and quality control.

There is predominately an arm's length based relationship between the cooperatives and the lead firms. Exporters/lead firms determine the price and have set the quality standards for any suppliers to follow. One cooperative did not continue to supply to the exporter due to the low price offer.

Selection of baled coco fiber suppliers are based on quality standards. Exporters set dimension and weight of the baled fibers. For buyers of coco nets and twine they are still in the initial try out stage of the products from the cooperatives. The Mining companies are comparing these to the nets/twine sourced from Bicol.

PRICE AND COST STRUCTURE

Income and Profit

TABLE 83. COSTS AND RETURN ANALYSIS, COCONUT FARM(1 HECTARE)

Item	Qty	Unit	Unit Cost	Amount
EXPENSES (Inputs)				
Inputs				
Salt Fertilizer	5	bags	225.00	1,125.00
Equipment				
Bolo	5	pcs	100.00	500.00
Sudsud	2	pcs	175.00	350.00
Tingkalan	2	pcs	8.00	16.00

TABLE 84. COSTS AND RETURN ANALYSIS, COCONUT FARM(1 HECTARE)

Item	Qty	Unit	Unit Cost	Amount
Carabao	1	head	1,000.00	1,000.00
Tapahan	1	pcs	2,500.00	2,500.00
Carriage	2	unit	350.00	700.00
Sacks	10	pcs	10.00	100.00
Labor	Contract			
Harvesting				-
Picking/ Gathering				-
Dehusking				-
Copra Making				-
Scooping	8		2,000.00	16,000.00
Hauling	16		250.00	4,000.00
Resecada cost(20%)				10,080.00
TOTALEXPENSES				36,371.00
INCOME				
Yield per hectare(copra)	3360	kg	15.00	50,400.00
NET INCOME (nuts)				14,029.00
Yield per hectare(husks)	6720	pcs	0.25	1,680.00
TOTAL INCOME (with husks)				**52,080.00**

The above table shows that a coconut farmer whose only source of income is copra production can have an additional income of Php 1,680 by just collecting the husks. The family can have additional income if her wife and children will work as twine makers at their house and sell it in nearby community-based processing plants in their area. Assuming that household members can produce a total of 95 hanks per day and work 20 days in a month, with an average price of Php 4.50 per hank (labor only), thus, a total of Php 8,550 per month will be their additional income in twine making.

TABLE 85. COSTS AND RETURN ANALYSIS, 1 MONTH COIR PROCESSING				
Item	Qty	Unit	Unit Cost	Amount
MATERIAL COSTS				
Raw Materials	198,000	pcs	0.25	49,500.00
Hauling (Fuel/Oil)	132	ltr	42.00	5,544.00
LABOR COSTS				-
1 driver	22	MD	250.00	5,500.00
2 helpers	44	MD	150.00	6,600.00
DECORTICATING COSTS				-
2 Machine Operators	44	MD	250.00	11,000.00
4 helpers	88	MD	150.00	13,200.00
MARKETING COSTS				-

Table 85:Costs and Return Analysis, 1 month Coir Processing				
Item	Qty	Unit	Unit Cost	Amount
Used Sack	990	pcs	10.00	9,900.00
Plastic Straw	19,800	mtr	0.50	9,900.00
Transportation cost(fuel)	48	ltr	42.00	2,016.00
hired labor (4 deliveries)				-
- 1 Driver	4	MD	250.00	1,000.00
- 2 helpers	8	MD	150.00	1,200.00
Cash Point	4	days	100.00	400.00
OVERHEAD COST				-
Electricity	22		378.00	8,316.00
Water	2	cu.m	210.00	420.00
ADMINISTRATIVE COST				-
1 plant supervisor	1		6,000.00	6,000.00
1 book keeper	1		3,000.00	3,000.00
1 cashier	1		5,000.00	5,000.00

OTHER EXPENSES				-
Repair & Maintenance	0.001666667		2,526,000.00	4,210.00
Permit/Registration	0.083333333		10,000.00	833.33
DEPRECIATION				-
1 truck(P1.2M, useful life 10 yrs)	1		10,000.00	10,000.00
1@ deco,baling, sieving, pump	1		6,883.33	6,883.33
1building	1		2,083.33	2,083.33
3 phase installation	1		4,166.67	4,166.67
TOTAL COST				166,672.66
SALES:				-
Coco Coir	19,800	kg	9.50	188,100.00
Coco Peat	39,600	kg	1.00	39,600.00
Gross Sales				227,700.00
Net Income/Loss				61,027.34

The above table is a general cost and return analysis of monthly operations of a coco coir processing plant. Assuming a group of 80 farmers in an area will form a cooperative and decide to engage in cococoir production. From the Php 61,027.34 monthly income of the group, the cooperative's annual income will be Php 732, 328.08. Assuming their net surplus is 80% of the annual income. In coir production alone, each farmer will have an equal interest share of capital of Php 9,154.10. Most likely be given every year on the month of December, just like a regular employee receiving his bonus from his employer.

Relative Financial Position of Players

The tables below shows the coco-nets value analyses both for exports and local markets. The analyses show that the export prices are relatively low. Table 3 also shows that the twining segment gets the highest share of the value-adding activity. In effect, the coconut farmers get about 74.12% value in the chain while the processors get only about 25.06%. Should the farmers opt to produce the fibers manually, they would get additional 3.82% of value added.

TABLE 86. COCONUT FOR EXPORT VALUE ANALYSIS

Particulars	Value Chain Segment / Actors				
Selling Price (Php)	Input Providers	Decorticating /Defibering	Twine Makers	Processors/ Geo-net makers	Export Buyers
		P 3.60/kl	P9.00/k	37.00/14 hanks	P 36.25 @22.50 per sqm
Cost of Husks(10-15pcs)		3.60			
Transport Cost of Husks		0.50			
Cost of other materials					
Cost of decortications (labor)		2.50			
Cost of decortications (power)		1.75			
Cost of fibers			9.00		
Transport Cost of fibers			1.00		
Cost of labor-twining			16.80		
Cost of twines			1.00	37.00	
Cost of weaving				13.00	
Transport Cost of geo-nets				2.50	
Cost of geo-nets					
Cost of geo-nets handling					
Cost of inputs (labor , etc.)	0.20				
Value Added	3.40	0.65	9.20	3.75	T= p17.00
% Value Added	20.00	3.82	54.12	22.06	

Table 86 shows that if the geo-nets are sold in the local market maintaining the pricing schemes for the export market, the shares in the value adding activities would change in favour of the processors and contractors. However, changing the buying prices would not be beneficial for the industry since the local market is limited and arbitrary (depending on the utilization of DPWH and the mining areas rehabilitation) so unsustainable. Hence, the best thing to do is to maintain the buying prices and re- distribute the value added to the input providers and twine makers interms of other benefits and incentives. This should be done to protect the export market which is unlimited and more sustainable.

TABLE 87. COCONET FOR LOCAL MARKET VALUE ANALYSIS

Particulars	Value Chain Segment / Actors					
Selling Price (Php)	Input Providers	Decorticating /Defibering	Twine Makers	Processors/ Geo-net makers	Contractors	Users
		P 3.60/kl	P9.00/k	39.00/10 hanks	84.90 @45.00 per sqm	94 @ 50.00 /per sqm

Particulars	Value Chain Segment / Actors					
	Input Providers	Decorticating /Defibering	Twine Makers	Processors/ Geo-net makers	Contractors	Users
Cost of Husks(10-15pcs)		3.60				
Transport Cost of Husks		0.50				
Cost of other materials						
Cost of decortications (labor)		2.50				
Cost of decortications (power)		1.75				
Cost of fibers			9.00			
Transport Cost of fibers			1.00			
Cost of labor-twining			24.00			
Cost of twines			1.00	39.00		
Cost of weaving				13.00		
Transport Cost of geo-nets				5.00		
Cost of geo-nets					84.90	
Cost of geo-nets handling					2.00	
Cost of inputs (labor , etc.)	0.20					
Value Added	3.40	0.65	4.00	27.90	7.10	T=43.05
% Value Added	7.90	1.51	9.30	64.80	16.49	

Tables 86 and 87 clearly shows the potentials in both export and local markets and it would lead us to question how could the processors make it possible to compete in the export market with the very low pricing? The key is production cost of fibers and the quality of twines. The production of coir fibers require the decortications of coconut husks which is expensive due to high power rates and the distance of husks from the processing plants. Only 30% of the husks are recovered as fibers while 70% is cocopeat. At present, there is negligible market for cocopeat so that 100% of the cost of production is carried by the coir fibers which is only 30% of the products obtained. This is so because the coconut peat is expensive to market due to its high moisture content and electrical conductivity. Should there be assistance in acquiring equipment for coconut peat drying (after hydrowashing), the material would be easier to market and should carry portion of the decorticating cost which should reduce the coir fiber costs. Using such material for farm fertilization would also help move the product.

High quality twines and coco-nets are required for the export market. The only way to make it is to be more efficient and productive. In localmarket production, a kilo of coir fiber may produce only 10 hanks. But for export market production,a kilo of coir fibers should produce between 15 to 17 hanks. This quality production would also improve the income opportunities of the twine makers because for a lesser volume of coirfibers, they will produce more number of hanks which are paid by piece.

Since the key is quality, the challenge of development facilitators is how to improve quality in order to be competitive in both export and local markets. And this requires a strategy to deal with other pressing factors like shortage of farmworkers, availability of other more attractive

jobs and employment opportunities while harnessing the availability of women and family work force, and the comfort of working at home.

MARKETS AND MARKET TRENDS

Local Consumption

From 2001 to 2010, local consumption averaged 311 mt per year with a peak level of 599 mt in 2010 and a low of 119 mt in 2003. Domestic consumption for the past ten years grew by 2.7%. In the domestic market, coir is being used as a stuffing material for mattresses and upholsteries. It is likewise processed locally into household brushes, doormats, rugs, ropes and twines, cocopads, rubberized coir,panel boards, media for gardening, geotextiles and numerous fiber craft items which are mostly intended for the export market. The geotextiles,mattress and upholstery makers are now themajor local users of coir.

Locally, coir geotextiles have gained acceptance as alternative material for soil erosion control and road rehabilitation. Some of the important local projects which made use of geotextiles include the Subic-Clark-Tarlac Expressway, the rehabilitation of damaged slopes in Southern Leyte, the construction of cross drain structures in Baguio-Bontoc Road(Halsema),the embankment of the Zamboanga slope and road for protection from erosion and a number of other projects of the Department of Public Works and Highways(DPWH) and by the private sector. The DPWH found geotextiles more advantageous than other traditional materials such as concrete construction materials for erosion control for the following reasons:(1)the overall cost of coir as erosion control material was lesser by two-thirds;(2) it is comparable in durability as long as the soil is well stabilized prior to its installation;and(3)coir is eco-friendly and biodegradable and it promotes vegetation growth as it traps topsoil and keeps its nutrients intact.

Potential users of geotextiles, aside from the DPWH are mining companies for soil erosion control and site rehabilitation projects and property developers and landscaping contractors for green architecture and landscaping projects.

Coirdust/peat, meanwhile, has gained more attention from local gardeners and plant enthusiasts as they now use this materialas growing medium and soil conditioner. The agriculture sector, with vast tracts of land planted to plantation and horticultural crops, thus, presents a big potential market for coir dust/peat as organic fertilizer and soil conditioner. The recommended application of coir peat compost is at 5 tons per hectare of land regardless of its elevation. It is recommended to put the peat in the base of the land before sowing. For greenhouses, about 23 tons of coir peat is required for every hectare. For application in fruit bearing trees such as coconut, mango, and banana, it requires at least 5 kg per tree.

The Office of the President also issued Memorandum Circular No. 25 which could help boost local demand for coir. The circular directed all national and local government agencies, bureaus and other instrumentalities including agricultural institutions and councils to use coco peat or coir dust and coconut fiber material for soil conditioning and erosion control in government projects nationwide.

In the past years, the domestic market absorbed the bulk of available supply of coir. However, since 2002,the situation had reversed as the export market was able to get the majority of the supply.

Coir Manufacturers

Coir manufactures consist of other coir products, carpets, doormats and floor coverings, husk cubes and nets of coir. These new commodity codes were introduced when the Harmonized System (HS) was implemented in 2007. The commodity classifications, processed coir (not spun) and coir waste ceased to exist.

Export volume and value of coir manufactures from 2007 to 2010 averaged 413 mt and US $ 78,398, respectively.

Coir Dust

Coir dust was exported for the first time in 1992 to Taiwan and Japan. Japan remained the most consistent foreign market although its imports averaged only 169 mt per year during the period under review. South Korea emerged as the top market with annual average imports of 768 mt. From 2001 to 2010, foreign shipment of coir dust averaged 2,016 mt. Most of the Asian importing countries use coir dust and peat for animal beddings, fertilizer and as water holding agent.

Major importing countries and demanded products:

Raw Fiber: Taiwan, China, Hongkong
Coir Dust: South Korea, Japan, Canada
Coir Wastes: South Korea, Taiwan, Japan
Processed Coir: Japan, China, and Taiwan*(Source:PhilFIDA)*

The grades of coir are determined by three qualities: strength, cleaning and color. The standard grades of coir are the following:

Table 88. Standard Grade of Coir

Letter Designation	Name of Grade	Description
CH-1	Coir Good	Fiber (bristle) is of good cleaning, with little orno pulp content; color is light brown to almost dark brown; length is not less than 5 inches
CH-2	Coir Fair	Fiber(bristle) is of fair cleaning; fibers are stuck together and considerable pulps are present; color ranges from dull brown to dark brown or black; length is not less than 5 inches
CH-3	Coir Mixed	Mixture of bristle and mattress fibers, generally crumpled and tangled; of good and fair cleaning, must be free from coir dust and hard, undefibered portion of the husk;color ranges from lightbrown to dull brown.
CH-4	CoirMattress	Consists mostly of short crumpled fibers with an average length of not less than ½ inches; must be free from coir dust and hard, undefibered husk.
CH-W	Coir Waste	Consists of coir dust and fiber not fitted in any regular grades of coir, with length of less than 2 ½ inches long.

By 2016, the country intends to be world's top 3 exporters of cococoir products. It is reflected in "The Philippine Coco Coir Road Map 2012-1016 (DTI)". Export is targeted at $50million from $3.38 million in 2013, and domestic sales to increase similarly from P 500 million to P 1.7 billion in 2016. Expected investment is P2.0 billion, expansion in production volume of 83,000 metric tons, 450 small and medium enterprises (SMEs) and 200,000 farmers assisted in 2016.

According to the 2013 National Cococoir Fact book of the Department of Trade and Industry:

- There is a growing export market for coco geonets in Europe, Japan, China, South Korea, USA, Canada and the Middle East;
- The country's major export market for raw and baled cocofiber are China, Japan, Taiwan and USA; for Peat/Dust are China, Korea, Singapore and Japan; Coco twines/cordage are China, EU, UAE, US and Asia (India, Indonesia,Vietnam);Carpets and other products– Malaysia and US;
- Demand in the US for geotextiles/geosynthetics is forecasted to increase 6.6 percent per year to 1.3 billion square yards in 2017, valued at $2.9 billion.This is spurred by improved spending in construction of structures and roads and will benefit from increased awareness

of the construction sector on the long term cost and performance advantages of geotextiles/geosynthetics products versus traditional geotechnical solutions. Increasing concerns on environment protection will see a shift to the use of geotextiles/geo-synthetics in such application as erosion control, mining and shale gas containment. The next five years appear to offer a steady increase in the potential for geotextiles.

According to DTI-BETP and as quoted by Phil Coir Vice President Go, the demand for geotextile, a by- product of cococoir as an erosion control material in China alone is estimated at 270,000 square kilometers and its desert are asare increasing at a rate of 1.17 percent annually during sand storms.

A significant prospect for coir is the growing global concern to address ecological problems through the use of natural materials for environmental protection (FIDA). Coir nets of geotextiles and bio- logs of fascines, two of the most important products of coir today both here and abroad, have been proven to be effective materials in controlling steep and road slopes erosion and for riverbank protection in technologically advanced countries.

PRICE TRENDS

Export Market

The price of cocofiber and peat varies on its grade classification. Price of crude coconut fiber rose significantly in just 11 months from 273 USD per metric ton in May 2013 to 350 USD in January 2014 then reached to 383 USD in June 2014. The price of coir mixed also increased from 122 USD per ton in March 2013 to 159 USD in October 2013 and by June 2014 it has a price of 209 USD.

TABLE 89. PHILIPPINES, NON-TRADITIONAL COCONUT EXPORTS BY DESTINATION,2008-2012

Value in US $ 000FOB

Commodity Destination	2008	2009	2010	2011	2012	AVE	SHARE
B. Non-Food 2. Husked/Fiber Prods 1. Baled Coir	922.39	739.14	946.39	1978.95	1983.52	1314.08	100.00
Americas	60.60	0.00	3.83	5.20	13.50	5.83	0.44
USA	6.60	0.00	3.83	5.20	13.50	5.83	0.44
Europe	0.00	0.00	0.00	0.00	1.48	0.30	0.022
Netherlands	0.00	0.00	0.00	0.00	1.48	0.30	0.02
Asia &Pacific	891.79	739.14	942.56	1973.75	1968.54	1303.16	99.169
Australia	0.00	0.00	0.00	0.00	16.84	3.37	0.26
Hongkong	93.25	76.99	0.00	23.40	12.98	41.32	3.14
India	4.00	2.35	0.00	0.00	0.00	1.27	0.10
Japan	21.68	35.80	31.00	87.01	94.11	53.96	4.11

Table 89. Philippines, Non-Traditional Coconut Exports By Destination, 2008-2012 Value in US $ 000 FOB							
Commodity Destination	**2008**	**2009**	**2010**	**2011**	**2012**	**AVE**	**SHARE**
Korea	25.29	107.09	40.6	46.00	60.37	56.01	4.26
Malaysia	0.00	15.12	0.00	0.00	0.00	3.02	0.23

In 2012, the value of exported cocofiber, geonets and other by-products amounted to $2.078 million, mainly to China, Asia and USA while domestic sales were reported at P18.16 million (DTI, R-V Report).

Domestic Market

TABLE 90. INDICATIVE PRICES OF COCONUT HUSKS, HANKS, PEAT, GEO-NETS	
Product Format	Indicative Price (PhP)
Husks	0.15-0.25per piece or 15-20 per cubic meter
Hanks	2.60 – 4.50 per piece
Cocopeat	100/bag (raw)or 300/bag(vermicompost)
Geo-nets	2,500-3,000 per roll
Source: KII/FGD	

SUPPORT SERVICES

Financial Services

TABLE 91. FINANCIAL SERVICES			
FINANCING INSTITUTIONS	PROGRAM/LOAN FACILITY	ELIGIBLE BORROWERS	LOANABLE AMOUNT
Land Bank of the Philippines	*Retail Countryside Fund (RCFI and II)*forWorking Capital and Fixed Asset Investment (New and/or Incremental)	Sole proprietorship, partnership, at least 70% Filipino-owned corporation, Cooperatives/ Associations with projects located outside NCR and Cebu City	Php 100,000 to Php 10,000,000

Land Bank of the Philippines	*Credit Program for Cooperatives (CPC) or Cooperative Lending Program(CLP)* *-Agricultural Product Loan (APL)*intended to finance crop production *-Working Capital Loan (WCL)* for operating capital *-Rediscounting Line (RL)* To supplement operating capital through rediscounting or promissory notes (PNs) of members	Agricultural cooperatives, non-farmers or credit cooperatives, institutional or employees' association cooperatives which meet the LBP accreditation minimum requirements	Up to 80% of the Project cost For rediscounting, up to 85% of the outstanding balance For institutional/ employees association's cooperatives,up to Php 300,000
Land Bank of the Philippines	*Accelerating Change in the*	Eligible partners: Cooperatives/ Federations, farmers and fisherfolk, NGOs, Private Entrepreneurs, LGUs, and other interested investors provided they have no adverse CI/BI reports	Equity Investment amount of Php 1 million and shall not exceed Php 20 million
Land Bank of the Philippines	*Easy Pondong Pang-Asenso (EPPA)* for Working Capital and Fixed Asset Acquisition except lot	Sole Proprietorship, partnership, corporations engaged in manufacturing, agribusiness and processing,and services including trading &merchandising *(minimum of 3 million and maximum of 100 million*	80% of the total project cost and the borrower has to put up the 20% as equity either in cash or in kind

Table 91. FinancialServices			
FINANCING INSTITUTIONS	**PROGRAM/LOAN**	**ELIGIBLE BORROWERS**	**LOANABLE AMOUNT**
Land Bank of The Philippines	***SME Unified Lending Opportunities for National Growth (SULONG)*** for Working Capital	Profitable enterprises with Track record except trading of imported goods, liquor, cigarettes, and extractive industries	Maximum of Php 5 million
Foundation for a Sustainable Society, Inc. (FSSI)	***Coconut Business Integration and Development Program (COCOBIND)*** for working capital, acquisition of productive assets, and credit line	Organized marginalized groups, development organizations, and individual private social entrepreneurs in cococoir sub-sector	Php 500,000 to Php 5million (for first time borrowers) Up to Php 12 million for re-availment
United Coconut Planters Bank	***Small Business Loan (SBL)*** for business expansion, acquire fixed assets, and settle trade payables	Sole Proprietorship, partnership, corporation	Php 500,000 to Php 5 Million (outside Metro Manila and key provincial cities)

Non-Financial Services

Business development and other services relative to the coconut fiber industry are provided in the following methods:

1. Informal
2. Embedded
3. Commercially sponsored mechanism
4. Fee-based Mechanism
5. Stand-alone free services

TABLE 92. NON-FINANCIAL SERVICES	
Agencies	ServicesProvided
Department of Trade and Industry (DTI)	The lead agency in the implementation of the CY 2012 -2016 National Road Map for the Cococoir industry. It highlighted the importance of moving up the value-chain by expanding production in value-added products such as twines, geotextile, stitched mats, tufted mats and coco-peat as growing medium. Business models are presented which can bead opted i.e.1) Community-based integrated processing, 2)Big-brother integrator, 3)Tufting facility as market consolidator of twines, 4)Triple armor application of coco-nets in mining areas,and 5)provision of shared service facilities(SSFs).
Department of Public Works and Highways (DPWH)	Approved the adoption of coconut geo-nets as bio-engineering solutions, item 518 for controlling erosion and slope stabilization in compliance with presidential Memo Circular No. 25. solutions, Item 518 for controlling erosion and slope stabilization in its construction of roads and highways and riverbank erosion

Table 92. Non-Financial Services	
Agencies	**Services Provided**
Department of the Interior and Local Governments (DILG)	Issued Memo Circular No.2013-005 enjoining all Provincial, City and Municipal Chief Executives, DILG Provincial, City and Municipal Operations Officers to institutionalized the advocacy, support and promotion of the use of coco coir and by-products for soil conditioning, soil erosion and flood control.
Department of Science and Technology(DOST)	Conducting research on prototypes of decorticating and other machines for coco coir, the use of coco peat as substrates, and the distribution of these equipment to farmers and their organizations.
Department of Agrarian Reform (DAR) and Cooperative Development Authority (CDA).	Collaborate in the institutional development of agrarian reform beneficiaries and their organizations.
Department of Agriculture (DA) and Philippine Coconut Authority(PCA)	Collaborate in the acceleration of coconut planting/replanting, intercropping and other productivity programs; establishment of common service facilities for cococoir processing; development of standardized and durable cococoir processing equipment, and pricing of coconut husks; promotion of new incentives for agro- industrial enterprises to use coir products, and extension of tax holidays and other fiscal incentives for small coco coir enterprises; provision of proper infrastructure support to the industry, and sponsoring scholarships/academic research on innovating our local fiber and peat.
Local Government Units	CLGU-Provide counterpart funding for project development, technical support, facilitate organization of farmer groups, planning and collaboration.
Congressional Districts' Office	Projects/interventions in support to the coconut industry.

ENABLING ENVIRONMENT

FORMAL RULES, REGULATIONS AND POLICIES

Among the policies that adversely affect the industry are cabotage law and the Department of Agriculture or Philippine Coconut Authority's lack of focus in coconut products development and marketing.

The Cabotage Law causes the shipping costs tobe more expensive and made usless competitive than our competitors.

The lack of focus of the Philippine Government on addressing coconut value adding and marketing issues delays the progress of the industry. For years,the PCA had focused on coconut planting and re-planting programs which is not substantial since the competitiveness of the industry should anchor on a balance supply of raw materials and processed products. The

value chain approach should have been the basis of interventions to enhance the industry's competitiveness.

Government Policies Impacting the Coconut Industry

CARP on Coconut Land: This policy has had a severe effect on the efficiency of coconut lands given the large swaths of coconut land redistributed, and the ineffectiveness of government extension and other support services to equip small holders with the technical and financial capacity to maintain or improve the productivity of their coconut trees. As of 2006, coconut lands under CARP scope as a percentage of total coconut lands in Mindanao has ranged from substantial to nominal as illustrated in three selected provinces. According to industry stakeholders interviewed, the ability to access consistent volumes of copra, husks and charcoal to meet market demands has been negatively impacted by the supply disaggregation caused by CARP.

TABLE 93. COCONUT LANDSUNDER CARP

Indicator	Davao Oriental	Zamboanga del Norte	Misamis Occidental
Total coconut area	156,139 ha	141,966 ha	107,327ha
CARP Geographic Target Area	55,965ha	50,131ha	18,184ha
Coconut area under CARP targets	30,000ha	41,617ha	11,448ha
Coconut under CARP as %of total	19%	29%	11%

The Coconut Levy Fund: The coconut levy was a tax collected from coconut farmers during the term of the then President Ferdinand Marcos under Presidential Decree 276. The tax initially of P15 per 100 kilograms of copra was imposed on every first sale. This figure then increased to P100 per 100 kg over a 9 year period. The proceeds established a fund which was intended for the development of the coconut farmers in terms of productivity improvements, micro finance and a range of other socio-economically responsible interventions. Instead, it was controlled by the PCA, COCOFED and the United Coconut Planters Bank (the UCPB was established as the financing arm entrusted with the funds) under the Marcos regime. Rather than benefitting coconut Farmers, funds were either siphoned off, used to invest in non-coconut industry interests, or to create oil milling monopolies in order to benefit the Marcos loyalists. (PCA News)

The Coconut Industry Investment Fund (CIIF) was established to invest in industrial oil milling interests,claiming to this day to benefit coconut farmers by creating a stable market. The reality is that 1)a competitive private market for copra would exist without the presence of CIIF mills, 2)the subsidized CIIF Oil Mills distort market forces, making it more difficult for private enterprises to compete, and 3)CIIF mills buy directly from traders and middlemen, rarely directly from farmer member based organizations. Infact, the assessment team was told by

one CIIF oil mill that they were considering sourcing copra from Indonesia, despite their apparent socio-economic mandate to support Filipino coconut farmers.

Currently estimated at P100-P130 billion (USD2.15B- 2.8B), the coconut levy fund has yet to be released to directly benefit coconut farmers. Instead it is a convoluted and complex management structure, which has been repeatedly criticized over the years as corrupt and benefitting only those who control the purse strings.The UCPB indicated that the CIIF is 51% controlled by government and 49% by farmer representatives, with a board of directors determining the allocation of funds. Farmers continue to lobby for the direct release of funds to no avail.

Coconut Preservation Act: Republic Act 8048 established in 1995 regulates the indiscriminate cutting of coconut trees. The law is intended to provide regulatory grounds for maintenance of the raw material base of the coconut industry. However, due to increasing senility,the low perceived value of potential coconut income, and the scarcity of wood in the Philippines, farmers continue to remove their trees for sale as coconut timber. This is threatening the productive base of the coconut industry, and also creating a natural resource management dilemma (30% of coconut trees are on hill sides, and widespread removal creates soil instability).

According to PCA, if a farmer intends to follow the Coconut Preservation Act and remove a moribund tree formally, there is a litany of bureaucratic steps which they must follow. First, they must have a barangay-level consultation to prove ownership of the tree in question;second,the PCA must visit the farm to inspect the tree and determine if it is fully unproductive; and finally, the farmer must pay P25 to the PCA in order to receive approval to cut the tree. Needless to say, this tedious process would dissuade the most responsible coconut farmer from participating formally. It is evident that the process for justified felling needs to be simplified, the cost for approval needs to be eliminated, and PCA must focus on incentivizing farmers for maintenance of their tree stock rather than regulating and taxing rational economic decisions.

INFORMAL RULES AND SOCIO-CULTURAL NORMS

Input Provision

The suppliers of raw materials (husks) are the farmers.

There are no written policies as to the payment scheme between farmers and decorticators in terms of collecting and buying the husks from the farmers. One of the observed informal practices in the industry is that the buyers (decorticators) have this box that serves as their scale which is approximately 1 cubic meter (Approximately 170 coconut husks) and to be filled in with husks they buy in the amount ranging from Php 15 to 21. Some are selling it based on the agreed prices from Php 0.15 to 0.35 each. Also, decorticators tend to collect husks from farms for free also to eliminate wastes made by the husks. These husks as they say became the dwelling places of venomous snakes and by which the place became more dangerous to people.

Farmer-Members of some cooperatives are being obliged through verbal agreement that a certain percentage of their whole coconut produce (usually10%) is to be sold in the cooperative.

Coir Production (Primary Processing)

In primary processing, the decorticating process, the usual laborers are also the farmer-member of the cooperatives/associations who were trained to operate the machines in the plant.

Processing (Twining and Weaving)

Twine makers and weavers of geo-nets are usually the household members of the members of the cooperatives/associations. Twining machines are being supplied by the cooperatives/associations to their houses who are willing to make twines but in exchange, they have to hit a certain volume of production such that it will not be pulled out from their houses, this will encourage those wives and children of the farmer-members to augment their income even without leaving their houses. Thus, they can gain income through twine making and even do their chores in their houses.

Cooperatives/Associations are also accepting children below 18 years old to do the twine making on week ends and holidays to have an their own income itself to support their studies as long as they have this permit from the Department of Labor and Employment and the Department of Social Welfare and Development, including the written consent from their parents allowing them to do the job.

Trading

Traders are usually contacting the plants who produce baled fibers and geo-nets, but these traders dictate the prices as they are the ones who have contacts with the final buyers.

The Department of Science and Technology (DOST), is conducting research on prototypes of decorticating and other machines for cococoir, the use of cocopeat as substrates, and the distribution of these equipment to farmers and their organizations. The Department of Agriculture (DA) and Philippine Coconut Authority(PCA), collaborated in the acceleration of coconut planting/replanting, intercropping and other productivity programs; establishment of common service facilities for cococoir processing; development of standardized and durable cococoir processing equipment,and pricing of coconuthusks; promotion of new incentives for agro-industrial enterprises to use coir products,and extension of tax holidays and other fiscal incentives for small cococoir enterprises; provision of proper infrastructure support to the industry, and sponsoring scholarships/academic research on innovating our local fiber and peat. The Local Government Units (LGUs) provide counterpart funding for project

development, technical support,organization of farmer groups, and planning, collaboration and providing extension services to farmers.

Recent development in the foregoing case has the Supreme Court ruling to free up the Php 71billion in coconut levy funds to be used for programs thereby benefiting coconut. The decision specifically ruled that the funds is *"be used only for the benefit of all coconut farmers and for the development of the coconut industry."* The PCA is challenged bythe coconut farmers' organizations to assume full management role in utilizing the Fund for and in behalf of coconut farmers and ensure proper identification and accounting of all farmers' organizations nationwide, as provided by existing laws." (PCA)

The coconut coir sub-sector industry is still hoping that the House Bill No. 6667 otherwise known as "*Philippine Coco Coir Industry Development Act of 2012"*will be enacted into law the soonest time possible. Under this bill, the Philippine Coco Coir Industry Development is made a priority program of the country. It will also create the Philippine Coco Coir Industry Development Council (PCCIDC) which will formulate a ten-year Philippine Coco Coir Industry Development Plan. Its framework includes the following: Site Identification; Scientific Research and Development;Creation of Domestic Demand;Production Support and Extension; Market Promotion and Business Development; Infrastructure Development; Quality Assurance; and establishment of the Philippine Coco Coir Information Center. Salient features of this bill include implementation of CocoCoir Livelihood Programs, provision of funding requirements through Philippine Coco Coir Development Fund, and granting of numerous Incentives and Tax Exemptions.

This industry is highly affected by the efficiency of processing technology being adopted. In the production of fibers, a 2-pass decorticating machine would entail 30% additional cost and a 3-pass machine would entail atleast 50% additional cost. Hence, its competitiveness lies on the efficiency of machines and twining as regards material recovery.

Short fibers which are not used for twining averages about 10% and can be utilized for other products like biologs,tufted mats, organic fertilizers,or fiberboards.

The Philippines is aiming to be the world's number three exporter of cococoir in the world with specific goals such as 83,000 metric tons of coco fiber produced and exported in 2016;US$50 million in exports; Php1.7 billion in domestic sales; Php 2 billion additional investments; 200,000 farmers and 450 SMEs assisted; and created at least 10,000 jobs related to cococoir industry. If we grab the opportunity of the growing demand of the cococoir and coir products worldwide and the need to bring in together the concerned LGUs, NGAs, and other agencies to provide strategic interventions to the industry including production and market development,financing and policy support,these goals as set forth in the Philippine Coco Coir Roadmap 2012- 2016 are do able.

TABLE 94. EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT (E-VSA) RESULTS AND RANKING

REGION	PROVINCE	MUNICIPALITY	NO._FARMERS_ACTUAL_DATA	VOL._PRODUCTION_ACTUAL_DATA	AREA_PLANTED_ACTUAL_DATA	POVERTY_INCIDENCE_ACTUAL_DATA	OLD_COMPOSITE_INDEX	OLD_RANK	NEW_COMPOSITE_INDEX	NEW_RANK	GEOCODE
Caraga (Region XIII)	AGUSAN DEL NORTE	BUTUAN CITY	0	0	0	18.7	0.6022	1	0.28536	1	160202000
Caraga (Region XIII)	AGUSAN DEL NORTE	CABADBARAN	2018	46424	6908.36	24.9	0.4484	8	0.2307	2	160203000
Caraga (Region XIII)	AGUSAN DEL NORTE	MAGALLANES	386	4317	642.41	25.9	0.5704	2	0.21479	3	160208000
Caraga (Region XIII)	AGUSAN DEL NORTE	JABONGA	853	45457	6764.43	48.1	0.4215	11	0.20793	4	160205000
Caraga (Region XIII)	AGUSAN DEL NORTE	CARMEN	2404	31621	4705	37.7	0.5127	5	0.11376	5	160204000
Caraga (Region XIII)	AGUSAN DEL NORTE	REMEDIOS T. ROMUALDEZ	79	12138	1806.26	36.1	0.4444	9	0.09701	6	160212000
Caraga (Region XIII)	AGUSAN DEL NORTE	LAS NIEVES	1587	4507	670.7	59.4	0.4929	6	0.09645	7	160207000
Caraga (Region XIII)	AGUSAN DEL NORTE	NASIPIT	855	21858	3252.68	20.7	0.5156	4	0.04002	8	160209000
Caraga (Region XIII)	AGUSAN DEL NORTE	BUENAVISTA	1570	23352	3475	30.8	0.4648	7	0.03489	9	160201000
Caraga (Region XIII)	AGUSAN DEL NORTE	TUBAY	431	24713	3677.55	42.7	0.5366	3	0.02811	10	160211000
Caraga (Region XIII)	AGUSAN DEL NORTE	SANTIAGO	737	15065	2241.8	40.5	0.4122	12	0.02777	11	160210000
Caraga (Region XIII)	AGUSAN DEL NORTE	KITCHARAO	692	18196	2707.74	40	0.4226	10	0.01166	12	160206000

MAP 21. EXPANDED VULNERABILITY AND SUITABILITY ASSESSMENT MAP

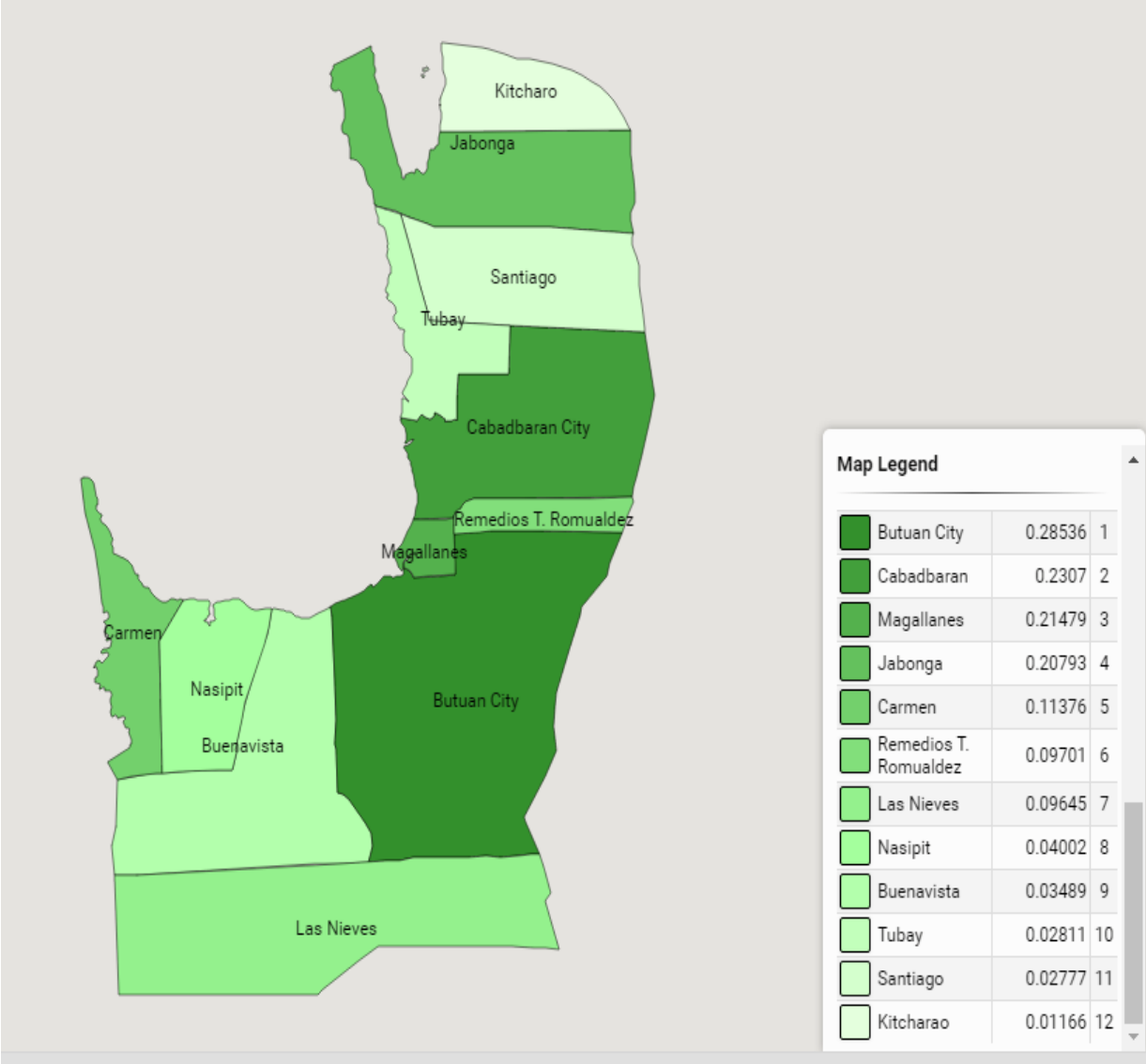


TABLE 95. GAPS AND THE PROPOSED INTERVENTIONS IN COCONUT DEVELOPMENT

Value Chain Segment	Key Gap/ Constraint in VC Development in Butuan City	Brief Description of Potential Intervention	Target Result/ Outcome	Target Areas to be covered	Proposed Lead Player	Estimated Project Cost (000)	Risk & Risk Management/	Rank
Input Supply	Poor and inefficient system of husks collection	Establishment of collection points at every participating barangays in a cluster	Increased base of coco husks supply chain	Sumile, Maibu,Maguinda, Don Francisco, Bilay	Bilay Small Coconut Farmers Organization	**2,250**	Collection points are managed by individual participating barangays provided with incentives for every kilo of coco husks sold	1
		Provision of hauling facilities	Increased efficiency in the collection and delivery of coconut husks			**1,950**	High maintenance costs can be reduced if hauling facilities are the modified kuliglig tractors	
		Adoption of a coco peat (organic fertilizer) to coco husks exchange program	Increased savings (organic fertilizers) and income opportunities for coconut farmers				This will facilitate farmers adoption of organic farming system and at the same time increases the coco husks supply chain	
		Provision of working capital to ensure prompt payment of raw materials	Increased volume of coco husks procured			**500**	The utilization of working capital must be geared towards the promotion and development of a social enterprise	
	High costs incurred in the collection and deliveries of husks due to the state of road networks affecting farmers income and making it unattractive	Improving the barangay road networks to increase efficiency of husks collection and deliveries	20 kilometers of road networks improved, rehabilitated and concretized	Sumile FMR, Maibu FMR, Maguinda FMR, Don Francisco FMR, Bilay FMR		**200,000**	Funding for the concreting of the road networks in support to the development of the coco enterprise in Bilay and supporting Barangays will be sourced out from the DA Regular FMRDP, PCA and possibly the	

							KALSADA Program of DILG/DBM if warranted	
Production	Low production of coco fiber and coco peat due to sub-standard decorticating machines	Institutionalization of parameters towards supplier accreditation focusing not only on AMTECH compliance	Increased efficiency which is output based	Sumile, Maibu,Maguinda , Don Francisco, Bilay,	Dept. of Agriculture		Machine testing of decorticators held on field and results must be adequately documented and disseminated.	
	High production costs due to lack of knowledge and skills in running an enterprise	Installation of an operational system/operations manual that will guide the proponent group	Increased management capacity of the proponent group	Bilay PG	CPMIU, DA-PRDP	**25**	The management team will ensure specific timelines in handholding the PG and in the engagement of business services development providers.	2
	Lack of research for product developments that produces other products	Conduct of research towards the manufacture of coco fiber boards	Increased earning opportunities from additional product lines	Caraga Region	Established coco coir enterprises in Surigao Provinces and PCA		This may compete with lawanit producers using falcata as their raw materials. However, the dwindling supply of falcata may facilitate the consideration of coco husks as raw materials for fiberboards	1
Assembly	Lack of interested assemblers for coco husks, coco fibers for twining and weaving	Setting up of financial packages/ pricing mechanism that will attract and develop assemblers along the coco coir value chain	Engagement of assemblers in the promotion and development of coco coir enterprises	Bilay	Bilay Small Coconut Farmers Organization /PG		The financial packages/pricing mechanism to be adopted shall also consider the provision of equal earning opportunities to other laborers in the development of the enterprise	**2**
Transformation	Inadequate expertise in the production of hanks and geo-nets due to lack of best practices, techno-transfer and skills training	Conduct of exposure trips/learning visits to successful coco coir enterprises	Enhanced perspectives on how to successfully operate coco coir enterprises	Caraga Region's coco coir enterprises	PCA	**50**	The exposure trip/learning visit should be a hands on experience	2

	Low production of high quality hanks and geo nets due to inefficient machines	Provision of improved/modified manual twining and weaving machines	Increased quality and high production efficiency	Bilay	PG		The improvised/modified manual twining and weaving machines must increase the capacity of man hour-machine ratio	3
	Lack of capacity to transform the collected coco husks to final products for sale	Provision of facilities and equipment	Capacity to transform coco husks into products for final sale established	Bilay	PG	**7,375**	The provision of the most needed interventions to promote and develop the coconut value chains in effect creates a social enterprise that is pro-poor, inclusive and one strategy of reducing poverty in depressed areas in Butuan City	
	Lack of other infrastructures	Provision of water system	Water system established to increase the efficiency of enterprise operation	Bilay	PG	**2,700**	For sustainability measures, the water system shall be driven by alternative energy sources	
Marketing	Access to market which is being monopolized by big consolidators	Establishment of a cooperation mechanism between the coco coir/coco products producers	Increased leverage to market	Caraga Region's coco coir enterprises	PCA	**50**	A quality control system and the manual of protocols for the deliveries/meeting the target volume and the timelines should be agreed and adopted	1
	Inability to meet volume requirement	Establishment of a lead consolidator from among the coco coir enterprises in the Caraga Region	Increased production volume on a regional scale					
	No market for coco peat	Installation of a mechanism where all coco peat products produced will be absorbed in LGU Organic Fertilization Programs/Regional Offices Organic Fertilization Program	Local market for coco peat established	DA/CGB			This should start with the PRDP funded projects already released and to be implemented by zones.	
Support Services								
Financial	Stringent process in securing financial support services from	Setting up of special development funds by the City Govt. of Butuan to promote	Additional financial support services provided to coco coir enterprise	Bilay	City Government of Butuan	**100**	The vision of the new City Mayor calls for the provision of focused agri-	5

	GFIs diminishes the interests of the coco coir operators	the local coco coir industry and championed by Barangay Bilay	operator				based projects to at least 10 most depressed barangays in Butuan City including Barangay Bilay. This is a welcome opportunity for the coco coir enterprise.	
Extension	Cooperation between the extension workers of the Office of the City Agriculturist and the Philippine Coconut Authority is not yet strengthened	Establishment of a cooperation mechanism between the Philippine Coconut Authority and the Office of the City Agriculturist	Enhanced extension services provided to the coconut farmers	All coconut producing barangays in Butuan City	PCA, OCA		The perception that developing the local coconut industry is the domain of the Philippine Coconut Authority would be diminished since the project to be established is consistent with the vision of the new City Mayor	2
Enabling Environment	No local policy governing the mandatory utilization of coco peat in the organic agriculture program and geonets in the soil conservation and erosion control program	Approval of an ordinance mandating the use of coco peat in all local organic agriculture devt. programs and geonets in all infrastructure projects with soil erosion issues	Efforts by the different stakeholders towards the development of the local coco coir/coco peat industry and generally the coconut industry are coordinated and enhanced	Butuan City	SP		It is recommended that the CPMIU head will initiate the moves towards facilitation of an enabling environment that will promote and develop the local coco coir industry	5

Generally, the Butuan City Commodity Investment Plan is structured into four sub-programs namely:

1. Intensification and development of the sustainable production systems
   This includes the provision of remedies to relieve the physical and economic constraints for sustainable agricultural development in consideration of the land limitations indicated in the Butuan city Land Resources Evaluation Program conducted by the Bureau of Soils and Water Management.

2. Support to the professionalization of farmers/ growers
   This is the provision of the farmers with the appropriate knowledge and skills for it to establish and flourish their business. This includes the provision of capacity building measures in the areas of production, marketing and processing.

3. Promotion of commodity chains and agribusiness development
   This is the creation of the environment, infrastructure and knowledge necessary for a strong inputs and processing sector. This involves the provision of data and information on market, updates on technology and processing to the rubber and cacao growers.

4. Institutional development
   This is to improve the capacity of the lead players implement the sector's development plan.

The Butuan City Commodity Investment Plan is initially structured according to the requirements of developing the four (4) commodities namely: 1. Rubber, 2. Cacao, 3. Banana, and 4.coconut adopting the value chain development approach. Its categorization into four (4) sub-programs stresses the strategic links and the parallel efforts to be undertaken. Indicated below are the summaries of financial interventions.

TABLE 96.SUMMARY OF RUBBER FINANCIAL INTERVENTION

Rubber Commodity Interventions :	**Support to the professionalization of the producers (in P 000)**	**Intensification and development of sustainable production systems (000)**	**Development of commodity chains and agribusiness development (in P 000)**	**Institutional Development (in P 000)**
Establishment of nursery and related structures		**8,500**		
Purchase of fertilizers under Plant Now Pay Later Program		**3,500**		
Printing of Rubber Techno Guides	**25**			
Capacity Building				

Measures				
Rubber Doctors Training Program	**30**			
Training on good Agricultural Practice	**30**			
Strengthening of Barangay Based Growers Association and the Local Industry Devt. Council				**125**
Market Matching/Mission				**25**
Engagement of a Business Development Services Provider				**50**
Provision of Rain protection Structures		**8,000**		
Provision of Other Infrastructures -Water Systems		**6,500**		
Construction of Consolidating Facilities and provision of a working capital			**9,000**	
Construction of Processing Facility			**20,000**	
Construction of support access road infrastructure			**216,000**	
Establishment of Expansion areas			**31,250**	
Sub-total	**85**	**26,500**	**276,250**	**200**
Grand total for rubber : P **303,035,000.00**				

TABLE 97.SUMMARY OF CACAO COMMODITY FINANCIAL INTERVENTIONS				
Establishment of nursery		**1,500**		
Production and distribution of organic fertilizers		**2,000**		
Establishment of a water system		**4,500**		
Establishment of a consolidating facility and provision of a working capital			**4,500**	
Establishment of a processing facility			**3,500**	
Construction of access road			**200,000**	
Capacity building Measures :				
Training on GAP and printing of prodtn. protocol brochures, leaflets	**200**			
Cacao Doctors Certification Program	**100**			
Strengthening of growers association and the local industry development council	**50**			
Training on Good Manufacturing Practices and the formulation of an Operations Manual				**50**
Hiring of a Business Services Development Provider				**50**
Sub-total	**350**	**8,000**	**208,000**	**100**
Grand Total for Cacao : **P 216,450,000.00**				

TABLE 98. SUMMARY OF BANANA COMMODITY FINANCIAL INTERVENTIONS				
Establishment of community based nurseries		**2,000**		
Procurement and distribution of organic fertilizers		**4,000**		
Establishment of water system		**6,500**		
Provision of hauling facilities , tools and equipment			**1,750**	
Provision of a working capital			**500**	
Construction of road infrastructures			**200,000**	
Capacity Building Measures :				
Training on GAP and printing of brochures, leaflets , techno guides	**100**			
Product Certification Program	**50**			
Strengthening of growers association and the local banana industry devt. council				**50**
Engagement of business development services provider				**50**
Sub-total	**150**	**12,500**	**202,250**	**100**
Grand total : **215,000,000.00**				

TABLE 99. SUMMARY COCONUT COMMODITY FINANCIAL INTERVENTIONS				
Establishment of collection points/centers			**2,250**	
Provision of Hauling Facilities			**1,900**	
Provision of Working Capital			**500**	
Provision of facilities and equipment			**7,375**	
Establishment of water system			**2,700**	
Construction of road infrastructures			200,000	
Capacity Building Measures				
Training on GMP and formulation of the Operations Manual				**125**
Conduct of exposure trips	**50**			
Market Matching/Mission	**50**			
Engagement of a Business Services Development Provider				**50**
Sub-total	**100**		**214,775**	**125**
Grand Total = **P 215,000,000.00**				

The second part of the investment plan details the total cost of each program as indicated below:

TABLE 100. SUMMARY OF FINANCIAL INTERVENTIONS BY PROGRAM:

Program	Target Result	Estimated cost in (P,000)	Allocation	
			PRDP (P ,000)	LGU/Producer Group (P ,000)
Support to the professionalization of the producers	Farmers sector are capacitated to be professional in their trade, to make business flourish	600	600	
Intensification and development of sustainable production system	Appropriate farming systems developed, intensified and sustainably managed to produce the volume requirements	47,000	34,180	12,820
Development of commodity chains and agribusiness development	Different value chains are promoted and developed towards efficiency and sustainability	901,275	819,675	81,600
Institutional development	Developing the local industry to enable it to chart and implement its development plan	525	525	
Total investment requirement		**949,400**	**854,980**	**94,420**

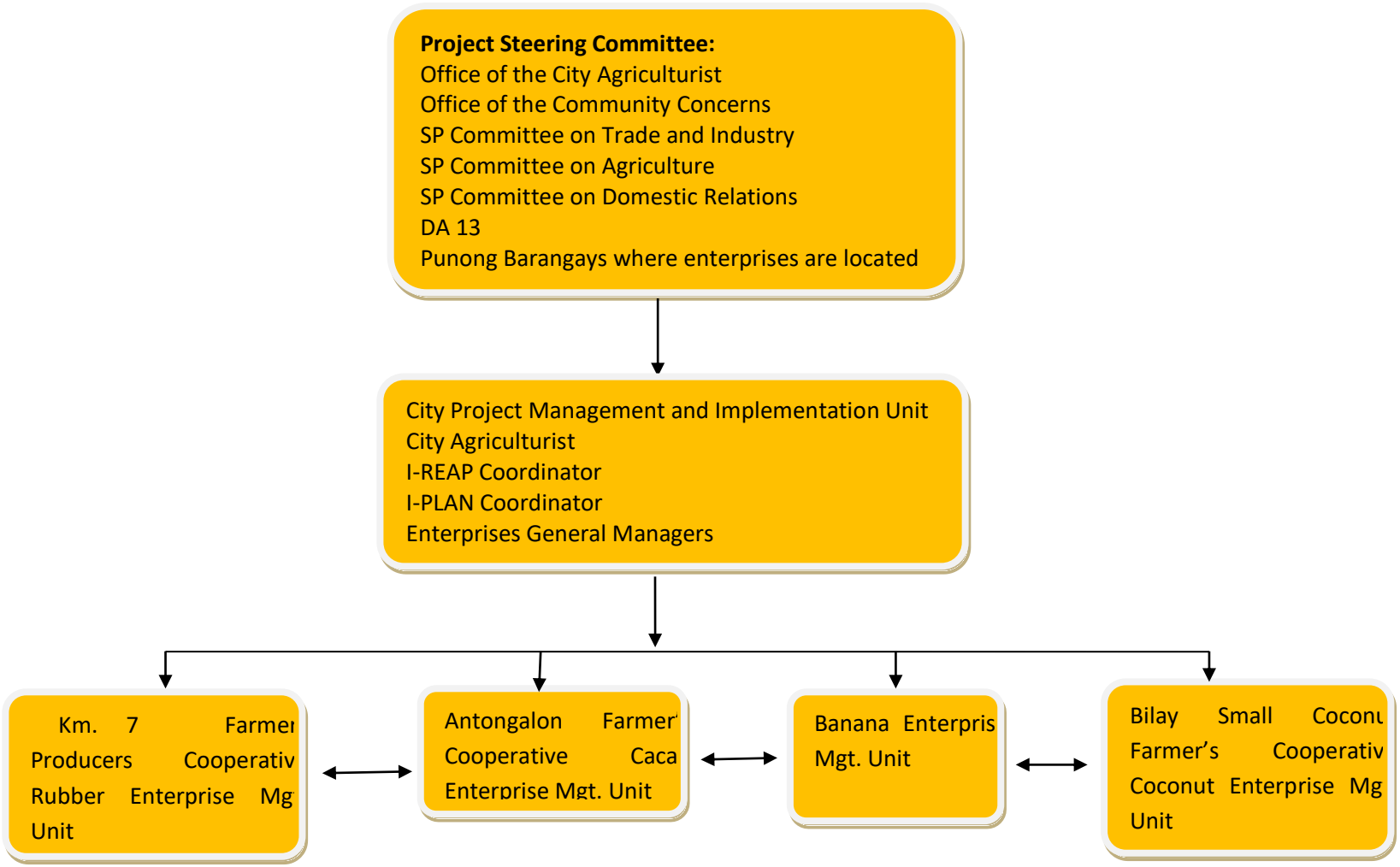
Indicated below is the capital Investments of the City Government of Butuan as reflected in its City Investment Development Plan for the year 2017- 2020. The budget below allocation is for the development of the agricultural sector covering the four commodities. However, the administration of the new City Mayor, Engr. Ronnie Vicente C. Lagnada has bring new dimensions in his governance system. The City Government of Butuan is now being run with a corporate sense, linking and utilizing the budget allocation efficiently, so that a new twist in the financial investments plan will be observed.

TABLE 101. SUMMARY OF INVESTMENT GAPS

Program	Cost (P000)	As budgeted in the CIDP in P 000	Gaps
Intensification and development of sustainable production systems	47,000	666.66	(46,333.34)
Support to the professionalization of producers	600	263.20	(336.80)
Promotion of commodity chains and agribusiness development	901,275	15,227	(886,048)
Institutional development	525	320	(180)
Total	**949,400**	**16,476.86**	**(932,923.14)**

The total financial gaps to develop the four commodities (rubber, cacao, banana andcoconut**)** in Butuan City is more or less 932.92314 M or approximately 98% of the total budget requirement. Some of the cost items are to be sourced out from the Philippine Coconut Authority, Department of Agriculture, the Konkreto at Ayos na Lansangan tungo sa Pangkalahatang Kaunlaran (KALSADA) of DBM/DILG and PAMANA-DILG FUNDS pertaining to the development of road infrastructures which is more or less 86% to the total investment requirements.

Institutional Arrangements for PRDP Funding Implementation Supervision



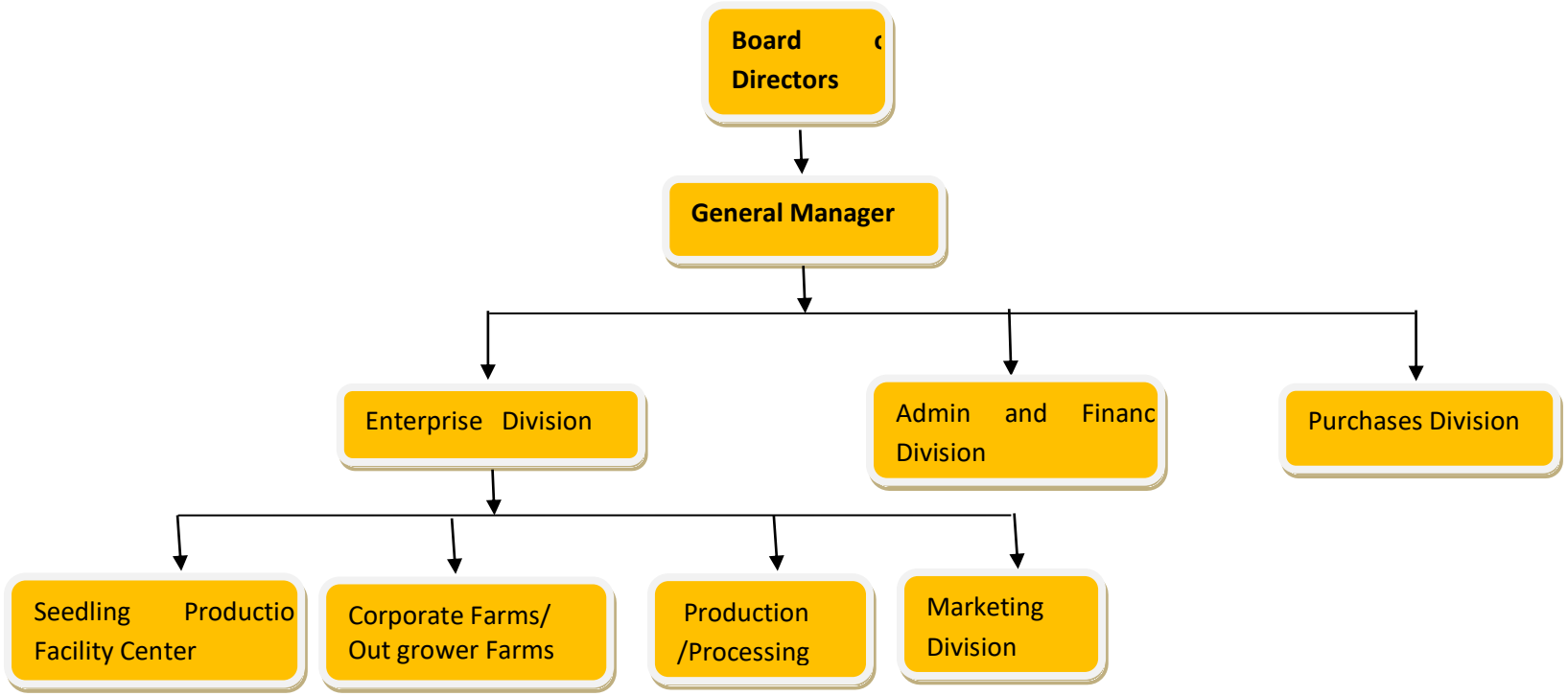
Functions of the Steering Committee:

1. Provide advice, ensure delivery of the project outputs and the achievement of project outcomes to include the following tasks :
   - providing inputs to the development of the project including the evaluation strategy
   - Identifying the priorities in the project where the most energy should be directed
   - identifying potential risks and monitoring the risks
   - Monitoring the timelines and the quality of the project as it develops
   - Providing advice about changes to the project as it develops
2. Provides strategic directions to ensure that strategies that would address the potential threats to the project's success have been identified , costed and approved, and that the threats are regularly re-assessed
3. Reconcile differences in opinion and approach and resolve disputes arising from them
4. Understand the strategic implications and outcomes of initiatives being pursued through project outputs
5. Ensure that the project's outputs meets the requirements of the business owners and key stakeholders
6. Formulate policies and guidelines that would ensure the success of the implementation
7. of the different enterprises
8. Recommend to the SP matters relative to the implementation of the enterprises in aid of legislation
9. Approves enterprises development plans consistent with the Implementation and Management Agreement executed with the Department of Agriculture-Philippine Rural Development Program
10. Recommends to the City Mayor through the Local Finance Committee counterpart funds/new funds to support expansion programs of the existing enterprises
11. Perform other functions as required in support to the implementation of the enterprises.

Functions of the Project Management and Implementation Units:

1. Provide support to the different enterprises implementation and management teams in the areas of technical, financial and institutional
2. Provide methodology support to the different enterprises in developing and implementing consistent and standardized process of project management and development
3. Provides support and assistance to the project implementing teams in improving competencies and skills
4. Increasing the collaboration mechanism between the different managers of the different enterprises
5. Assist the different enterprise implementing teams develop and utilize specialized software needed in the implementation of the project/enterprise.
6. To lead, coordinate project implementation including administration, monitoring and reporting on project's progress, finance and accounting, Procurement tasks and supervision of construction contractors.
7. Administer all activities in capacity development and work plan development.
8. Recommends to the Steering Committee all matters in the project implementation relative to policy development.
9. Harmonize and align the project implementations in the LGU governance systems and processes
10. Establish internal communication mechanism so that past experiences can be incorporated into the general operations of the project
11. Implement and standardize project management practices and methodologies for repeatable workflows and processes.

Implementation Arrangements in the Operation of the Respective Enterprises



Functions of the Project Manager

1. Developing project plans
2. Assigning tasks to other project personnel
3. Monitoring staff and project
4. Managing risks and escalated issues from project teams
5. Controlling budgets, scheduling resources, and recommending implementation approaches
6. Assuming overall responsibility for the successful conclusion of the Project
7. Measures project success against budget, original scope, business objectives

Safeguards

The project must institute social safeguards prior to the project implementation such as:

A. Conduct of stakeholders meeting (members of the cooperative, prospective investors, prospective farmer-growers , officials of the City government of Butuan) to bring about the following :
   - Clarity on the project
   - Transparency on how the project will be implemented
   - Accountability mechanisms to pinpoint responsibilities
   - Ownership to encourage investment capitalization

B. Development of a work and financial plan agreed and adopted for implementation
   Once the Business Plans are approved, the City Project Management and Implementing Unit will conduct workshops with the proponent group and its officers and members on how to operationalize the business plan consistent with the executed implementation and management agreement. Prospective farmers on the supply chain will also be engaged to discuss the ways forward relative to the project implementation.

Monitoring and Evaluation Implementation Arrangements

Institutional arrangements	Legal Mandate	Roles and Responsibilities	Timelines	Frequency
Enterprise Management Team (Barangay Level) through the General Mana	M & E Plan, Implementation and Management Agreement	Conduct baseline survey Submit data and information statistically stated depicting the status quo of the project Submit project progress reports including status of construction, level of awareness of its farmer-members, level of farmers equity participation, production of seedlings Submit project progress reports including status of monthly operation(sales and expenses)	Pre-Project Implementation Implementation Phase Project Middle Implementation Phase	Once Monthly Midterm or annually

City Project Management and Implementing Unit	Executive Order, IMA	Conduct project monitoring and site visits Evaluate the implementation of the project; project outputs and deliverables and the level of achieving its objectives Evaluate the changes observed and the level of achievement by the policy interventions Evaluate the project compliance and enforcements Evaluate the contextual information the project reports provides Submits consolidated progress report(if projects are many) with findings and recommendations	Implementation Phase	Monthly/Quarterly
Project Steering Committee	Executive Order, IMA	Acts on the findings and recommendations by way of policy recommendations to the Local chief Executive Recommends the dissemination and use of lessons learned that are considered good practices Formulate measures to improve the success and sustainability of the project and project implementation Recommends to the Local Chief Executive the provision of additional budget allocations towards the project's sustinability	Implementation Phase	Quarterly

CDC and SP Resolution – On the process for endorsement to SP and CDC

Prepared by:

REYNALDO A. ROSALES
I-PLAN Coordinator

Recommended by:

ALBERTO B. BUCA
CPMIU -Head

Annexes


Cacao Nursery in Bukidnon


Budwood Garden/Nursery of LARBECO in Basilan/ Photo from ACDIVOCA

Fertilizer also impacts pod quality, hence bean quality and weight, the latter being one of the best criteria to measure cocoa quality in terms of conversion rate from beans to cocoa butter (photos 1 and 2). The calcium nitrate plays a specific role by reducing the rate of diseases, especially black pod.

STANDARD COCOA FARM

Source: Cocoa and Fertilizer in West Africa/CIRAD


Sorting at Seed Core Enterprises


CSI Drying Facility


Kennemer Fermentation Facility

Dried Fermented Beans from Malagos/Puentespina

Wet Beans

Dried Unfermented Beans

Cacao Drying Platform owned by a farmer in South Cotabato who also processes tablea

Banana –Cacao Intercropping: FEDCO in Davao Region

Postharvest Losses: Poor quality bananas from farmers + poor postharvest handling (traders)

List of Proponent Group Per Commodity

Proponent Group Profile

1. Rubber Commodity

Proponent : KM 7 FARMERS PRODUCER COOPERATIVE

Location : P27-A, Barangay Tungao, Butuan City

Contact Person : Nilo R. Calipayan – General Manager

09284500294

BACKGROUND

In 1995, when the Nasipit Lumber Company (NALCO) collapsed, a group of displaced workers, women, senior citizens, youth and rebel returnees joined together and wasorganized as Peoples Organization occupying the log-over area along almost 12,000 hectares of land in Barangay Tungao.

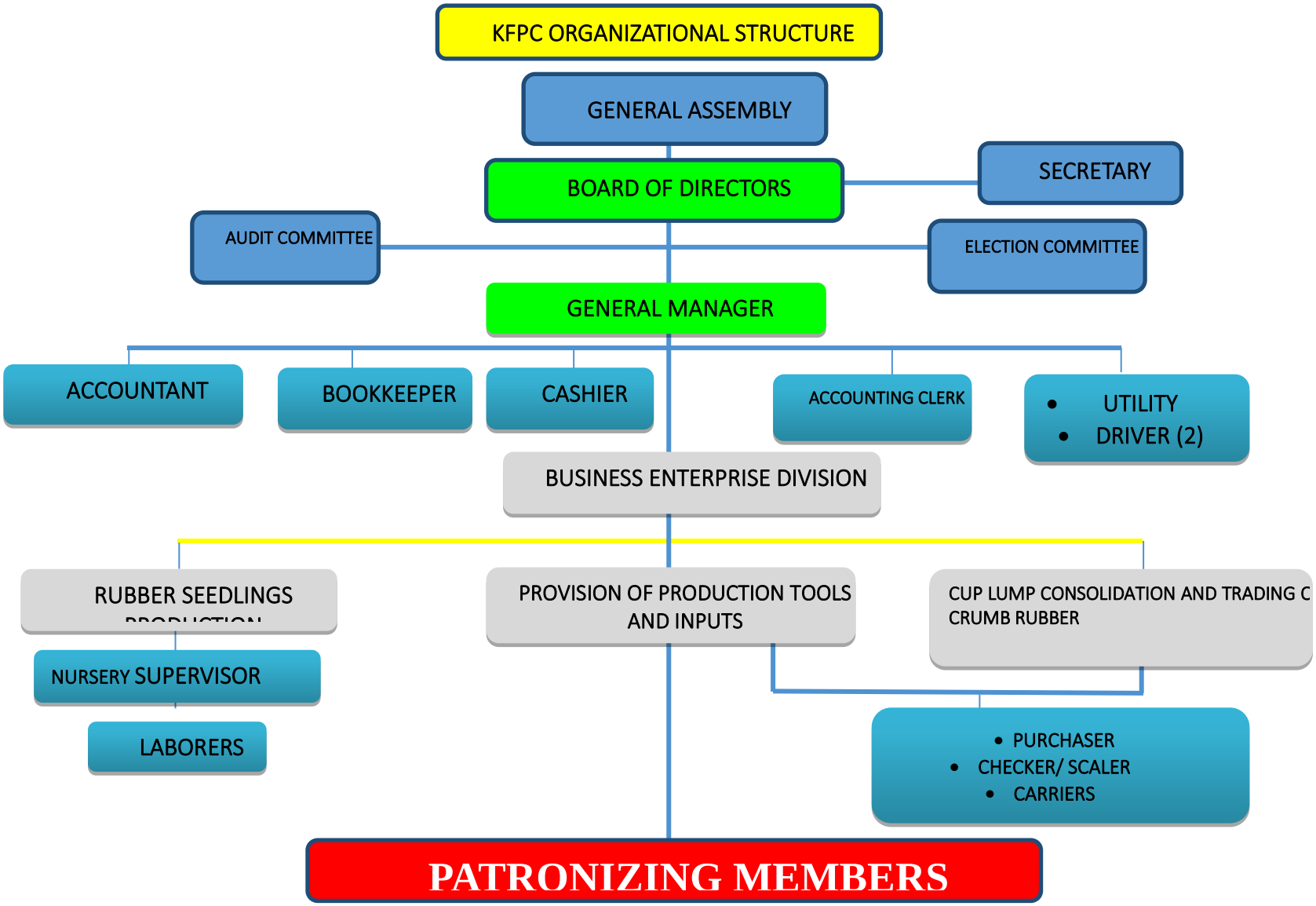
In 2000, the organized farmers registered at the Department of Labor and Employment, later also registered at Security and Exchange Commission, named Tungao United Farmers Association-Caraga Incorporated with 49 members.

On March 28, 2011, the organization was then registered at the Cooperative Development Authority (CDA) with registration number 9520-13019212 CIN 0101130345. It has an active members of 158, total number of males 115 and with 43 females. Considering number of IP'S, there were 23 IP members.

As a farmers producer, the Cooperative engaged in vermin-comosting project, plant nursery project: rubber, coffee, banana, fruit trees, (flitches) wood products, vegetables, livestock, farm technology, labor and dairy projects assisted by National Dairy Authority, Heifer International, Touch Foundation, D.A RFU 13, DTI, DOST, LGU Butuan, LGU Barangay Tungao in partnership of self-help group families.

In 2011, the KFPC availed the project from the city government for rubber development program of Butuan City and a recipient of (Php 333,000.00) three hundred thirty three thousand pesos loan and to be paid in 3 years period. The KFPC was able to pay the loan for about 2 year period of time in terms of 10,000 budded rubber seedlings.

In year 2012, the cooperative received an award from LGU Butuan as an organic practitioner in Butuan City and in 2013, KFPC received an award from BSWM as National Awardee for good practice in Organic Farming.


KFPC ORGANIZATIONAL STRUCTURE
GENERAL ASSEMBLY
BOARD OF DIRECTORS
SECRETARY
AUDIT COMMITTEE
ELECTION COMMITTEE
GENERAL MANAGER
ACCOUNTANT
BOOKKEEPER
CASHIER
ACCOUNTING CLERK
UTILITY
DRIVER (2)
BUSINESS ENTERPRISE DIVISION
RUBBER SEEDLINGS
NURSERY SUPERVISOR
LABORERS
PROVISION OF PRODUCTION TOOLS AND INPUTS
CUP LUMP CONSOLIDATION AND TRADING C
CRUMB RUBBER
PURCHASER
CHECKER/ SCALER
CARRIERS
PATRONIZING MEMBERS

Proponent Group Profile

2. Cacao Commodity

	Proponent Group
1	Antonglon farmers Association - Caraga Inc.
2	St. Gabriel Multi-Purpose Cooperative
3	Anticala Kabulay Tree Farmers Association Inc. (AKATFAI)

3. Coconut Commodity

	Proponent Group
1	Taguibo Integrated Multi-Purpose Cooperative
2	Bilay Coconut Farmers Association, Inc.

4. Banana Commodity

	Proponent Group
1	Bugsukan Farmers Association
2	Pianing Farmers Association, Inc.
3	Bitan-agan Banana Farmers Association
4	Butuan City Federation of Banana Growers, Inc.