EXECUTIVE SUMMARY

This roadmap sets the direction for the Philippine abaca industry. It encompasses industry analyses, benchmarking and supply/value chain. This roadmap identified the potential areas intended for planting and treatment of diseases which are the two most important factors in abaca fiber production.

A broad range of private and public sector groups contributed to the production of this document which sets forth new policy, capacity and capability priorities for the Philippine abaca industry.

Coordination and analysis of the inputs, organization of the workshops, and preparation of this document were carried out by PhilFIDA. Stakeholders' meetings and workshops were hosted and facilitated by PhilFIDA Regional Offices.

Where are we now?

Abaca, internationally known as Manila hemp, is endemic to the Philippines. The Philippines dominates the global abaca trade as the country supplies about 87.5 percent of the world's abaca fiber requirements and Ecuador and Costa Rica the remaining 12.5 percent as of 2016. In 2016, abaca was planted on 180,302 hectares (ha) with production reaching 72,000 metric tons (MT).

The abaca farm structure is classified as a small farm which is owned and managed by individual farmers. It has an average area of 1.6 hectare for every farmer. There are only few farms established and managed by cooperatives or associations with areas ranging from 10 to 100 hectares.

Almost one third of the abaca areas can be found in Region V or the Bicol Region with 52,493 hectares. The land area is comparable to combined abaca areas of Regions XIII, XI, XII and VI. Most of the abaca areas in Bicol are heavily concentrated in Catanduanes, comprising more than 60 percent of the total area of the region. At present, Catanduanes is the biggest abaca producing province contributing 35 percent of the total production, followed by Davao Oriental with about 8.5 percent. Due to frequent typhoons in Bicol and Leyte, there are moves by some abaca factories and investors to look for alternative areas to plant abaca.

Exports of abaca fiber and manufacture generated an average of US$97.1 million per year in the last ten years. Some US$84.9 million came from abaca manufactures such as pulp, cordage, yarns, fabrics and fibercrafts. The remaining US$12.2 million was from raw fiber exports. Europe, specifically, the United Kingdom, is the premier destination of abaca fiber followed by Asia,

with Japan as the leading buyer. All abaca pulp was exported for specialty paper manufactures.

Since 1991, local pulp mills had been importing abaca and sisal fiber from Ecuador except in 2005. The pulp processor resorted to importation to address the deficiency in local supply of specific grades and meet buyers' specifications.

On local benchmarking, a total of 1,000 abaca plants with a distance of 3.0x3.0m are planted to a hectare and intercropped with coconut, fruit trees and leguminous plants. The typical farm uses suckers, corms, tissue culture plantlets as planting materials. The good farm uses seeds, tissue culture plantlets, suckers and corms. Care and maintenance of the plantation in typical farming is minimal compared to good farming which is properly managed.

Harvesting is done every six months for the typical farm and every three to four months for the good farm. The first harvest is done on 18-24 months after planting.

Local Benchmarking, Abaca Farming: Typical vs. Good (Qualitative Parameters)

PARAMETERS	TYPICAL	GOOD	GAP
Planting Density (hills/ha)	1000 @ 3.0x3.0m	1000 @ 3.0x3.0m distance	-
Plant Propagation Practice	Suckers @ P15/pc.	TC plantlets @ P25/pc	(P10/pc)
Fiber Extraction Method	Hand stripped	Machine-stripped	P3/kg fiber
Fiber Recovery	1.5 percent	1.5 percent	-
Fertilizer Application	No fertilization	3 times/year @ P1,300/bag	P11,700[a]/Year
Weeding and Underbrushing	Occasional	regularly done every harvesting	much healthier plants
Pest and Disease Control	Not conducted	2 times/year @ 1liter/app	P 1,400[b]/year
First Harvest	Year 2	Year 2	-
Harvesting Frequency @ peak	2 times/year	4 times/year	twice as much

[a] Price of fertilizer @ Php 1,300/bag
[b] Price of insecticide @ Php 700/liter
Source of basic data: Actual farmer's field and Abaca Technoguide

The abaca varieties used in good (Maguindanao) and typical (Abuab) farming have the characteristics of 1.5 percent fiber recovery. Farmers undertake primary processing, which involves the extraction of fiber for harvested tuxies. To extract the fibers, hand stripping is used by the typical farm and mechanized stripping for the good farm. Drying is done through sun and air.

Local Benchmarking, Abaca Farming: Typical vs. Good (Quantitative Parameters)
(in PhP per ha unless otherwise specified)

PARAMETERS*	TYPICAL FARM	GOOD FARM	GAP
Average yield per ha (kg)	667	1,334	667
Peak yield per ha (kg)	750	1,700	750
Average establishment cost per ha (Year 1)	38,295	68,045	29,750
Average cash outflow per ha per year	22,610	51,930	29,320
Price per kg (farmer's selling price)	60	60	0
Average cash inflow per ha per year	36,000	86,400	50,400
Average net cash flow per ha per Year	13,390	34,470	21,080
Average Area to get preferred net income of Php 94,000 (poverty threshold, 1st half 2012) (ha)	7.02	2.73	4.29
Average cost per kg (PhP/kg)	37.68	36.06	1.62
Payback period (years)	5.22	4.03	1.19
IRR (percent)	39	44	5

*Years 2-10 are considered in the average values
Source of basic data: Actual farmer's field and Abaca Technoguide

On international benchmarking, Ecuador and Costa Rica are the only other commercial producers of abaca fiber aside from the Philippines based on Food and Agriculture Organization (FAO) data. However, there are reports that Indonesia has propagated abaca and harvesting will commence in 2018. The average export price of representative grades (S2, G and JK) of Philippine abaca ranges from US$170 per bale to US$212 per bale compared to Ecuadorian abaca (all Grades) at US$169 per bale. This shows that Philippine abaca is competitively priced with the Ecuadorian abaca.

In 2016, the country's exports of raw abaca fiber to the UK reached 2,477 metric tons (MT) valued at US$ 3.54 M, which represented 56 percent of the total exports of raw abaca fibers. The computed export parity price ratios to the UK market for grades S2, I, G and JK are 1.04, 1.13, 1.25 and 1.71, respectively, which indicates the price competitiveness of Philippine abaca in the said fiber grades. Another important edge of Philippine abaca is that of having more quality grades. The Philippines has nine grades/classifications of abaca fiber compared to only five of Ecuador, making Philippine abaca more versatile in applications. Philippine abaca has a wide range of utilization from the traditional cordage/rope and fibercrafts to more sophisticated industrial applications like specialty papers, textile and the emergent bio-composites and nanocellulose. The different grades allow the specialty papermakers flexibility to produce different types of paper and other by-products with the desired quality.

According to Glatfelter, the world's biggest manufacturer of specialty paper, the Philippine abaca fibers are deteriorating compared to Ecuador and Costa Rica fibers. Pulp mills need to buy higher grade of abaca fiber to produce quality pulp. The Philippine government will solve this problem through strict enforcement of abaca grading standards and promoting good agricultural practices among farmers during harvesting, post-harvest and trading activities.

Where do we want to go?

The stakeholders' consultations and workshops have set the vision, mission, goals and targets for the industry.

The Vision:

A progressive Philippine fiber industry that produce the world's best quality fiber to supply global demands for renewable, sustainable and environment-friendly products to achieve the country's inclusive growth.

The Mission:

- Improve the socio-economic condition of farmers, create livelihood and reduce poverty incidence through rural fiber-based enterprise development and business; and

- Maintain the country's status as the world's number one producer and supplier of quality abaca fibers.

Goals

- Produce sufficient quality abaca fiber to supply domestic and international markets;

- Establish rural livelihood and economic businesses that improve farming practices and land vegetation, rehabilitate the environment and mitigate climate change;

- Establish disease free abaca plantations in all regions to provide sustainable fiber supply for pulp millers, cordage companies and rural enterprises;

- Set new direction and agenda for R & D to improve varieties, increase fiber production, disease treatment, postharvest, processing, tensile strengths and utilization towards production of fiber by-products for industrial, commercial and other uses;

- Strengthen collaboration among industry stakeholders - international investors, local and national governments, farmer cooperatives/ associations, private sectors, non-government organizations, academe and corporations; and

- Promote an investment climate conducive for foreign and local direct investors for upstream and downstream processing.

Objectives

- To expand/rehabilitate a total of 146,248 hectares of abaca areas from 2018 to 2022;

- To mass produce planting materials thru tissue culture, micropropagation, conventional method and seeds;

- To increase fiber production by 36,482MT in 2020, 93,248MT in 2021 and 130,789MT in 2022 to address the projected 12% annual increase in demand;

- To adopt abaca tuxy buying scheme in the production of quality abaca fiber thru cooperative approach;

- To introduce new technologies in abaca production and treatment of abaca diseases;

- To accredit private, government (LGUs), and commercial abaca nurseries and distribute healthy planting materials;

- To train LGUs and NGOs agricultural technicians and farmers on new and improved fiber production technologies;

- To upgrade and modernize/mechanize post-harvest equipment and facilities to improve efficiency and increase fiber production;

- To strictly implement abaca grading standards;

- To conduct R&D for the production of quality and disease-free planting materials, new technologies on plantation establishment, treatment of diseases, production of by-products of abaca fibers, and processing and utilization in partnership with universities, corporation and private sectors; and

- Establish Monitoring and Evaluation Plan in partnership with abaca stakeholders, LGU, AAPMI, NGOs and other groups.

In terms of targets, a total of 69,364 hectares in 2018 and 44,167 hectares in 2019 will be planted to reach an estimated total abaca fiber demand of 160,444MT in 2020 with an increase of 12% annually. Many private sectors, corporations and farmers have committed to plant abaca in more areas depending on the availability of planting materials. By 2022, with the targeted farm expansion and rehabilitation of 146,248 hectares, an estimated abaca fiber production of 216,761MT will be attained.

Physical Targets for Abaca, 2017-2022 (in ha unless otherwise specified)

Indicators	2017	2018	2019	2020	2021	2022	Total
Abaca Areas	180,302	181,302	220,666	230,666	239,666	239,666	
New Area Planted	1,000	39,364	10,000	9,000			59,364
Area Rehabilitated	800	30,000	34,167	21,917			86,884
Number of Planting Materials Required (in million)	1.80	69.36	30.92	30.92			146.28
Fiber Production (MT)	74,160	76,385	79,576	117,519	176,715	216,761	

Note: Yield assumption was based on the Abaca Statistical Bulletin, 2006 - 2015 and the National Abaca Survey, 2009

How do we get there?

Major Problems and Interventions

Lack of Planting Materials. This is the main problem of the PhilFIDA because of its dependence to tissue culture planting materials, low seedbank seedling production and disease infected planting materials. Currently, the PhilFIDA can only produce maximum of 500,000 planting materials versus demand deficit of 146.28M planting materials requirement. It would take the industry about 292 years to acquire said requirement.

Solution 1: Use abaca seed-derived planting materials in response to the needs of the clients. In order to cover the 146.28M planting material requirement, a total of 4.17 tons of seeds are needed with an assumption of 35,000 seeds per kilogram.

Solution 2. Increase number of nurseries per region that will be accredited by the Bureau of Plant Industry and PhilFIDA and encourage local nursery operators and LGUs to engage on abaca seedling production. Accredited nurseries shall be established in each province. Agriculture staff of LGUs and NGOs will be trained on seedling production and nursery management.

Prevalence of Abaca Diseases such as Bunchy-top, Bract Mosaic and Mosaic.

Solution 1: Continuous eradication of infected abaca plants and replanting of disease-freed areas.

Solution 2: Promotion of efficient farm management by intensive and sustainable farmers' training. Agricultural Training Institute (ATI) will be tapped to support the trainings for farmers, LGU technicians and NGOs to improve their technical knowledge and skills on abaca farming.

Solution 3: Conduct exploration of new pest management technology to update the Integrated Pest Management Program for Abaca.

Low Fiber Production. Majority of abaca farms are far from the farmer's residences and harvesting is only done 2 times a year in some areas. Century-old harvesting device and tools, and spindle machines are used during post-harvest and needs to be improved to produce more quality fibers.

Solution 1: Organize the farmers to form into cooperatives (minimum of 100 abaca farmers).

Solution 2: Increase yield per hectare by optimizing planting distance in current abaca areas

Solution 3: Improve efficiency of postharvest equipment and facilities. The PhilFIDA, PhilMECH and SUCs will collaborate to fabricate machines and conduct researches to improve the performance of abaca fiber extraction machineries.

Solution 4: Availability of good and high yielding variety planting materials to support a reasonable increase in farm productivity of existing abaca hectarage.

Low Fiber Quality. The quality of Philippine fiber has deteriorated over the past years because of "all-in buying" practice and also because of the existence of commercialized spurious abaca varieties.

Solution 1: Strict enforcement of abaca fiber grading standards.

Solution 2: Promote production of quality fibers.

Solution 3: Implement the "Abaca Tuxy Buying Scheme".

Solution 4: Eradication of commercialized spurious abaca areas.

Insufficient Supply of Abaca Fiber. Abaca production has to be increased in various ways specifically through opening of new abaca areas and by invigorating old and less productive farms and plantations.

Solution 1: Aggressive campaign to promote abaca farming. Encourage private sectors, farmers' association/cooperatives and corporations to invest in abaca trading business and engage in farm service providers.

Solution 2: Active provision of technical assistance to industry players by PhilFIDA.

Solution 3: Establishment of processing centers and drying facilities near abaca farms and promote the production of spindle-stripped fibers. Farmers organizations/cooperatives with huge abaca farms will be encouraged to establish postharvest facilities with stripping machines and drying centers.

Solution 4: Support in the rehabilitation of old and unproductive abaca farms by providing them necessary inputs.

Solution 5: Support in the establishment of new abaca farms.

New Strategies

- The **Abaca Tuxy Buying Scheme**. This scheme will ensure the survival of abaca which is indigenous to the Philippines. This aims to organize and empower most of the abaca farmers nationwide as a cooperative, produce their own abaca fibers as a group which will redound to better competitive price, quality and quantity and sell their harvest directly to Grading and Baling Establishments (GBEs) and local processors.

  The traditional way of abaca fiber extraction/harvesting by the abaca farmers has Twelve (12) stages. The project intends to lessen it to only six (6) steps --Topping, Tumbling, Tuxying, Tuxy Bundling, Tuxy Transporting/Hauling and Tuxy Trading /Selling -- thereby removing and easing the burden of the abaca farmers of the other six (6) activities and just let them continue producing all the abaca tuxies they want for the day before selling it to their cooperative that same day. This will surely increase abaca fiber production.

- Disease-free and abaca seed-derived planting materials shall be distributed to interested stakeholders who are members of a farmer's association or cooperative.

- Encourage more farmers, private sectors, NGOs, corporations and big land owners to plant abaca in their areas identified under National Color-Coded Agricultural Guide Map launched by AMIA.

The PhilFIDA under the management of the Executive Director (ED) and a Deputy Executive Director (DED) will be the lead agency that will implement the Philippine Abaca Industry Roadmap. The implementing units within PhilFIDA are the nine regional offices, three regional satellite offices and four technical divisions assisted by two support divisions.

The ED will be the prime mover that shall direct all operating units of the agency to perform the planned programs, projects and activities stipulated in the roadmap and agreed upon with the stakeholders during the various consultations. The ED shall report to the DA Secretary regularly the progress of implementation and accomplishments of the roadmap.

CHAPTER I

INTRODUCTION

A. Rationale

The pressing global realities of going natural driven by the emergent "green" economy sweeping across the globe are most conducive to the Philippine fiber industry. More industries are increasingly utilizing natural materials while other manufacturing companies are on the search for resources that could replace or at least blend with man-made fibers, glass fibers and other non-biodegradable materials to come up with "green" products. The conservation of forest resources protected by government legislations and sustainability compliance requirements led to the use of alternative sustainable natural fiber materials. This consciousness among industries worldwide especially from developed countries stems from their intense advocacy to protect and preserve the environment for the next generation and mitigate the adverse effect of climate change and global warming. This global scenario resulted in heightened consumers' awareness and demand for products made from sustainable, renewable and environment-friendly resources, the very nature of natural fibers like abaca.

As the Philippines gears towards the attainment of inclusive growth through poverty eradication, the country's fiber industry can certainly be an immense contributor as it has high multiplier effect on job generation in both rural and urban communities. A wider mass-based manpower is needed from fiber production to semi-processing and manufacturing and in each stage of trading from the fiber and product sources to the mainstream and special markets, domestically and internationally. Men, women and out-of-school youths have been provided economic and social benefits by the fiber industry that, currently, the industry sustains about two million Filipinos who are directly and indirectly dependent on it for a living. Moreover, the high value addition through abaca fiber conversion into industrial products is the country's best option not only for poverty eradication but also to the attainment of peace and order in the countryside. Economic activities in the target communities could likewise be hastened as rural families could generate more income through upcycling of extraction and plantation wastes into fertilizer, pesticides, disinfectant, bio-fuel and wellness products, definitely the driving forces for achieving inclusive growth.

The Philippines has different varieties of plants that produce fibers in commercial quantities with diverse applications which entail great economic importance. These fibers include abaca, banana, piña, silk, raffia, buntal and salago among others. Abaca which is being grown in the Philippines for centuries is the most important among the commercially produced fibers in

the country in terms of hectarage, production and contribution to the nation's economy. Abaca is endemic to the Philippines and has, for centuries, been synonymous to the Philippines because it is known worldwide as Manila hemp. The Philippines dominates the global abaca trade as the country supplies about 87.5 percent of the world's abaca fiber requirements and Ecuador the remaining 12.5 percent as of 2015. A total area of 180,302 hectares was devoted to abaca with production reaching 72,000 MT (PhilFIDA, 2016).

Although the bulk of the country's abaca fiber production is processed locally, most of these processed products, particularly abaca pulp, cordage/rope and fibercrafts (lifestyle products) are also exported all over the world. Foreign shipment of these products including raw fiber is one of the major contributors to the Philippine economy that in 2014, export receipts generated reached US$111 million. Being a dollar trade, the rapid developments in technology and product innovations happening worldwide are realities that the Philippine abaca industry is challenged to meet not only to maintain its global presence but to also further strengthen its dominant position in the international abaca trade. Along this context, there is an urgent need to align the existing programs and projects on Philippine abaca industry to the Medium Term Philippine Development Plan (MTPDP) and consistent with the United Nations Millennium Development Goals with special focus on eradicating extreme poverty and hunger; promoting gender equality and empowering women; ensuring environmental sustainability; and creating a global partnership for development.

B. Objectives

The general objective of this project is to develop an industry Roadmap that will set new and pro-active direction for a stronger and more dynamic Philippine abaca industry responsive to global realities and challenges.

Specifically, this roadmap aims to:

1. Present an industry analysis covering farm structure, industry performance (2017-2022) and policies;
2. Present new approaches, direction and policy such technologies for farm production, seedling production and treatment of diseases;
3. Conduct benchmarking analysis;
4. Analyze the supply/value chain from input supply, production up to final sale of raw fibers;
5. Present the competitive analysis focusing on price differences and technical advantage of Philippine abaca over Ecuadorian abaca;

6. Conduct SWOT analysis;

7. Craft an industry vision, mission, goals, objectives, strategies, action plan and the required budget; and

8. Determine the development programs and budgetary requirements, public and private initiatives (for possible local and global partnership for development and local/foreign direct investments).

C. Data Sources and Methodology

1. **Data Sources**

The crafting of this roadmap was based on the prescribed format, data and information provided by the PhilFIDA, High Value Crops Program of the Department of Agriculture and consultants from the University of Asia and the Pacific. The data for this expository study were gathered from both primary and secondary sources. The new administration made revisions to update the data.

Most of the information provided in this roadmap were obtained from the fiber statistics data of the Philippine Fiber Industry Development Authority (PhilFIDA), Bureau of Customs, Philippine Statistic Authority (PSA) and the National Statistics Office's Volume and Value of Exports/Imports Report from 2010 to 2016. Information particularly on production and baling were collected from traders and grading and baling establishment (GBEs) through the Data Monitoring System (DMS) of the agency.

Inputs were also collected from fiber processors/ manufacturers (local and foreign) and fiber exporters. The 2009 National Abaca Survey of Areas Planted to Abaca, a report by the Technical Assistance Division of PhilFIDA, also served as an important primary source for this paper. Various industry reports and publications from the internet were used as secondary source of data. These include Report on the Conference on Sustainable Development, Rio De Janeiro, Brazil by the United Nations (June 2012); Opportunities in Natural Composites by Lucintel (March 2011); Renewables 2010 Global Status Report by the Renewable Energy Policy Network for the 21st Century; As Ethanol Booms, Critics Warn of Environmental Effect by Erica Gies (2010); American Energy: The Renewable Path to Energy Security by the Center for American Progress; and other reports on Kafus Bio- Composites, World Draping Organic, New Dimension to Organic Clothing, Present Directives for Product Development, World Fiber Forecast 2030 and articles/publications from the Food and Agricultural Organization (FAO) of the United Nations and the

International Documentation Center on Abaca of the University of the Philippines at Los Banos.

Inputs were also gathered from various industry stakeholders during consultation meetings and workshops organized by the PhilFIDA. Three (3) consultation meetings were conducted on 4 October 2013 in Davao City (Mindanao Cluster), 11 October 2013 in Cebu City (Visayas Cluster), and 15 November 2013 in Quezon City (Luzon Cluster). Additional inputs from the report on the Cross-Visit of Abaca Farms in Iloilo done by PhilFIDA VIII, from the 2016 Stakeholders Forum in all regions and the recent Management Conference of the agency held in Cagayan de Oro City last December 2016 were also collected. Moreover, some data were taken from the PhilFIDA 2016 Annual Report. Major industry players like farmers/producers, traders, private sectors, processors and representatives from the academe, research institutions, non- government organizations (NGOs), local government units (LGUs) and concerned government agencies attended the meetings and workshops. Views, insights, recommendations and commitments in the finalization and implementation of the programs/activities in this Roadmap were solicited from the different participants during the workshops and fora.

Analysis of data for all the chapters in this roadmap were done using the available statistics. These data were explained using graphs and figures.

2. **Area Coverage**

This roadmap focused on the key producing abaca areas nationwide such as Bicol Region and Mindoro in Luzon, Leyte, Samar, Negros Oriental, Iloilo and Aklan in Visayas and all provinces in Mindanao. Davao and some parts of Mindanao aims to become the major producer of abaca by 2022 as many idle and unproductive lands of private sectors and Indigenous People will be developed.

3. **Analytics**

This roadmap covered industry situationer, supply value chain analysis, local benchmaking, competitive analysis, market analysis, SWOT analysis, strategy settings, target planning and new policies for adaption of technologies to improve the industry.

Industry Situationer. This covers the assessment of the abaca industry structure and performance. The abaca industry situationer consisted of the abaca farm structure and size, performance (covering production area and yield, trade both exports and imports), production technology, local consumption and prices.

Supply/Value Chain Analysis. The supply/value chain analysis discussed the supply chain segments and players. It includes input supply, farm production, primary processing, trade and final sale including the logistics

between each process. Similarly, it analyzes the cost build up along the supply chain, including margins. It also dealt with the factors supporting growth of the industry particularly key and main industries, programs, production support and institutions. Finally, it identified the key constraints to value chain stability and sustainability.

Benchmarking analysis. This portion compares the typical and good farm practices in abaca fiber production. The analysis utilized both the quantitative and qualitative measures. Qualitative analysis includes the planting density, plant propagation or cultural management practices, disease treatment, fiber extraction method and trading. On the other hand, quantitative analysis includes the average yield per hectare, income, payback period and IRR.

Competitive Analysis. The price competitiveness of the abaca industry was analyzed as a highly exportable product. Analysis include the export parity price, domestic whole sale price and export price ratio.

Market Trends and Prospects. The market trends and prospects determine the glowing global interests and acceptability of the fiber products emphasizing its role in the green economy. It includes discussion on the potentials and markets of pulp and paper, composites for automotive, construction and other purposes, textile, new product innovation and an important component for sustainability certification of green products.

SWOT Analysis. This presented the industry's advantages as strength and opportunities and the constraints as the weaknesses and threats identified according to the supply chain segments.

Target Setting. This portion includes the vision, mission, objectives and targets (area, income and job generation).

Strategies and Policies. This covers the critical key result areas which have to be addressed along the supply chain to enable the industry to meet the targets.

4. **Limitation**

Abaca fiber is a raw material being used for industrial products such as pulp and paper, cordage, fibercrafts, nanocellusoe and many others. As a limitation, the value chain analysis covered only up to raw fiber or primary processing.

CHAPTER II

INDUSTRY SITUATIONER

A. Abaca Farm Structure and Size

The development of an abaca plantation must take into consideration the constraints of an industry that has several competitive substitutes which include synthetics, sisal, maguey, kenaf, bamboo, wood products and others. Plantation must be highly efficient and even from the start, plantation development must already be planned towards maximum efficiency in production. Elements for a good farm site are climate and soil, accessibility to transport, manpower, and available financing services. With the advent of new technology, topography is no longer a prime consideration since abaca can now be planted in all types of terrains as long as the area is not water-logged. For efficiency of production, field preparation, planting, maintenance and postharvest facilities must be greatly considered.

The abaca farm structure in the Philippines is classified as a small farm which was owned and managed by individual farmer. It has an average area of 1.6 hectare for every farmer. There are only few abaca farms being established and managed by cooperatives or associations. In 2016, many private sectors with vast landholdings committed to venture in abaca production in different regions, particularly in Mindanao.

Statistics shows that total farm area dedicated for abaca farming in our country is almost 180,302 hectares. The ratio of the total land area for abaca planting over the total land area of the country reveals that only a small portion of the country's land area is utilized for growing abaca because abaca farms are concentrated in isolated and mountainous areas.

The region with the highest expansion potential is Davao. Although, record shows that Davao Region only ranks fourth at 13 percent or 15,880 hectares in terms of the current land area, it has the highest potential for expansion at 20 percent of the total national land area with 27,381 hectares capable of being expanded and converted into abaca areas. When this amount of land is fully converted to abaca farming, this will make the total area for Davao Region to some 41,000 hectares which is slightly a little higher compared to the combined and current land areas of Eastern Visayas.

Region V or the Bicol Region has a total land area of 49,531 hectares. This land area is comparable to combined abaca areas of Regions CARAGA, Davao, SOCCSKSARGEN and Western Visayas. Most of the areas planted with abaca in Bicol Region are heavily concentrated in Catanduanes comprising 47 percent of the total area for the region. However, 33,136 hectares of abaca

in Catanduanes were damaged by Typhoon Niña in December 2016. It is expected that fiber production will reduce significantly. To illustrate, the total land area for Northern Samar alone is already comparative to a little more than the total land areas planted to abaca in SOCCSKSARGEN and Western Visayas. Second to Bicol Region is Eastern Visayas with a total land area of 45,527 hectares dedicated to growing abaca.

In 2013, Glatfelter was already looking for alternative sites for planting of abaca as its main supplier, Catanduanes, is always visited by typhoon. Glatfelter was recommending Panay to be developed because of its quality fiber. The target expansion areas are concentrated mainly in less-typhoon visited provinces where abaca is suitable.

The concentration of abaca farming is skewed toward the Visayas and Mindanao areas specifically on the Eastern part of the country as manifested with the top three regions. On the other hand, the three regions having the least land area in terms of abaca farming can be found within Luzon. Pulp companies are focused in Leyte and Bicol. They are concentrating on establishing abaca farms in Mindanao and Western Visayas due to frequent typhoons that damage abaca farms in Eastern Visayas and Bicol.

In terms of tenurial status of abaca farmers, 63 percent of the total abaca farmer population own their respective farms and another 13 percent obtained the land they are currently toiling from ancestral domains and timberlands. Some ten thousand farmers or 9 percent of the population are tenants of their respective farms.

Data revealed that only 13 percent of the abaca farmers use fertilizer in growing abaca. Majority of the farmers or 87 percent do not apply fertilizer at all and they depend only on the available soil nutrients. To those farmers who apply fertilizer, 11 percent use organic fertilizer while 2 percent use the inorganic ones.

Noting for a fact that farming is one of the major livelihood in the Philippines, land areas for abaca farming are most, if not all, are being shared with some intercrops. Record shows that a combination of banana and coconut are the most common intercrops of abaca with 44 percent. This can be logically traced since these crops are grown in almost the same condition with abaca thus farmers tend to do intercropping to provide alternative sources of income. Next to the combination of banana and coconut, dominantly banana comes as the second most common intercrop at 16 percent. Only 2 percent of the abaca farms are intercropped with root crops.

Two of the most significant demographics that measure productivity of farms are the frequency of harvest which determine the annual farm productivity. The frequency of weeding which indicates the conscious effort

on the part of the farmers to clean their respective farms to avoid infestation of diseases and thus, result to higher yield. Both annual harvest and weeding frequencies show that in general, abaca farmers harvest and weed their respective farms once to twice a year.

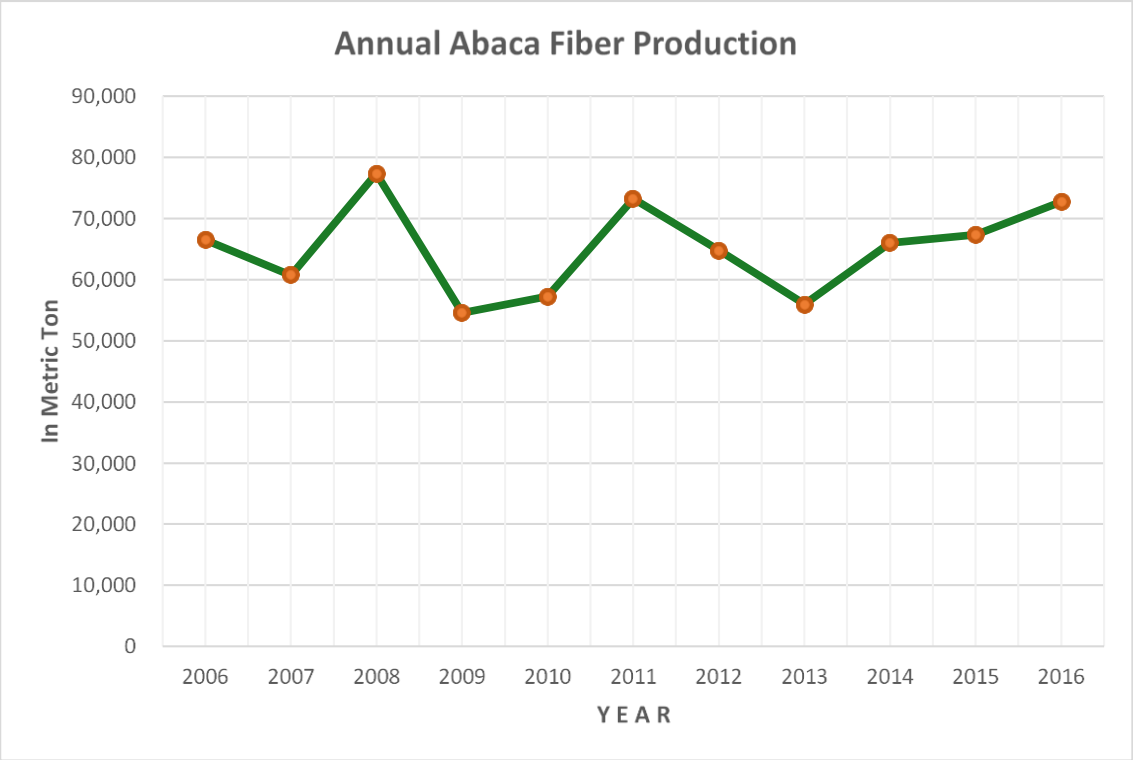
As part of the normal farming process, the specific market to which the abaca farmers sell their abaca fiber is also determined. Study reveals that 85 percent of farmers sell their fibers in barangay and town traders. Only 2 percent sell their produce to GBE's and less than 1 percent to abaca processors.

B. Performance

1. Production, area and yield

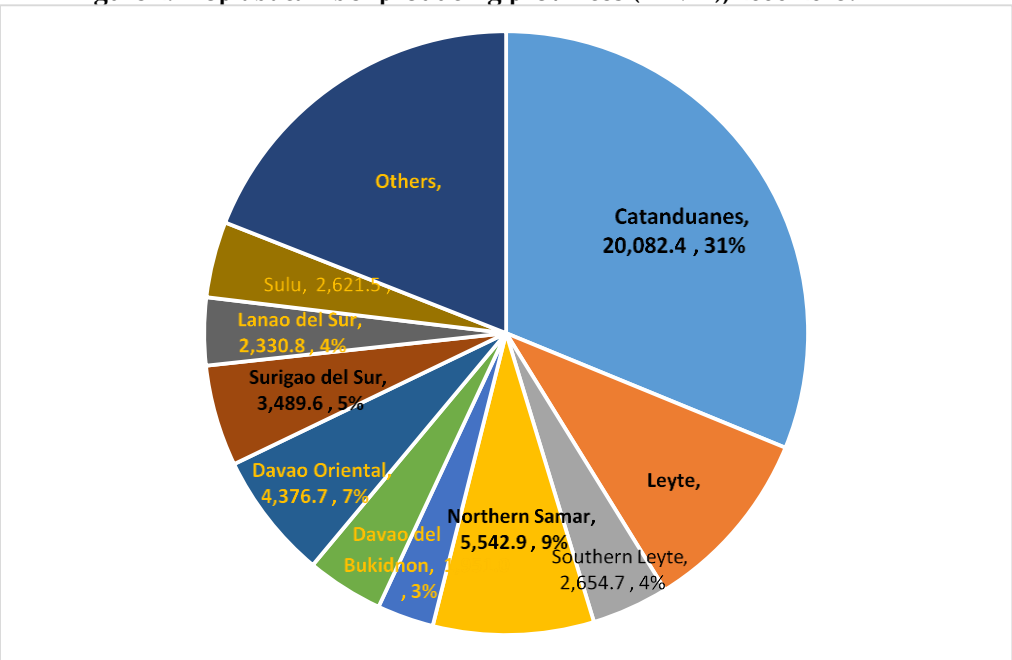
From 2006 through 2016, production of abaca fiber averaged at 67,329 MT and had been decreasing at a moderate rate of 0.8 percent per annum. There was a sharp drop in production in 2006, 2007 and 2013 caused by the devastating typhoons that hit the Bicol, Leyte, Samar, Panay and some parts of Mindanao, especially Typhoons Yolanda and Pablo. Production recovered in 2008, reaching its peak at 77,389 MT as outputs of all producing regions, particularly Bicol, Davao and Caraga, substantially increased during the period. This was primarily the effect of the incremental production from the abaca plantations established starting 2005 under FIDA's program Goal I "Development of New Agri-Business Lands" and the continued strong demand and attractive prices offered for the fiber by local traders, processors/manufacturers and exporters. The abaca industry, however, suffered a setback in 2009 when fiber output slumped to its lowest level of 54,584 MT due to the weakened market demand and falling prices as a consequence of the worldwide financial crisis. It was considered as the most severe downturn since the Great Depression of the 1930s. Furthermore, many abaca farms were still infected with viral diseases such as Bunchy-Top, Bract Mosaic and Mosaic which hampered abaca fiber production. In 2012, the production of 64,806 MT is still below the average annual production. Typhoons Yolanda and Pablo contributed much to the very low production in 2013 at 55,958 MT but continuous effort in the opening of new abaca areas and rehabilitation of diseased abaca farms, a 15.0 % increase in production was reached in 2014 at 66,004.

Figure 1. Abaca fiber production, 2006-2016.



Source: PhilFIDA DMS Report 2016

Figure 2. Top abaca fiber producing provinces (in MT), 2006-2015.



From 2006-2008, Eastern Visayas had been the leading abaca producing region with an average of 23,560 MT. The last six years however, was dominated by the Bicol region contributing an average of 20,082 MT or 35 percent. Eastern Visayas followed with an average of 14,623 MT or 25 percent while Davao Region, supplied 13 percent or an average of 4,376 MT ranked

third. Catanduanes consistently remained as the biggest abaca- producing province.

The top five abaca producers from 2006-2015 were Catanduanes, Leyte, Northern Samar, Davao Oriental and Surigao del Sur. In 2015, the leading producers of abaca were the provinces of Catanduanes, Davao Oriental, Northern Samar, Lanao del Sur and Davao del Sur.

Driven by the improving demand for abaca, in 2005, PhilFIDA implemented its abaca plantation expansion program, "Development of New Agri-Business Lands" where farmers were encouraged to open new abaca plantations. In 2006, abaca hectarage reached 141,711 hectares and further increased to 176,793 hectares in 2012 capable of meeting increased fiber demand. In 2013, however, a decrease in abaca areas was attributed to typhoons and phased out areas due to disease eradication activity. The plantation area has increased to 179,858 hectares in 2015 and 180,302 hectares in 2016.

Figure 3. Top abaca producing regions, 2006-2015

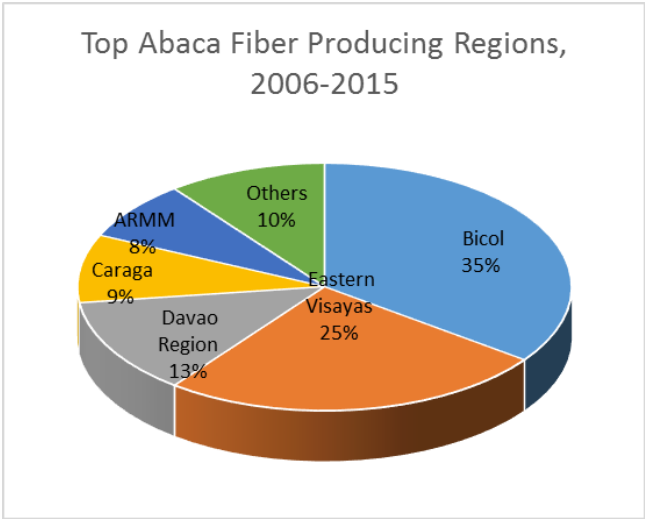
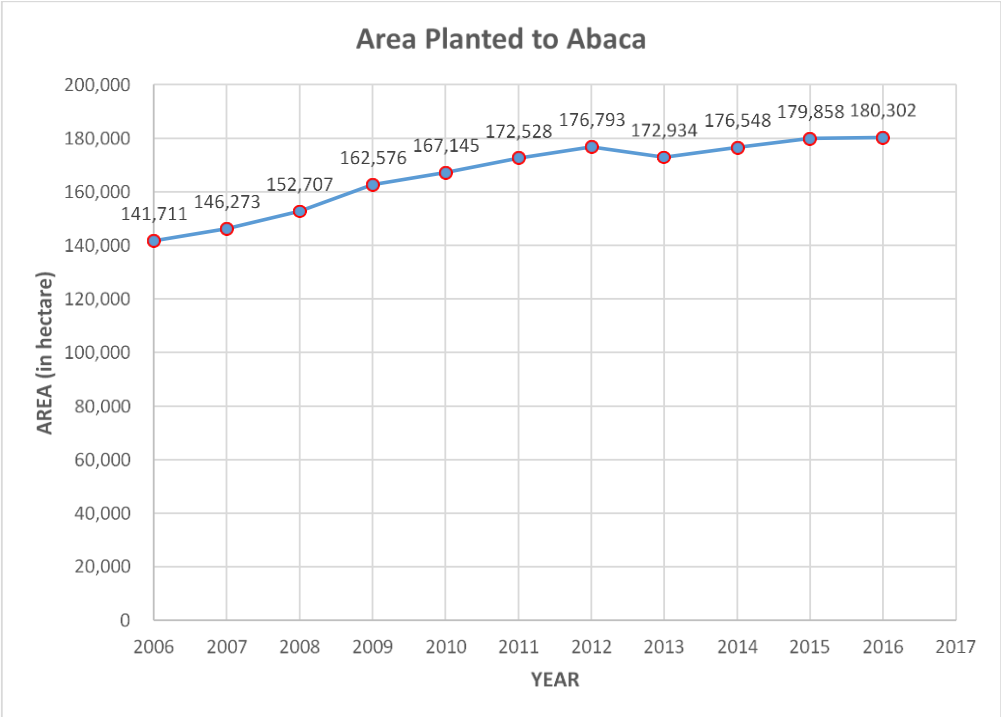


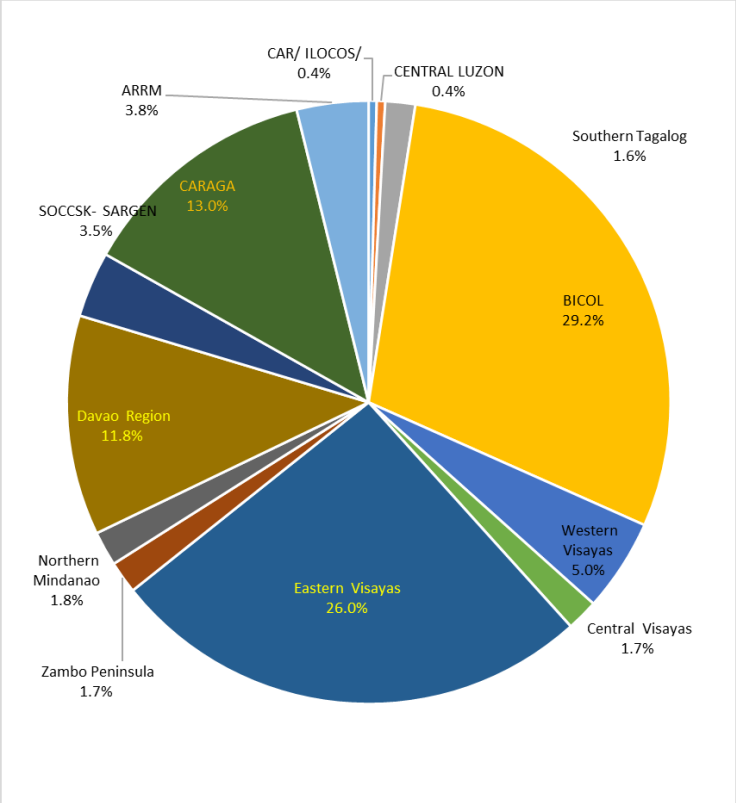
Figure 4. Area planted to abaca, 2006-2016.



Source: Abaca Statistics 2006-2015

In terms of regional distribution of abaca farms, the Bicol Region has a total land area of 49,531 hectares or 29% of abaca areas nationwide. Most of the areas planted with abaca in Bicol Region are heavily concentrated in Catanduanes comprising 47 percent of the total area for the region. Second to Bicol Region is Eastern Visayas with a total land area of 45,527 or 26% hectares dedicated to growing abaca. CARAGA and Davao Regions ranked third and fourth with areas of 19,087 (13%) hectares and 15,880 (11.8%) hectares, respectively.

Figure 5. Regional Distribution of Abaca Farms, 2006-2015.



As shown in Figure 6a, the ARMM has the highest yield for the past ten years with 718 kilogram per hectare per year followed by Davao Region with 509 kilogram per hectare; Bicol Region with 455 kilogram per hectare and Eastern Visayas with 358 kilogram per hectare. Likewise, Figure 6b shows that Northern Mindanao is the highest producing region in terms of yield for the year 2015 with 1,255.2 kilogram per hectare followed by ARMM with 981.6 kilogram per hectare which is higher than the 10-year average yield.

Figure 6a. Top Regions in terms of yield, 2006-2015

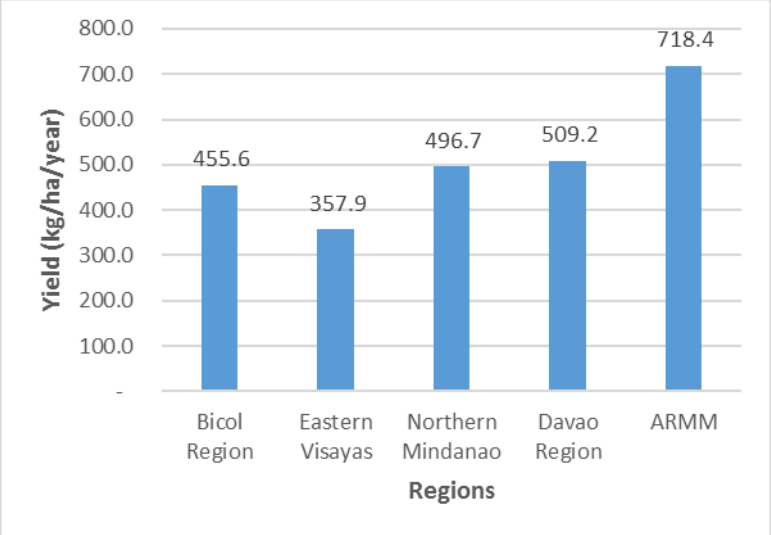
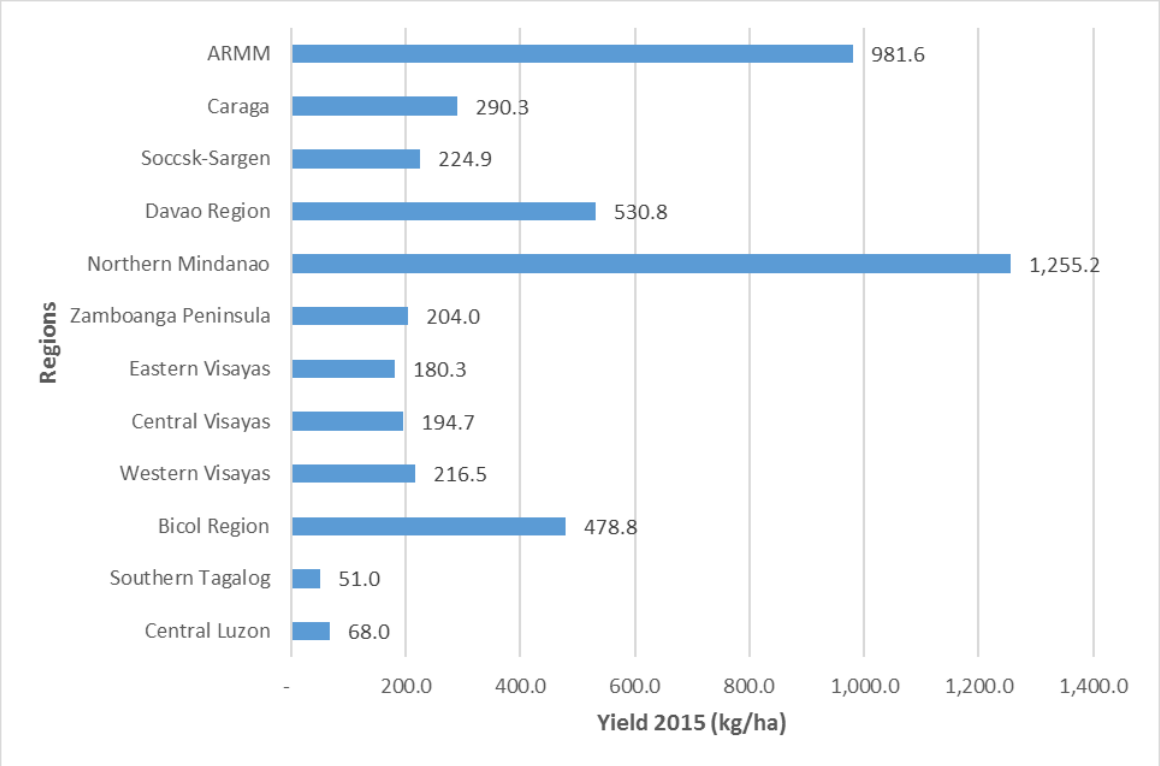


Figure 6b. Abaca fiber yield per region, 2016.



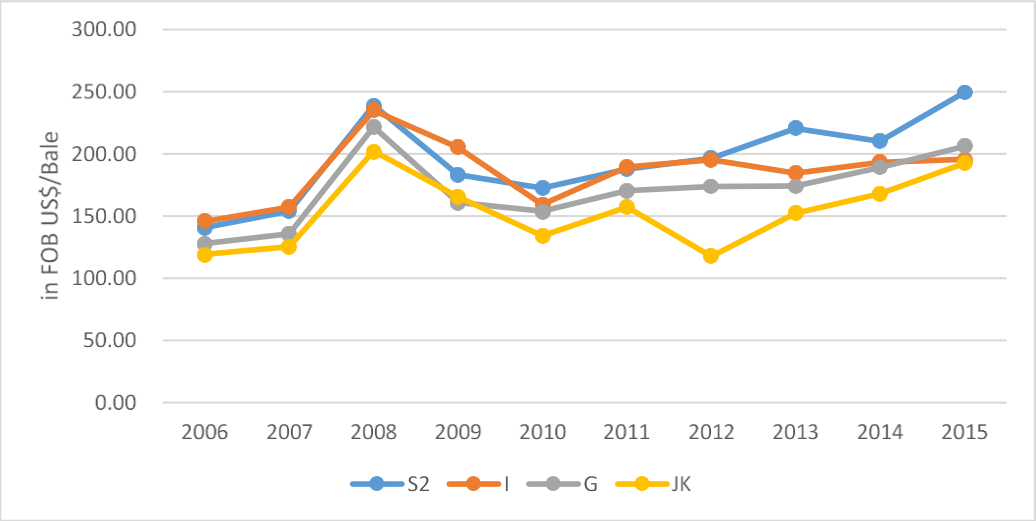
2. Prices

The price of abaca fiber depends on the manner of extraction, whether hand- stripped or spindle-stripped, and on the fiber grade based on cleaning.

	Fiber Grade
Excellent	AD, EF, S1, S2
Good	I, G, H
Fair	JK, M1
Course	L
Residual	Y1, Y2, O, T, WS
Decorticated Fibers	AD1, AD2, AD3 and AD4

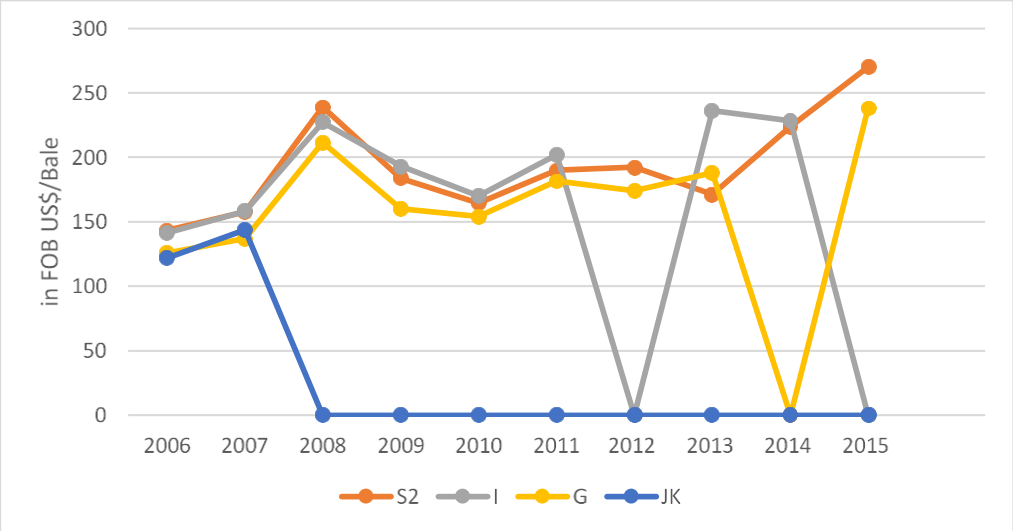
As a traded commodity, the price of abaca fiber is also dependent on market forces. The strong demand for abaca, particularly for pulp starting in early years until 2005, and the tight supply situation due to the effects of typhoons in 2006, which continued to be felt until the early part of 2008, caused the escalation of abaca prices, reaching their peak in 2008. The weakened global demand due to recession especially in the country's major trading partners also caused prices to fall slightly in 2009 and 2010 but improved in the succeeding years (Figures 7 and 8). In 2016, the prices of fiber escalated to its highest peak because of lack of fiber supply in the market. This was due to limited farm production, rampant infestation of diseases in abaca farms and inefficient post-harvest machineries and facilities. S2 Grade is decreasing but commands a higher price among abaca traders.

Figure 7. Weighted average export prices of hand-stripped abaca by grade, 2006-2015



Source: Abaca Statistics, 2006-2015

Figure 8. Weighted average export prices of spindle-stripped abaca by grade, 2006-2015



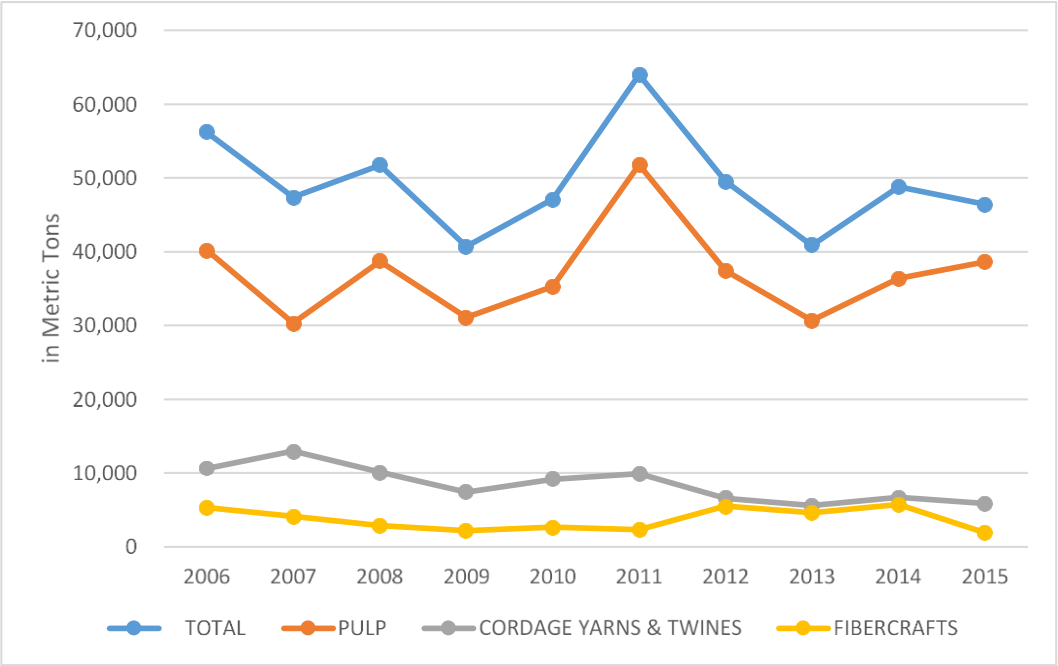
Source: Abaca Statistics, 2006-2015

3. Local Consumption

Domestic processors used an average of 49,260 MT or 76.51 percent of the country's average yearly production of abaca fiber during the past decade. Abaca fiber is being processed locally into pulp, cordage and various fibercrafts items including furniture.

The pulp sector consistently remained as the growth area of the abaca industry utilizing an average of 37,043 MT or 75.2 percent of the annual average local consumption and increasing at a minimal rate of 0.4 percent per annum. The pulp millers' utilization level is highly dependent on the demand for pulp by the specialty paper manufacturers abroad as abaca pulp is the raw material used in meat and sausage casings, tea/coffee bags, k-cups, bags, cigarette paper, currency paper, nancocelluse, polyester and other specialty papers. Processing of pulp into specialty papers is done in Europe, the US, Japan and China as there is no available processing facility in the country.

Figure 9. Domestic consumption of abaca, 2006-2015



Source: Abaca Statistics, 2006-2015

The cordage sector, on the other hand, consumed an average of 8,493 MT of abaca fiber per annum or about 17.2 percent of the yearly average usage of domestic manufacturers. Utilization decreased by 6.4 percent per year from 2006 to 2015. Cordage and allied products have continuously been facing stiff competition from synthetics and other cheaper natural materials. Major cordage companies in the Philippines are the Manila Cordage and Pacific Cordage.

Fiber utilization of fibercraft processors who are mostly cottage-based, exhibited a decreasing trend of 10.6 percent and consuming an average of 3,724 MT or 7.6 percent of the annual average domestic consumption. These figures, however, may not reflect the actual situation in the fibercraft industry, as purchases of other fibercraft makers were in loose form and therefore difficult to monitor. Unlike the other sectors, the fibercraft processors are numerous, not well-organized and are scattered throughout the country (Figure 9).

In 2012, abaca domestic consumption declined by 4.6 percent compared to the average of 10-year period of 49,260 MT. From 2006 to 2015, pulp accounted for the biggest share of consumption at 75.2 percent or 37,043 MT. It was distantly followed by cordage, yarns and twines with only 8,493 MT and fibercrafts with 3,724 MT. The domestic consumption for pulp significantly increased in 2014 with 30,639 MT almost comparable to the 10-year average of 37,043 MT from 2006 to 2015.

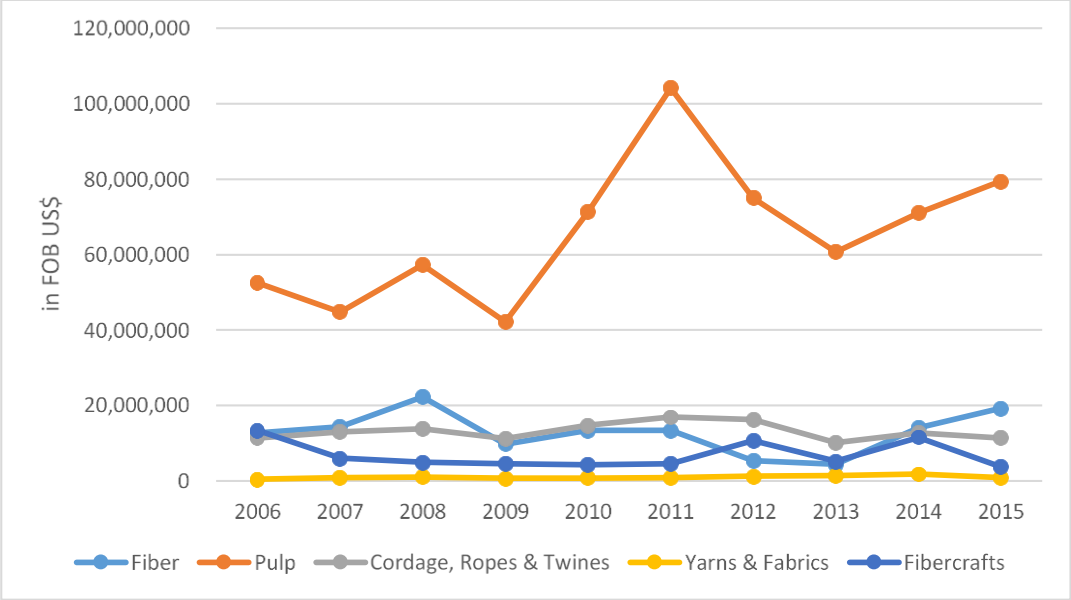
4. Trade

Exports

For the past ten years, the Philippines generated an average of US$100 million per year from the exports of abaca fiber and manufactures. Some 87 percent or an average of US$87 million came from abaca manufactures such as pulp, cordage, yarns, fabrics and fibercrafts. The rest (13 percent) was from raw fiber exports with yearly average earnings of US$12.94 million.

Among the abaca manufactures, pulp continued to lead exports. Shipments averaged US$63.1 million, equivalent to a 65 percent share of the average export earnings per year. Meanwhile, fibercrafts and cordage/allied products generated US$7.7 million (7.9 percent) and US$13.0 million (13.45 percent) per annum, respectively, while yarns and fabrics accounted for US$0.98 million (1.0 percent) of the yearly average. In 2016, abaca fiber export earnings increased to $51.4 million, from 2015 with US$ $36.8 million earnings from January to May (philstar.com).

Figure 10. Export earnings from abaca fiber and manufactures, 2006-2015



Source: Abaca Statistics, 2006-2015

Abaca Fiber

Exports of fiber averaged 9,841.4 MT per annum from 2006 to 2015. Growth decreased at 0.8 percent per annum during the period. The demand of the country's major trading partners, the United Kingdom (UK) and Japan, had been erratic since the financial crisis hit the global economy. In 2010, however, there was a substantial increase in abaca imports of the major buyers including emerging market, China, following their gradual recovery from the global economic recession. In the succeeding years though, the purchases of the UK and Japan and the rest of the European and Asian countries slowed down by 42.7 percent as some specialty papermakers abroad shifted to the importation of abaca pulp instead of the usual raw fiber.

Europe, specifically the UK and Germany, is the premier destination of abaca fiber, absorbing an average of 4,485 MT or 45.6 percent of the ten-year average exports. Exports remained at practically the same level in 2006-2008 but further slumped to 3,329 in 2009 due to global economic downturn. In 2010, abaca exports to UK made an upturn to 4,216 MT but only to decline in the succeeding two years but rebounded to 5,817 MT in 2015. Because of the slowdown, fiber exports to the country declined at a rate of 1.6 percent during the 10-year period.

The Asian market was the second most important destination of abaca fiber, with Japan as the leading buyer. Japan continued to influence abaca trade in the region accounting for the biggest market of 3,651 MT or 37 percent of the 5,000MT annual average Asian imports.

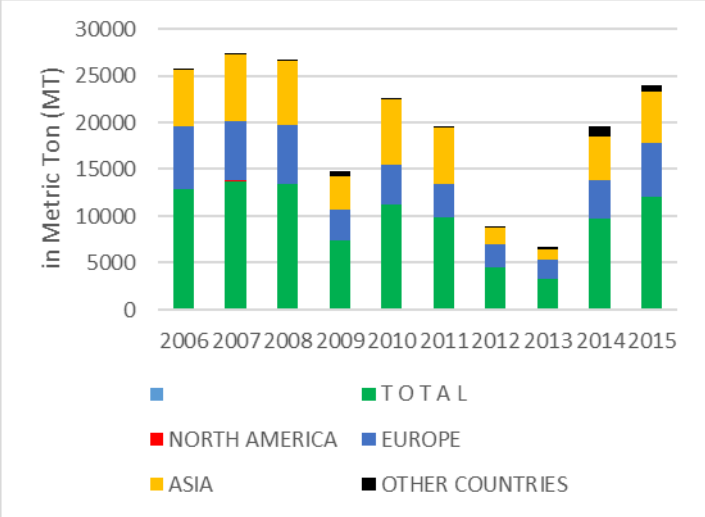


Figure 11. Exports of abaca fiber by destination,2006-2015

From 2006 through 2008, imports of Japan rebounded due to the printing of the Japanese yen that has new designs and sophisticated security features as protection. Furthermore, businesses in Japan have picked up supported by its strong exports to the United States (US) and Asian countries, especially China. In 2009, however, the Japanese market slowed down following the global economic recession. Fiber imports severely contracted to 1,502 MT but rebounded in 2010 when demand picked up by as much as 4,680 MT. Imports, however, dropped to only 3,867 MT in 2011 and further dipped to 1,297 MT and 960 MT in 2012 and 2013 due to the continuing effects of the financial downturn. Fiber exports in 2014 exponentially increased gaining a 277 percent increase to 3,625 MT compared to previous year and further increased in 2015 at 4,846 MT.

On the other hand, India and Indonesia had consistently been buying abaca fiber although the shares were very minimal at one percent each. Abaca fiber is used as raw material in the manufacture of cordage and fibercrafts in these countries. China's share accounted for 11.4 percent (1,122 MT) of the overall Asian trade and is presently the second biggest Asian market for Philippine abaca fiber. It is now using the fiber in the manufacture of tea bag, capacitor paper and fibercrafts.

The importation of North America averaged 32.7 MT from 2006 to 2008 with the US as the sole market destination. Imports of the US consistently remained low because its biggest abaca pulp mill ceased to operate in 2004 to concentrate in the UK. From 2009 to 2015, the US market was seriously hit by recession which led to its non- importation of abaca from the Philippines.

In 2013, export of abaca fiber recorded its lowest value of 4,456 MT far from the 10-year average of 9,841 MT. In that year, UK was the highest importer with 1,936 MT or 57.88 percent of the total volume.

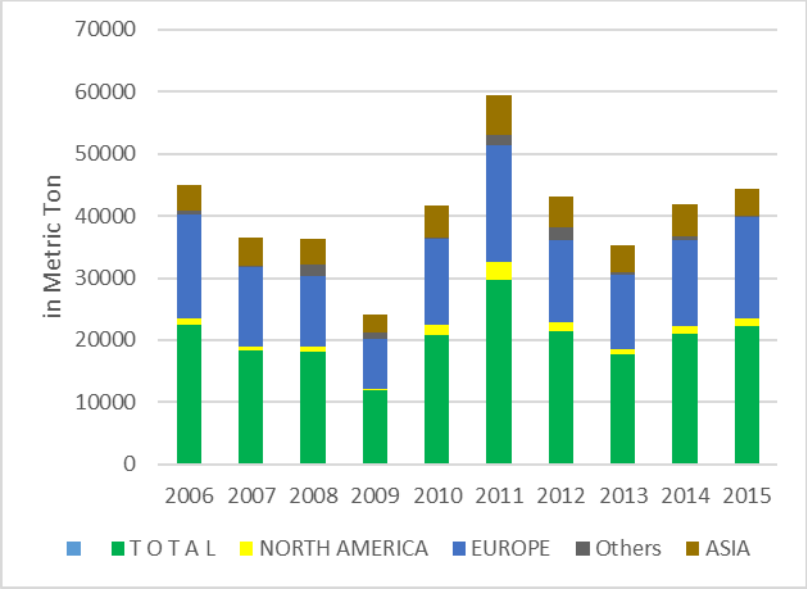
Abaca Pulp

All abaca pulp manufactured in the Philippines are exported, especially during when it was used as raw material for cigarette paper by a local cigarette manufacturing company which ceased operation in the latter part of 2002. Exports of abaca pulp averaged 20,382 MT over the ten-year period (2006-2015).

Europe is the most important destination for Philippine abaca pulp since it is home to a number of specialty paper manufacturers. Exports to Europe averaged 16,454 MT per year or 80 percent of the total, with 7,420 MT or 36.4 percent being absorbed by Germany.

The UK was the second biggest and the fastest growing European market for abaca pulp. Exports increased by 1.6 percent yearly as a result of the transfer of the pulp operation of a US-based abaca pulp mill to the UK. France is likewise an important export market for abaca pulp with imports averaging 1,590 MT per year or 7.8 percent share to the total annual average exports.

Figure 12. Exports of abaca pulp by destination, 2006-2015.



Source: Abaca Statistics, 2005-2014

Exports to Asian countries averaged 4,613 MT per annum with Japan as the leading destination. Japan's purchases averaged 3,466 MT annually or 17 percent of the total. Aside from the Japanese yen, abaca is processed into capacitor paper, insulation paper, tea bag, masking tape, stencil paper, filter oil absorbent paper and other specialty paper products.

China and Taiwan consistently imported abaca pulp during the last ten years. Their shares though were fairly minimal at 4.9 percent and 0.6 percent, respectively. Imports of China significantly increased in 2011 to 2,265 MT from 1,045 the previous year and grew at a considerable rate of 20.9 percent per year. South Korea's imports were in small quantities only.

Abaca pulp imports of the US, the third biggest market for Philippine abaca pulp, averaged 1,201MT or a share of 5.9 percent to the annual average during the ten-year period. Abaca is currently utilized in the

manufacture of cigarette filters of the Winston and Marlboro Lights cigarettes, among others.

Exports of abaca pulp averaged at 20,382 MT for the ten-year period. The two top importers were Germany and the UK with 7,420 MT and 4,686 MT, respectively.

Tea Bags

The provinces of Catanduanes, Aklan and Iloilo are supplying the certified abaca fibers to Glatfelter Gmbh that are made into tea bags of Lipton Tea. The 2013 demand of tea bags is 206 Billion annually. Some processors are also producing tea bags. By 2020, the Unilever will only procure certified fibers.

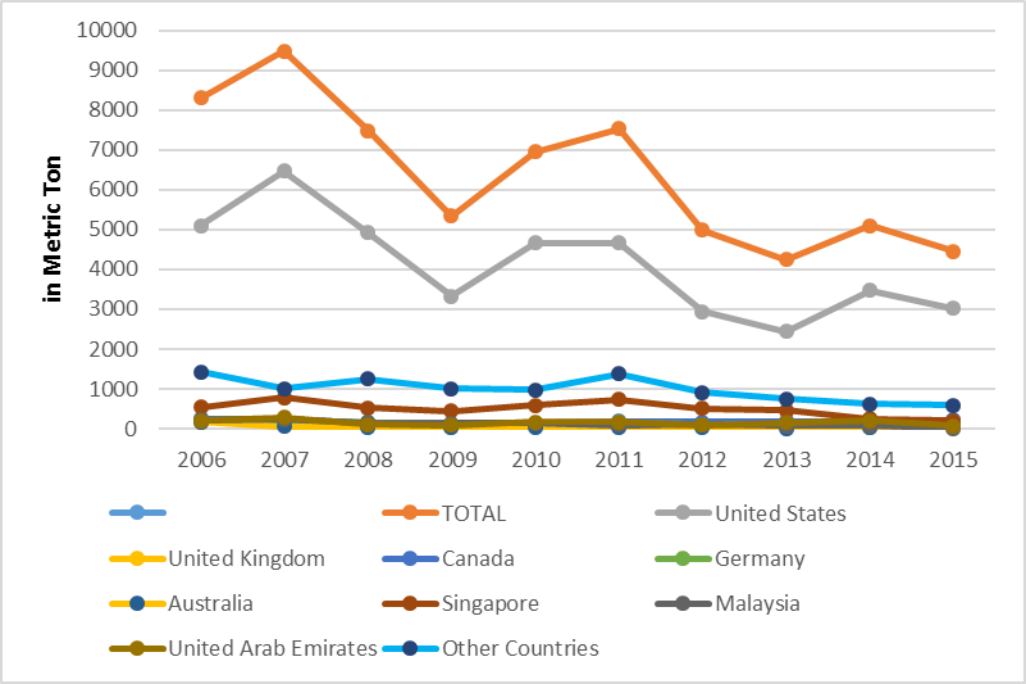
Abaca Cordage and Allied Products

From 2006 through 2015, exports of abaca cordage and allied products such as ropes, cables and twines averaged 6,355 MT per year. Shipments were decreasing at 6.7 percent annually. The stiff competition posed by cordage products made of synthetics and other cheaper natural materials continued to affect the country's abaca cordage industry.

The US absorbed the bulk of the exports accounting for 64.2 percent or an average of 4,100 MT. Singapore, Canada, the United Arab Emirates, the UK, Germany, Malaysia and Australia consistently remained as the other major markets for Philippine cordage (Figure 13).

In 2013, exports of abaca cordage and allied products slid to their lowest in the past seven years to 4,240 MT or only 66 percent of the average 6,385 MT. The US absorbed the bulk with 2,443 MT or 58 percent of the total while Australia had the lowest at only 7.4 MT or 0.17 percent share.

Figure 13. Exports of abaca cordage and allied products by destination, 2006-2015.

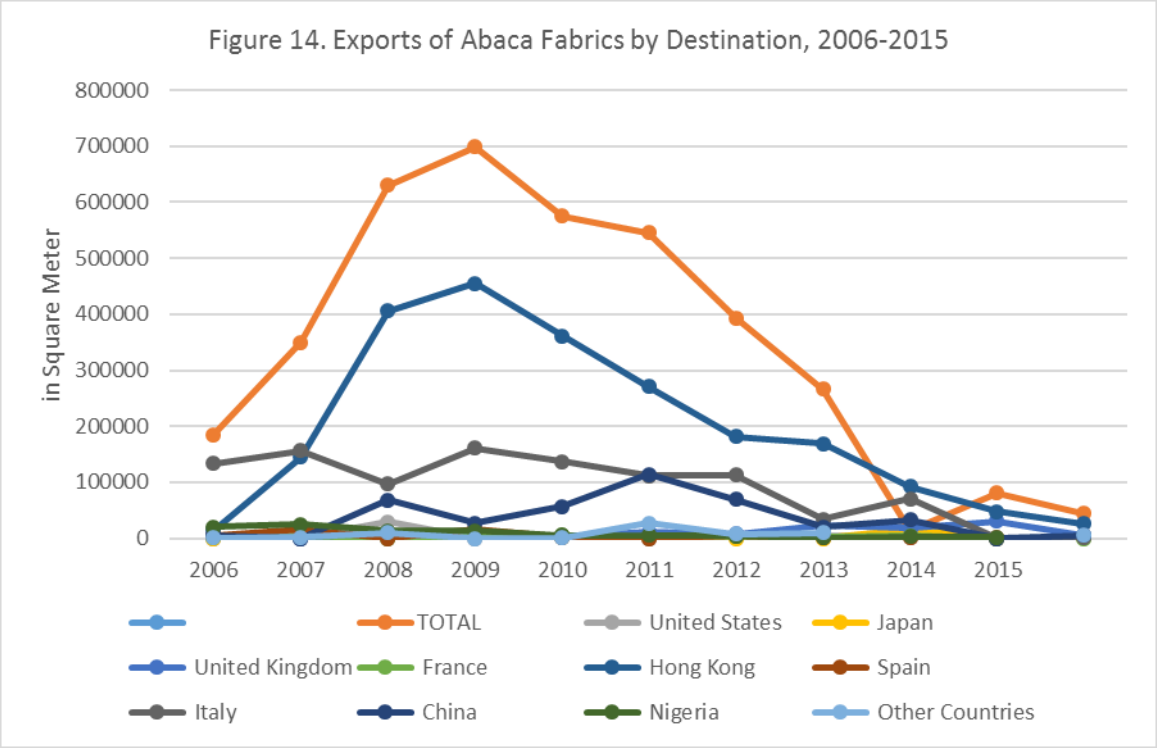


Abaca Fabrics

Exports of abaca fabrics had been on an uptrend from 2003 to 2012, recording an annual average of 386,899 square meters (sq.m.) and a significant growth rate of 14.1 percent yearly. Exports were highest in 2008 at 698,335 sq.m. following surges in the demand of Hong Kong, Italy, Japan and the UK and the resumption of importation of Spain and France.

Hong Kong was the biggest market, importing an average of 200,509 sq. m. per year or 51.8 percent of the annual average. It was followed by Italy with average purchases of 111,221 sq. m. or 28.7 percent of the total. China, which began its fabric importation only in 2002 but on irregular basis, emerged as the third biggest market from 2007 until 2011 with an annual average of 36,339 sq.m. with 9.4 percent share. Its imports in 2011 however, slumped to 69,461 sq.m. and further dipped to 20,658 sq.m. in 2012.

Other regular buyers were the UK and Japan, with corresponding imports averaging 8,257 sq. m. and 3,618 sq. m. per year. Nigeria's importation had been noticeably regular in the past eight years, with a yearly average of 9,792 sq. m. while purchases of other trading partners were intermittent during the last ten years (Figure 14).



Source: Abaca Statistics, 2006-2015

Generally, the demand for abaca fabrics and other fiber-based products is largely dictated by fads and fashion. However, other consumers patronize natural-based materials not only due to their unique appeal but also due to environmental considerations.

In 2012, exports of abaca fabrics declined by 31 percent as compared to the 10-year period average of 386,899 sq.m. Hong Kong had the highest import of 169,217 sq.m. or 63.5 percent of the total.

Imports

Since 1991, local pulp manufacturers had been importing abaca fiber from Ecuador except in 2005. The pulp processors resorted to imports to address the deficiency in local supply of specific grades and meet pulp buyers' specifications. In 2012, abaca imports fell by 68.3 percent against the 10- year period average to only 103 MT valued at US$ 105,147. Imports gained a peak in 718.3 MT valuing at US$1,078,342 million. Imports continued to increase in 2014 at 1,039.5 MT being the highest record in 10 years having a value of US$1,773,803 million.

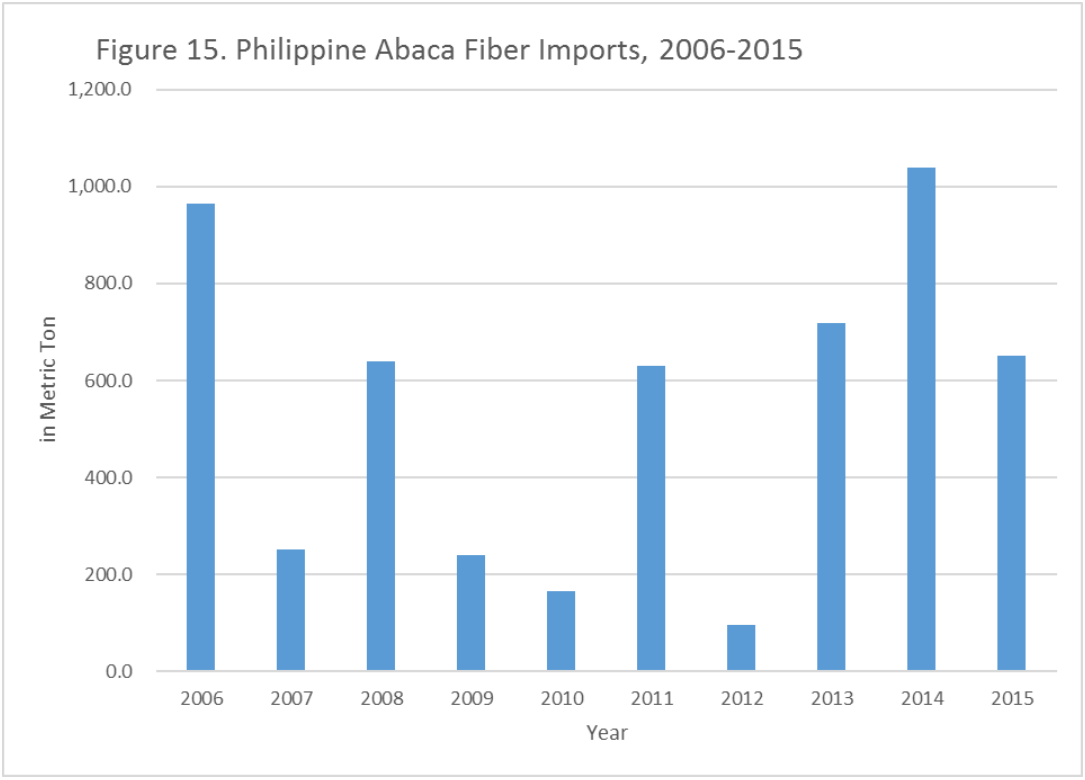


Figure 15. Philippine Abaca Fiber Imports, 2006-2015
1,200.0
1,000.0
800.0
600.0
400.0
200.0
0.0
in Metric Ton
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year

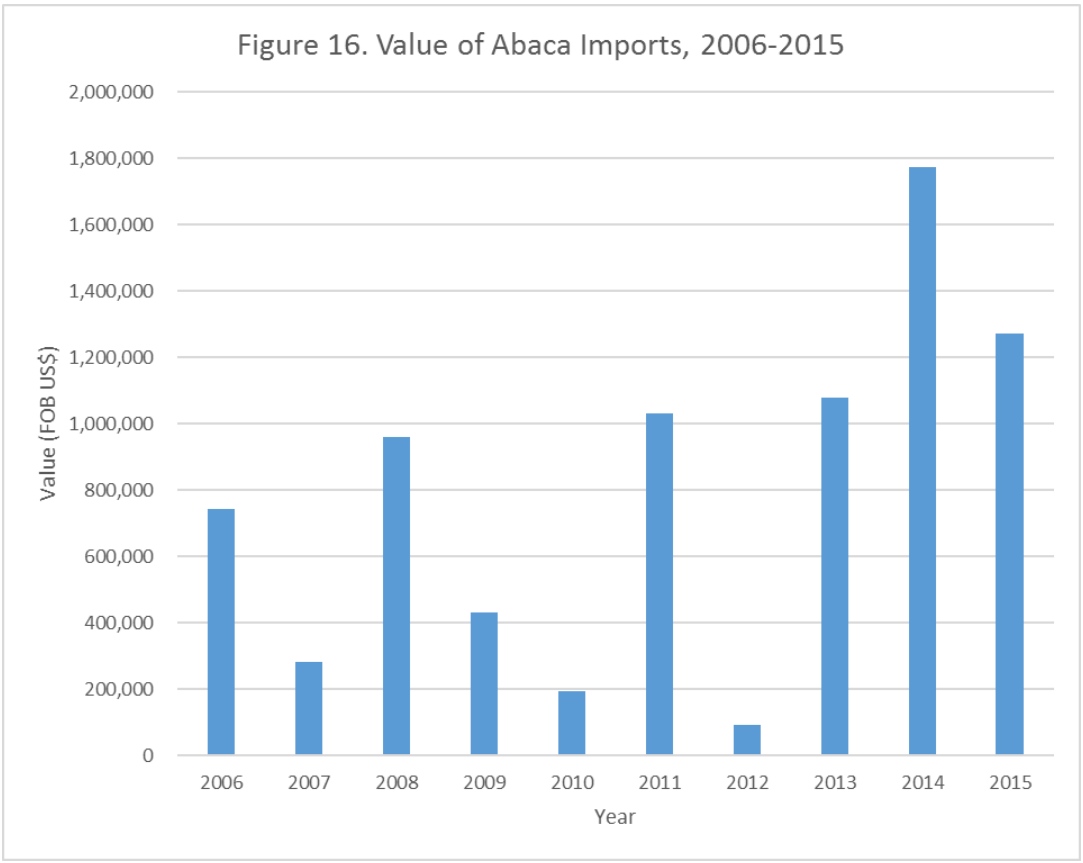


Figure 16. Value of Abaca Imports, 2006-2015
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Value (FOB US$)
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year

CHAPTER III

FARM INCOME ANALYSIS

Cash flows are compared between typical and modern farming at every step of production of abaca fiber. Typical farming requires less farmer intervention and material inputs than modern or good farming. The data for typical farm was based on abaca farm in Bicol Region planted with Abuab variety. The data for modern farm was based on Maguindanao variety planted in Davao.

A. Production Costs

Establishment cost is PhP 38,295 for the typical and PhP 68,045 for the modern farm including 10 percent allowance for mortality of planting materials. The planting densities are at 1,000 hills per hectare both for typical and modern farm. An average labor and material cost of PhP14,700 and PhP19,075 for typical farming and PhP 19,250 and PhP 43,075 for modern farming, respectively will be incurred. Additionally, logistics and land lease amounts to PhP 4,520 and PhP 5,720 for typical farm and good farm, respectively.

Total maintenance cost is PhP3,775 for the typical farm and PhP 22,425 for the modern farm. On the typical farming, weeding and under brushing are done only once during harvesting of abaca. No fertilizer application and pest control are being performed by the farmer. While on the good/modern farming, weeding and under brushing are done three times a year. Pesticide/insecticide application at the rate of one liter per hectare is done twice a year to prevent the occurrence of pest and diseases. Three bags of urea fertilizer are being applied three times a year.

Average harvesting cost per year for typical farming is PhP 16,450 while good farming has an average harvesting cost of P 12,250. At the farm level, only primary processing is undertaken. This involves the extraction of fiber from the harvested tuxies. The two methods of extraction are being used hand stripping for typical farming and mechanized stripping for good farming. Drying is done through air drying. The abaca fiber recovery of 1.5 percent is used using "0" serration standard stripping both in hand hagutan and mobile spindle machine.

B. Returns

Average yield during the productive years (2-10 years) of 667 and 1,334 kilogram per hectare are produced from typical and good farming showing a 667 kg gap favoring the latter practice. The abaca fiber is being sold to trader processors/exporters at an average price of PhP60 per kg. A total of PhP36,000 gross income is gained from typical farming while PhP86,400 is gained from good farming. There is a gap of PhP50,400 favored to good farming. After deducting the expenses, typical farming gained an average net income of PhP13,390 per hectare compared to PhP34,470 with good farming. There is a noticeable gap of PhP21,080 between the two farming practices.

The internal rates of return for the typical and modern farms are 39 and 44 percent, respectively. Payback period for the typical farm is 5.22 years compared to 4.03 years for the good farm. Good farming is the better practice.

Table 1. Abaca: Summary of Farm Cash Flows, Philippines, 2016.

PARAMETERS*	TYPICAL FARM	GOOD FARM	GAP
Average yield per ha (kg)	667	1,334	667
Peak yield per ha (kg)	750	1,700	750
Average establishment cost per ha (Year 1)	38,295	68,045	29,750
Average cash outflow per ha per year	22,610	51,930	29,320
Price per kg (farmer's selling price)	60	60	0
Average cash inflow per ha per year	36,000	86,400	50,400
Average net cash flow per ha per Year	13,390	34,470	21,080
Average Area to get preferred net income of Php 94,000 (poverty threshold, 1st half 2012) (ha)	7.02	2.73	4.29
Average cost per kg (PhP/kg)	37.68	36.06	1.62
Payback period (years)	5.22	4.03	1.19
IRR (percent)	39	44	5

Note: Establishment cost refers to Year 1 costs; the average cash outflow, average yield, average cash inflow, and average net cash flow are based on average cash flow values from Years 2-10, the productive years
Source: Actual interview with the trader and farmer, Data from abaca farm record keeping project. Please refer to Annexes 12 and 13 for details.

CHAPTER IV

SUPPLY/VALUE CHAIN ANALYSIS

This chapter discusses the supply/value chain of abaca fiber in typical and good farms. The value chain involves the processes of production, marketing and sale of abaca fiber in both farms. The supply/value chain for these two types of farms will be differentiated through the technology being applied by the farmers, particularly in fiber production, in order to efficiently address market demand. The sequence of abaca business activities from the provision of inputs to primary production, transformation and marketing, up to the final sale; the players, key institutions and support industries involved in all the processes; and the costs, value added and margins prevailing in the abaca fiber industry will be presented in this chapter.

A. Supply Chain Segments and Players

The segments along the supply chain are identified by players and their main functions.

A.1. Inputs Supply

Planting Materials. Abaca planting materials come from nurseries of abaca farmers or PhilFIDA seedbanks, private sector-owned tissue culture laboratories and the existing PhilFIDA tissue culture laboratories.

Tools and Equipment. Tools and equipment such as bolo, rake, spade, power sprayer, grass cutter and others will be supplied from the accredited dealers of farm tools and machinery equipment, hardware stores and agricultural supply stores in the locality.

Fertilizers and Pesticides. This will be procured from the agricultural supply dealers and stores in the locality.

A.2. Farm Production

Farmers cultivate land, fertilize, maintain and harvest abaca stalks for primary processing of producing abaca fiber. It involves farm activities such as area selection, land preparation (underbrushing, digging of holes, and layouting), planting, farm management (weeding, pest and disease control, fertilization and trimming of dry leaves) and harvesting (topping of leaves, tumbling, hauling and piling).

A.3. Primary Processing

This process includes extraction of abaca fiber from the stalks (tuxying, stripping by manual or machine operated, decorticating), drying of fibers and

bundling. This will be done by the farmers, skilled strippers and laborers. Hand hagutan tools will be used for manual extraction while spindle-stripping machine and decorticating machine for mechanized extraction process. These will be all procured from accredited fabricators in the locality.

A.4. Trade

Trading is done directly in the farm or local barangay, municipal/town and provincial traders/buyers. Traders buy dried abaca fiber from the farmers all-in (not yet segregated according to grade). In the case of cooperatives/ associations, they sell directly to the processors or Grading and Baling Establishments (GBEs). Activities involved in this segment are consolidating, hauling, grading and classification, baling and transporting. Traders, GBEs, warehouse and transport firms are among the players involved in this segment.

A.5. Market

This involved the buying/selling of classified and graded abaca fibers for processing into end products. Players involved are exporters and local processors (for pulping, cordage, fibercrafts, etc.)

A.6. Logistics

Logistics covers services for the transport of graded and baled abaca fibers to end- users, processors and exporters.

The processes and players in the value chain map for good farms are totally different from the typical farms. There are some crucial factors that are added/changed in some segments enumerated in the value chain map. For good farms, farmers will use suckers or corms and seeds as planting materials as part of their inputs, their production activities will involve the application of organic liquid fertilizers and farmers observe good agricultural practices in improving their farms with regards to growth and treating diseases. Also, in the primary processing, fibers will be mechanically stripped using high capacity machines. And with the use of stripping machines, accredited fiber extraction machine fabricators will be one of the important players in the value chain map for good farms. With these crucial factors, farmers will have a modern system of farming that will greatly increase the volume of abaca fiber production.

Figure 17. Typical farm: Value chain map of abaca (Processes and Players)

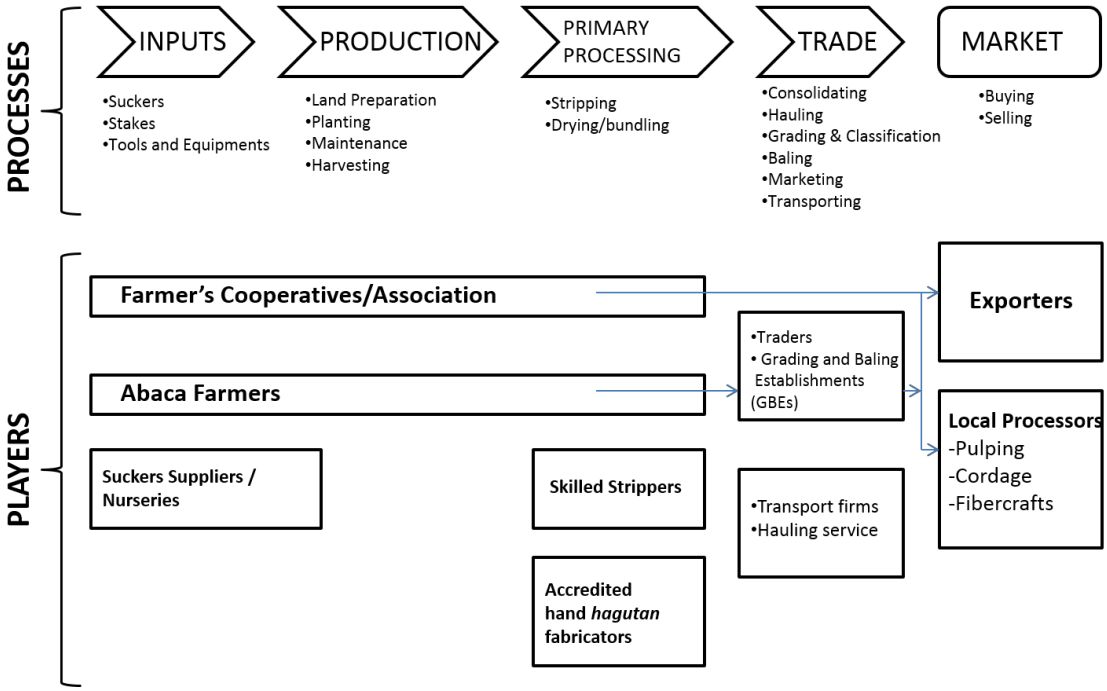
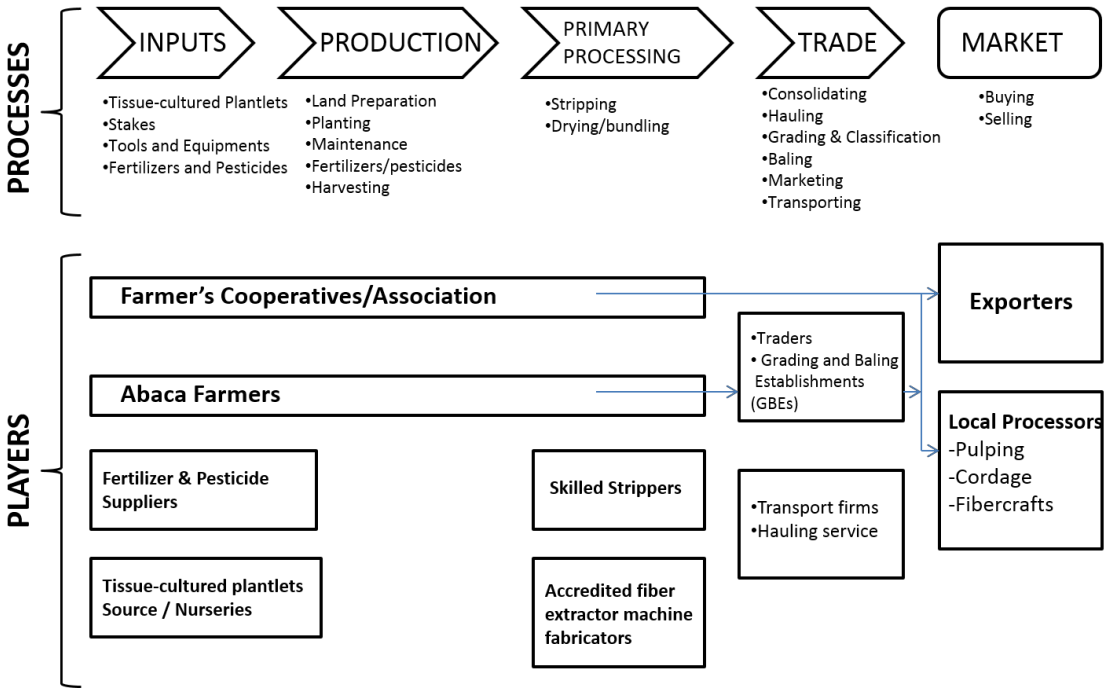


Figure 18. Intensive farm: Value chain map of abaca (Processes and Players)



Industry Players

The abaca industry is made up of six major groups of industry players: farmers, strippers, classifiers, traders, fiber exporters and processors/ manufacturers.

Farmers

As of 2016, there are about 128,958 abaca farmers cultivating a total area of 180,302 hectares or an average of 1.43 hectares per farmer.

Strippers

Strippers extract the fibers, either by hand or mechanical means. Included in the stripping work are harvesting of stalks, tuxying and drying of fibers. The strippers are paid on a pre-determined system wherein they receive 50, 60 or 70 percent of the harvest depending on the practice agreed upon and depending on the region. In 2014, some farmers or farmer groups bought or availed decorticating and spindle machines from the government, NGOs and pulp manufacturers.

Classifiers

Classifiers sort and grade the fiber based on the standards set by the government. They are trained by the PhilFIDA.

Traders

Trading of abaca fiber is done at different levels depending on the location of the farmers and where the accumulation of fiber is done. Hence, there are traders in the barangay, town, province, city and region. In each level, the pricing system includes mark-up attributable to the service provided by the traders.

Traders are classified depending on the volume of fibers being traded. A Class A trader sells more than 75,000 kg of fiber per year; Class B trader, more than 50,000 kg up to 75,000 kg per year; Class C trader, more than 25,000 kg up to 50,000 kg per year and Class D trader, 25,000 kilos and below.

As of 2016, there are about 750 licensed traders and 23 licensed trader-exporters.

Fiber Exporters

The fiber exporters, also known as grading and baling establishments (GBEs), operate in major abaca-producing regions and usually maintain liaison offices in Metro Manila. It is in this sector where abaca fiber, whether for local or foreign consumption, are graded and baled, using high density presses, into

125 kgs of 100 cm x 55 cm x 60 cm bundles per specific fiber grade. There are ten licensed grading and baling establishments operating in the country. The best bailing machine can be found in Davao which is owned by a trader that export fibers to China and Spain.

Processors/Manufacturers/Pulp Millers

As of 2016, four abaca pulp companies are expanding operations in the country: one in Bicol, two in Leyte and one in Iligan. The companies have well-established international market networks for their pulp.

Cordage Manufacturers

There are currently six cordage firms operating in the various parts of the country: two in Metro Manila, one each in Laguna, Albay, Cebu and Davao. They use abaca fiber as the principal raw material for rope, cordage and twine manufacturing. Blending with other natural fibers like maguey is done depending on the specifications of the buyers.

Fibercraft Processors

The fibercraft sector, which includes manufacturers of handmade paper, rugs and carpet and handloom weavers, is primarily a cottage-based industry. Operating mostly in the countryside, the sector is a major source of livelihood especially among women and out-of-school youths. Several of these manufacturers, particularly the Tinalak Foundation based in Tagum, Davao, have successfully established their markets abroad especially with their unique, functional and creative designs.

The handloom weaving sector produces abaca fabrics being utilized as raw material for making novelty and household items, as décor and wrapping material as well as for high fashion wear and accessories. Some abaca weaves are blended with metallic threads or polyester while others have printed, striped and ethnic designs to suit the varying needs of the market. The industry is mainly found in Bicol, Western Visayas, Eastern Visayas, Central Visayas and in Southern Mindanao, wherein particularly in the latter, indigenous people are actively engaged in tinalak, nabel and dagmay weaving. Production of new product lines for fashion wear, accessories and specialty/novelty items is mostly based in Metro Manila.

In 2016, about 156 licensed fibercraft processors have been recorded who used abaca as their raw material for their processing activities.

Other Processors

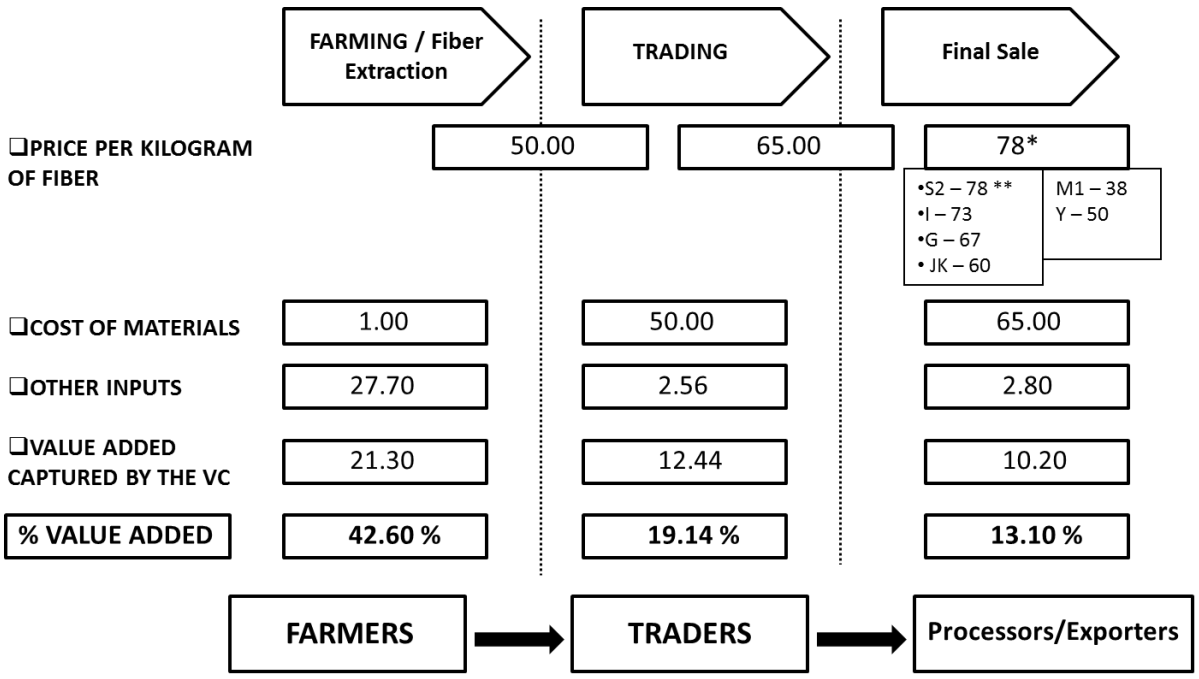
Other processors include manufacturers of machine-woven carpet, dartboard pads, soap and lotion (from enzymes) as well as the makers of

furniture who are now using fiber and "bacbac", the dried outer skin of the abaca leafsheath.

B. Costs, Value Added and Margins

The cost builds up from inputs, production, processing up to exporting of abaca is summarized in Figure 20 and 21. Average values for the peak productive years (year 4-10) are considered. Value-added and profit margins were calculated for both farming practices. No inputs were further added during the fourth up to tenth production year for a typical farm therefore entailing no input supply cost in its supply value chain. The farmer's value-added margin is computed by adding the cost of labor, processing, land lease and profit margin for typical and good farm alike. Delivery cost of fiber from farm gate to trader was included in the total farmer's cost while the cost of delivery from trader to importer was charged to the trader.

Figure 19. Typical farm: Value addition of abaca (Abaca Fiber Production)



** Exporter Price – Source: Average Buying Price of GBEs Philippine Fiber Industry Development Authority*
*** Top 4 Grades – Export Grades*

Figure 20. Typical farm: Abaca value chain, (PhP/kg fiber) Philippines 2015.

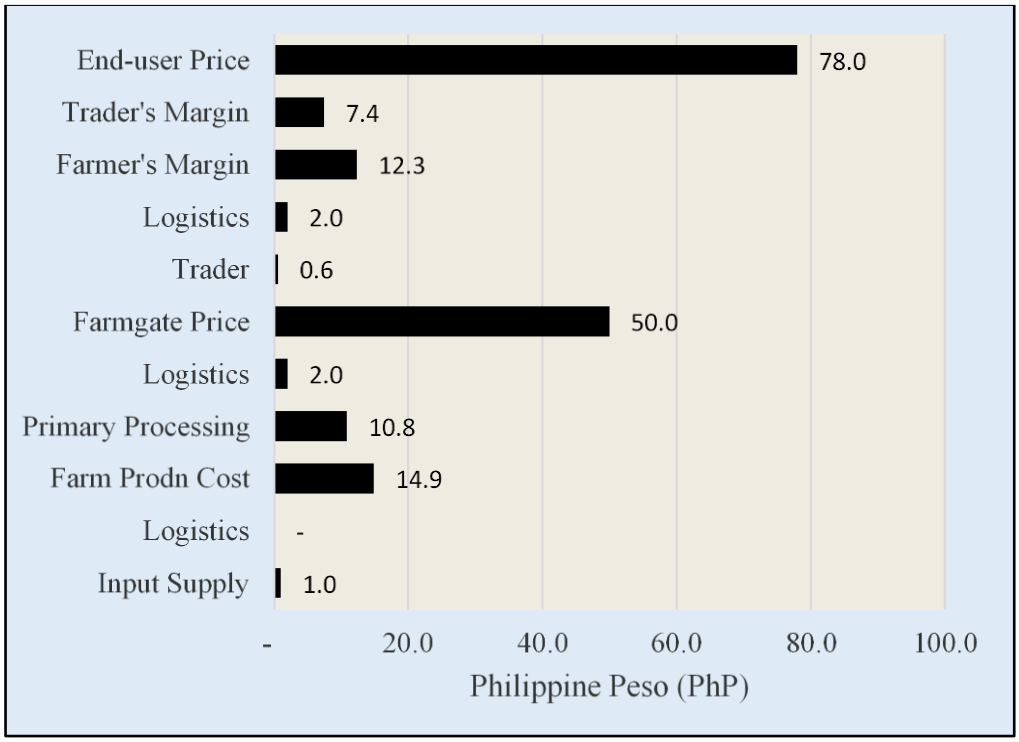


Figure 21. Intensive farm: Abaca value chain, (PhP/kg fiber) Philippines 2015.

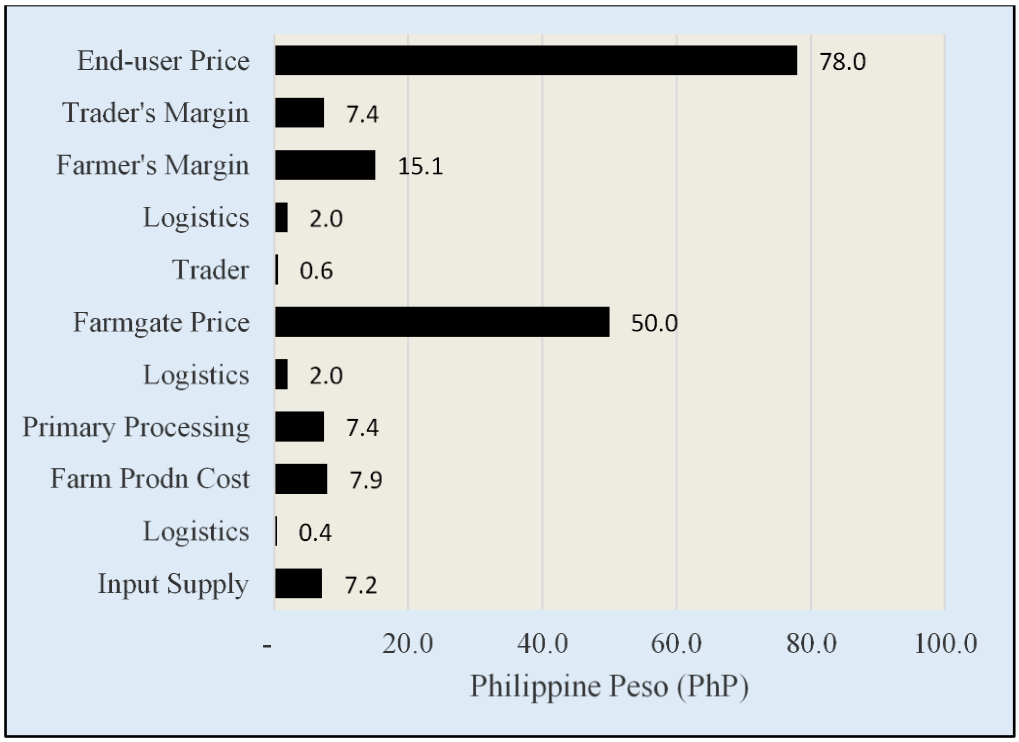
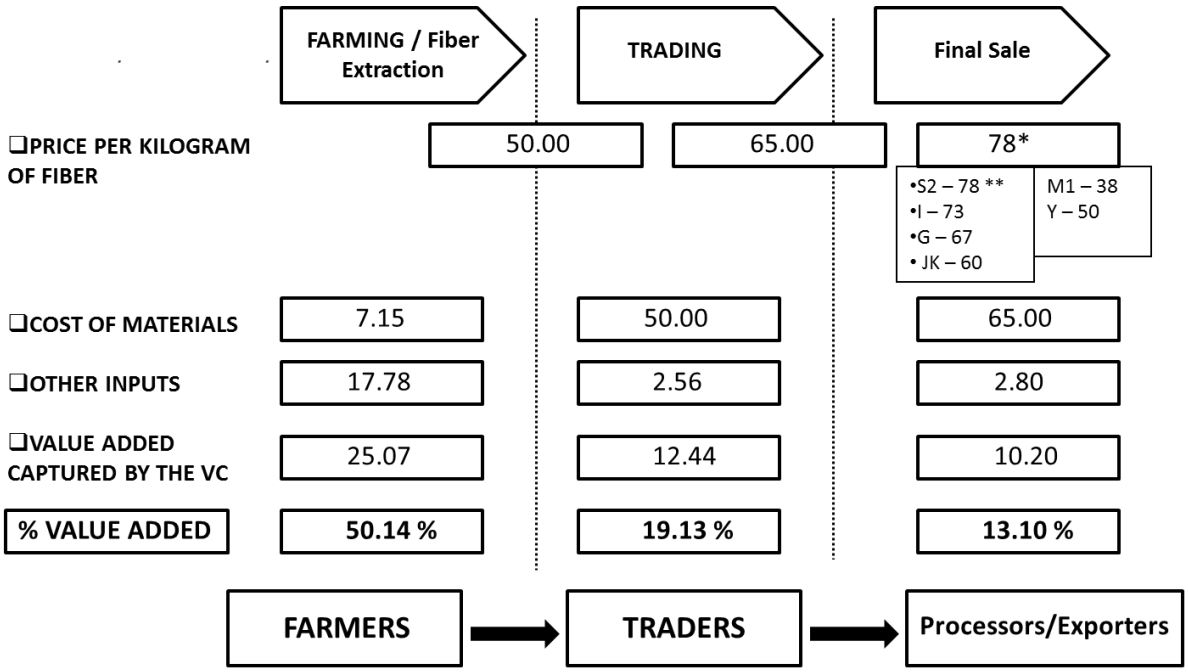


Figure 22. Intensive farm: Value addition of abaca (Abaca Fiber Production)



** Exporter Price – Source: Average Buying Price of GBEs Philippine Fiber Industry Development Authority*
*** Top 4 Grades – Export Grades*

Figure 23. Typical farm: Schematic diagram of the Value chain of abaca (PhP/kg fiber) 2016.

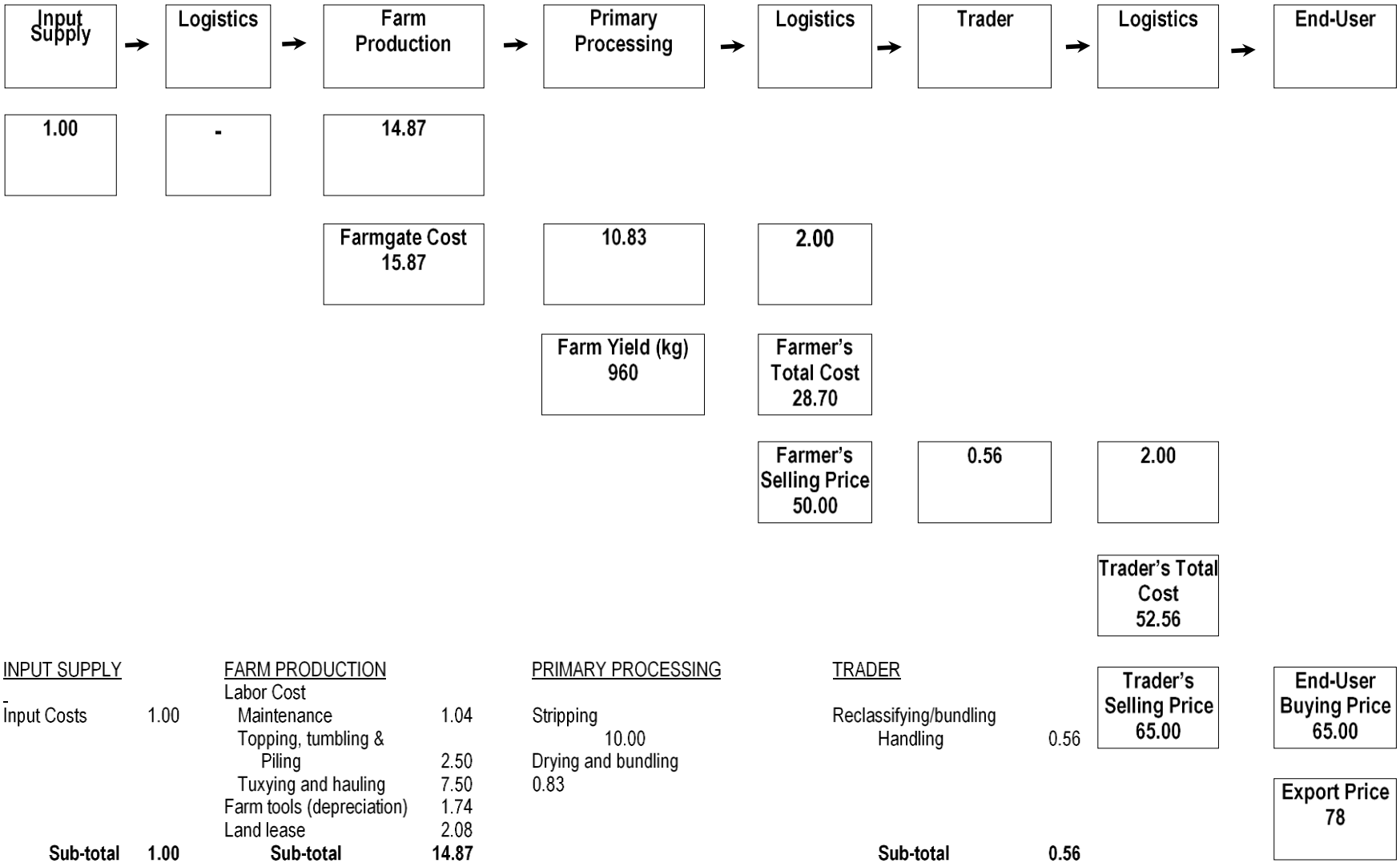


Figure 24. Intensive farm: Schematic diagram of the Value chain of abaca (PhP/kg fiber) 2016.

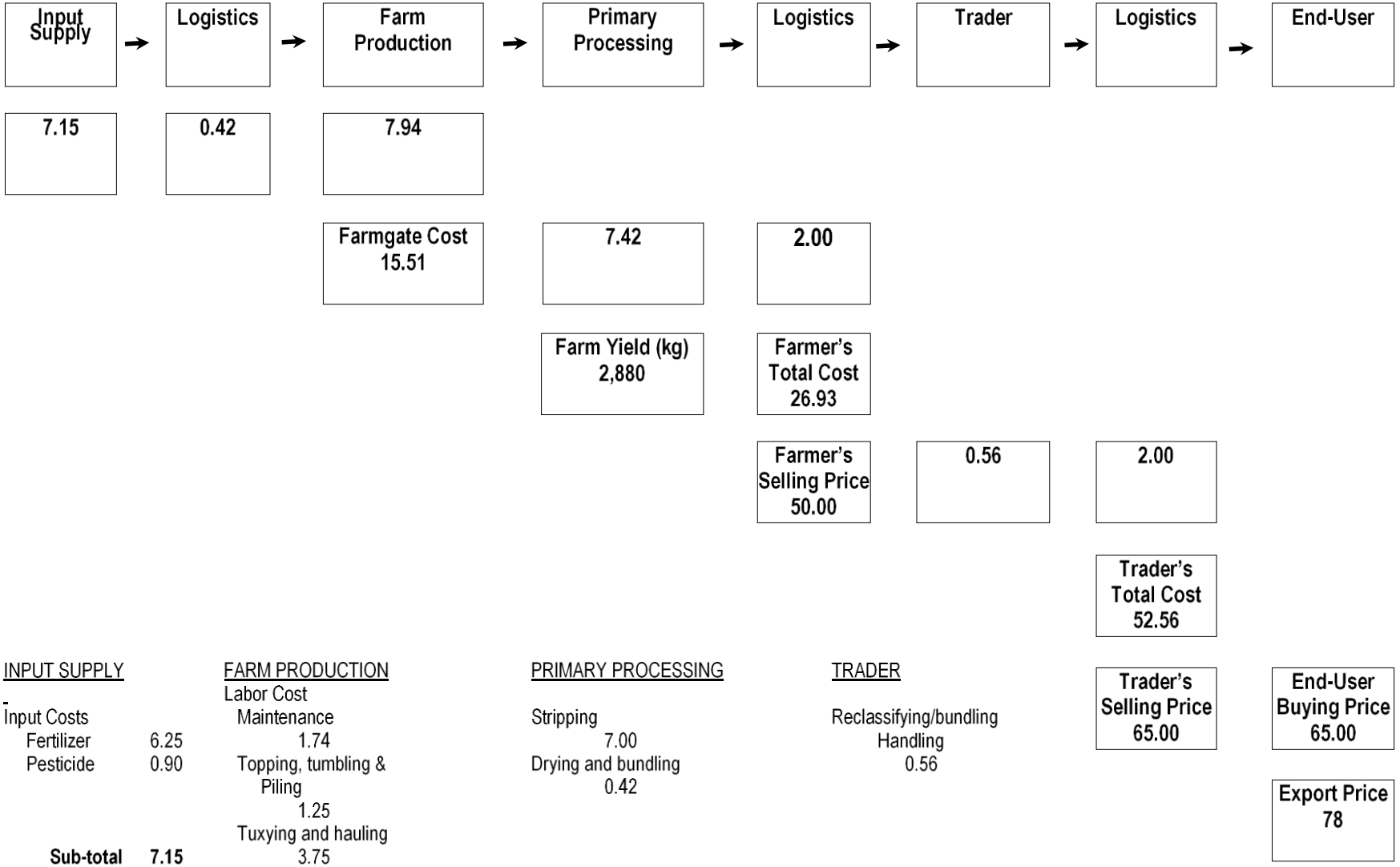


Table 2. Typical farm: Cost structure, value-added and margin for each segment of abaca value chain, Philippines 2016.

CHAIN NODE	COST	PhP/kg	VALUE ADDED	PhP/kg	PROFIT MARGIN	PhP/kg
Input Supply	Cost of inputs	**1.00**				
Logistics	Cost of delivery of inputs to farmgate	-				
Farm Production	Cost of material inputs	1.00			Farmgate selling price	**50.00**
	Labor cost	12.79			cost of inputs	1.00
	maintenance	1.04			cost of farm labor	12.79
	topping, tumbling and piling	2.50			land lease	2.08
	tuxying and hauling	7.50				
	farm tools (depreciation)	1.74				15.87
	Land lease	2.08				
	= Total production cost	**15.87**			= Profit Margin	**34.13**
Primary Processing			Farmgate selling price	**50.00**		
	Stripping	10.00	cost of inputs	1.00		
	Drying and bundling	0.83				
	= Total primary processing cost	**10.83**				
			= Value Added	**49.00**		

CHAIN NODE	COST	PhP/kg	VALUE ADDED	PhP/kg	PROFIT MARGIN	PhP/kg
Logistics	Cost of delivery of fiber from farmgate to trader	**2.00**			Farmgate selling price	**50.00**
					cost of inputs	1.00
					labor cost	-
					processing cost	10.83
					land lease	2.08
					logistics	2.00
						15.91
	Total Farmer's Cost	**2.00**			= Profit Margin	**34.09**
Trade	Buying price of fiber	**50.00**				
	Reclassifying/bundling/handling	0.56				
	= Total trader's cost	**50.56**				
Logistics	Cost of delivery of fiber from trader to exporter/market	**2.00**			Traders Buying Price	**50.00**
					reclassifying/bundling/handling	0.56
					logistics	2.00
						52.56
					Traders Selling Price	**65.00**
					= Profit Margin	**12.44**
Market	Exporter's buying price	**78.00**			Exporter's buying price	**78.00**
	Classifying/Sorting	1.75			classifying/sorting	1.75
	Baling	1.05			baling	1.05
	= Total exporter's cost	**80.80**				80.80
					Exporter's selling price	**90.00**
					= Profit Margin	**9.20**

Note: average of years 4-10 was considered in the computation of the costs per kg at the farm level.

Table 3. Intensive farm: Cost structure, value-added and margin for each segment of abaca value chain, Philippines 2016.

CHAIN NODE	COST	P/kg	VALUE ADDED	P/kg	PROFIT MARGIN	P/kg
Input Supply	Cost of inputs					
	fertilizer	6.25				
	pesticides	0.90				
	= Total cost of inputs	**7.15**				
Logistics	Cost of delivery of inputs to farmgate	**0.42**				
Farm Production	Cost of material inputs	7.15			Farmgate selling price	**50.00**
	Labor cost	7.25			cost of inputs	7.15
	maintenance	1.74			cost of farm labor	7.25
	topping, tumbling and piling	1.25			land lease	0.69
	tuxying and hauling	3.75			logistics	0.42
	farm tools (depreciation)	0.51				15.51
	Logistics	0.42				
	Land lease	0.69				
	= Total production cost	**15.51**			= Profit Margin	**34.49**
Primary Processing			Farmgate selling price	**50.00**		
	Stripping	7.00	cost of inputs	7.15		
	Drying and bundling	0.42				
	= Total primary processing cost	**7.42**				
			= Value Added	**42.85**		

CHAIN NODE	COST	P/kg	VALUE ADDED	P/kg	PROFIT MARGIN	P/kg
Logistics	Cost of delivery of fiber from farmgate to trader	**2.00**			Farmgate selling price	**50.00**
					cost of inputs	7.15
					labor cost	7.25
					processing cost	7.42
					land lease	0.69
					logistics	2.00
						24.51
	Total Farmer's Cost	**26.93**			= Profit Margin	**25.49**
Trade	Buying price of fiber	50.00				
	Reclassifying/bundling/handling	0.56				
	= Total trading cost	**50.56**				
Logistics	Cost of delivery of fiber from trader to exporter/market	**2.00**			Traders Buying Price	**50.00**
					reclassifying/bundling/handling	0.56
					Logistics	2.00
						52.56
					Traders Selling Price	**65.00**
					= Profit Margin	**12.44**
Market	Exporter's buying price	**78.00**			Exporter's buying price	**78.00**
	Classifying/Sorting	1.75			classifying/sorting	1.75
	Baling	1.05			baling	1.05
	= Total exporter's cost	**80.80**				2.80
					Exporter's selling price	**90.00**
					= Profit Margin	**9.20**

Note: average of years 4-10 was considered in the computation of the costs per kg at the farm level.

C. Support Industries

All abaca production projects and fiber marketing activities will be effectively accomplished through the support of big industries involved in the abaca business like the Association of Abaca Pulp Millers, Inc., a major processor and exporter. These support industries contribute in productively carrying out the chain of abaca business activities starting from the making, marketing and up to the sale of abaca fibers. Support industries in the abaca production level also involve suppliers of organic fertilizers, manufacturers of stripping machines and fabricators of manual stripping devices and other abaca extraction tools. The marketing and sale of abaca fibers are executed through the support of available transportation and communication systems in every abaca producing region. These include transport firms, hauling services and telecommunications and internet networks that would capably link the producers and end users of abaca fibers. These support industries are necessary business partners to ensure the success of the delivery of fibers to all local and foreign buyers of abaca.

D. Key Institutions and Programs

Various institutions will serve as important partners of the agency in the implementation of the programs enumerated in this Roadmap. These institutions will aid PhilFIDA in carrying out the targeted activities for all industry stakeholders especially the farmers. The agency will continue to have close partnership with concerned local government units (LGUs) and non-government organizations (NGOs), private sectors and private companies in all abaca producing regions. These groups will provide support in the implementation of projects in the regions especially in the mobilization of farmers and in the provision of planting materials, land for the establishment of abaca nurseries and other fiber production facilities. Cooperatives are also considered key partners of the agency. Farmers who become part of a certain cooperative are made more efficient in marketing their fibers and in demanding higher price for their commodity. Established cooperatives can eliminate middlemen since organized farmers can directly sell their accumulated produce to potential buyers. Cooperatives also extend financial assistance to individual farmers and make aids and provisions more accessible to their members. Funding Institutions are strategic partners in helping farmers to increase their income and in creating more livelihood opportunities for them. Some of the important financial institutions are the Philippine Crop Insurance Corporation (PCIC), Land Bank of the Philippines, Development Bank of the Philippines (DBP) and agencies and programs under the Department of Agriculture (DA) that provide financial support to farmers which include the Agricultural Competitiveness Enhancement Fund (ACEF), Agricultural Credit Policy Council (ACPC), High Value Crops Development Program (HVCDP) and the Philippine Rural Development Program (PRDP). The DA Agribusiness and Marketing Assistance Service (AMAS) will serve as the industry's marketing and promotional arm while the DA's regional field units (RFUs) and Local Government Units will play a crucial role in supporting all

abaca fiber production projects in assisting the PhilFIDA since they will be in charge of all the extension activities and will be directly providing technical assistance to farmers in the field. State Universities and Colleges (SUCs) will also be essential partners in performing extension work and especially in conducting research on sustainable abaca production techniques. More collaborative undertakings will be done with other key government agencies like the Bureau of Plant Industry (BPI), Department of Science and Technology (DOST), Department of Environment and Natural Resources (DENR), Department of Agrarian Reform (DAR), Department of Trade and Industry (DTI) and its export marketing arm, the Center for International Trade Expositions and Missions (CITEM).

Table 4. Key institutions of the abaca industry.

Key Institution	Abaca-related Functions/Objectives
Department of Agriculture (DA) and AMAS	To help promote the production, processing, marketing and distribution of high value crops such as abaca. It also provides funds for special projects.
DA Regional Field Units	To provide assistance and finding support in the implementation of various agricultural policies and programs related to the production, processing, marketing and distribution of high value crops such as abaca.
Local Government Units (LGUs)	To take charge of all the extension activities and will be directly providing technical assistance to farmers in the field. Some LGU provide counterpart funds for nursery establishment and abaca planting.
Non-government Organizations (NGOs)	To provide funding support in the implementation of programs and projects in the regions especially in the mobilization of farmers, provision of land for the establishment of abaca nurseries and other fiber production facilities.
Credit cooperatives and other government financial institutions (LBP, ACEF, ACPC, & HVCDP)	To provide financial support to farmers and help them increase their income, support marketing and construction of access roads to mountainous areas and in creating more livelihood opportunities.
State Universities and Colleges (SUCs) and Department of Science and Technology (DOST)	To help in performing extension work and especially in conducting research on sustainable abaca production techniques.
Department of Environment and Natural Resources (DENR) and Department of Agrarian Reform	To help in the expansion of abaca farm on areas covered by the National Convergence Initiative (NCI) Programs and National Greening Program.
Department of Trade and Industry (DTI) and CITEM	To oversee the implementation of abaca agreements between the Philippines and other countries and to also act as the marketing and promotional arm of the abaca industry.
Bureau of Plant Industry	Provides assistance in the regulation of quality standards for the abaca industry.
Philippine Statistics Authority, Bureau of Customs	Provide foreign trade and export statistics.

CHAPTER V

BENCHMARKING ANALYSIS

This chapter covers global and local benchmarking and compares the performance of typical and modern farming using qualitative and quantitative parameters. The qualitative parameter mainly describes farm practices instead of cropping system, planting materials, pests and disease control and fiber extraction method. The quantitative analysis focused on measurable aspects such as density of planting, input usage and financial indicators.

A. Global Benchmarking

A.1. Philippine Abaca vs. Ecuadorian

Abaca reportedly thrives in Ecuador, Costa Rica, Panama, Guatemala, Indonesia and other countries, the origin of which could be traced to the Philippines by indexing through finger printing. Nevertheless, records from the Food and Agriculture Organization (FAO) of the United Nations (UN) showed that Ecuador is the only other commercial producer of abaca fiber aside from the Philippines. In the 2011 FAO Report, about 89.2 percent of the world demand for abaca fiber was supplied by the Philippines and the rest came from Ecuador.

In the same FAO Report, the average export price of representative grades (S2, G and JK) of Philippine abaca ranged from US$170 per bale to US$212 per bale (of 125 kg f.o.b. Manila port) compared to Ecuadorian abaca (all grades) at US$169 per bale. This shows that Philippine abaca is competitively priced with the Ecuadorian abaca (Table 5).

Notwithstanding the slightly higher price, the Philippines' share to the global abaca trade continued to improve. From an average 84 percent share in the previous years, its contribution increased to 89.2 percent in 2011 per FAO Report. Consumers around the world continue to patronize locally-produced abaca primarily because of the reliability of Philippine supply due to sustained substantial fiber production owing to the expansion of abaca plantation. In 2012, the 176,793 ha is capable of producing at least 97,204 MT of fiber yearly. Although abaca farming in the Philippines is generally for income augmentation only and farmers usually prioritize cultivating and harvesting these other agricultural crops than abaca, farmers will nevertheless respond to the needs of the market. This was evidenced by the increased production of abaca to an all-time high of 73,274 MT in 2011 due to the bullish market following the intensified demand. While abaca cultivation in Ecuador is of plantation type, its production has not gone beyond 12,000 MT per year

since it started producing abaca. This level is expected to slow down, in fact in 2011 its production fell to 9,600 MT from 10,200

MT the previous year, as some plantation owners are gradually shifting to African palms.

Table 5. Abaca: Prices of representative grades, 2011

	PHILIPPINES			ECUADOR Average export unit value (all grades)
	Hand-cleaned non-Davao			
	S2	G	JK	
	f.o.b. Manila port USD per 125 kg bale			f.o.b. USD/bale
2011 Average	**211.9**	**192.1**	**170.2**	**168.8**
January	202.0	185.0	162.0	156.1
February	202.0	185.0	162.0	150.0
March	202.0	185.0	162.0	155.5
April	204.0	187.0	163.0	162.0
May	207.0	189.0	163.0	163.1
June	211.0	192.0	163.0	172.0
July	215.0	197.0	171.0	170.6
August	220.0	197.0	177.0	170.4
September	220.0	197.0	180.0	176.8
October	220.0	197.0	181.0	178.9
November	220.0	197.0	180.0	182.3
December	220.0	197.0	178.0	187.9

Source of data: Food and Agriculture Organization, 2012

Another important edge of Philippine abaca is that of having several different grades. The Philippines has nine grades/classifications of abaca fiber compared to only five of Ecuador making Philippine abaca more versatile in applications. Philippine abaca has a wide range of utilization from the traditional cordage/rope and fibercrafts to more sophisticated industrial applications like specialty papers, textile and the emergent composites. The availability of the different grades of the Philippine abaca allows the specialty papermakers flexibility enabling them to produce different types of paper with the desired quality. Ecuadorian abaca, on the other hand, with only five grades, does not have the full spectrum of the quality of abaca the specialty paper manufacturers need. Each particular end-product requires different quality of raw material and because of its fewer grades, only limited products can be manufactured out of Ecuadorian abaca.

On another issue relating to indicative price arrangement for Philippine abaca set by the Inter-governmental Group on Hard Fibres (IGHF) of the FAO, the indicator price or the average of the monthly export prices of S2, J and JK still falls within the indicative price range. The indicator price of the representative grades of Philippine abaca in 2011 was US$191 per bale (FAO Report) which is within the indicative price arrangement ranging from US$160 to US$232 per bale. The same FAO Report recorded that the monthly 2011 indicator price of the three representative grades ranged from US$183 to a high of US$199 per bale.

The IGHF, composed of representatives from both the fiber-producing and consuming countries, regularly meets to set and review the indicative price arrangement for abaca. The objectives of the indicative price arrangement when first conceived in 1968 were to raise ruling market prices above a minimum level and to reduce abaca price fluctuations. FAO further cited that it was agreed that indicative prices should not be so high as to defend inefficient producers nor should they be so high as to encourage research into synthetic substitutes; conversely, they should not be so low as to discourage efficient producers & the range chosen should be reasonably wide.

A.2. Philippine abaca versus other natural fibers (jute and sisal)

The closest competitors of abaca particularly in pulp and cordage applications, the present major markets for abaca, are jute and sisal. Jute is primarily produced in Bangladesh and India while sisal originates from African and Latin American countries as well as from China. The major producing countries of sisal are Brazil, China, Tanzania and Kenya. Based on the 2011 FAO Report, the average export prices per metric ton of the two grades of jute namely, BWC and BWD, from Bangladesh were US$742 for BWD to US$831 for BWC. On the other hand, the export price of the three representative grades of sisal averaged US$791 to US$1,435 per metric ton. The three grades indicated in the FAO Report are East African EL, East African UG and Brazil No.3 with East African EL priced the highest and Brazil No. 3 as the lowest.

Following this price scenario, Philippine abaca is not competitive with jute and sisal (Tables 6 & 7).

Admittedly, the price of abaca is much higher than other natural fibers like jute and sisal and is actually the envy of other fiber producers as acknowledged during the Eight International Conference of the European Industrial Hemp Association (EIHA) held in 2011 in Wesseling, Germany. The biggest advantage, however, of abaca over its competitors is its superior qualities. Quality considerations play a predominant role in the choice of fiber for the major specialty end-uses and technical properties provided by abaca outweigh price advantages of other natural fibers.

In the pulp and specialty paper industry, abaca is the most sought after and is actually the principal raw material because of its desirable qualities which meet the requirements in the manufacture of specialty paper products. Most specialty papers require high porosity and excellent tear, bursting and tensile strength, all of which abaca can impart. Specifically, in the production of meat/sausage casings and coffee/tea bags there are very stringent specifications on strength, elongation and formation required to ensure correct performance on automatic filling machines that these casings must be made entirely of abaca. Furthermore, sisal, the closest competitor of abaca in specialty paper manufacturing, has shorter and thinner cells, and, therefore, produces paper with lower tensile strength than abaca-based paper of the same weight per area. Sisal likewise gives rise to knots which makes it unsuitable for the production of very thin papers and, therefore, cannot replace abaca in uses like meat/sausage casings. These casings and coffee/tea bags are the two major markets for abaca pulp.

Table 6. Representative monthly export prices of jute fiber, 2010/2011

	Bangladesh Export Prices		
		BWC	BWD
2010/11	**Season**	**830.8**	**741.7**
2010	July	750.0	660.0
	August	800.0	700.0
	September	900.0	820.0
	October	900.0	800.0
	November	880.0	800.0
	December	880.0	800.0
2011	January	750.0	660.0
	February	800.0	700.0
	March	900.0	820.0
	April	900.0	800.0
	May	880.0	800.0
	June	880.0	800.0

Source of data: Food and Agriculture Organization, 2012

Table7. Sisal : Prices of representative grades, 2011

	East African		Brazil No.3
	3L	UG	
2011, Avg.	**1435**	**1327**	**791**
January	1250	1150	735
February	1270	1170	714
March	1300	1200	711
April	1300	1200	750
May	1300	1200	743
June	1350	1250	769
July	1550	1450	818
August	1550	1450	794
September	1550	1450	848
October	1600	1450	845
November	1600	1475	860
December	1600	1475	902

Source of data: Food and Agriculture Organization, 2012

For cordage application where high tensile strength is of prime consideration, abaca is also an excellent choice over other natural fibers because it is considered as the strongest among the plant fibers. Abaca has the best reputation for strength and tenacity and is technically three times stronger than cotton and two times stronger than sisal. Abaca is far more resistant to salt water decomposition than most of the vegetable fibers, making it the most suitable for rope and cordage manufacture. According to historical accounts, since the 1820s when sample of abaca fiber was brought to the United States by an American lieutenant of the U.S. Navy, abaca became well known as one of the strongest materials for marine cordage because of its superior tensile strength and proven durability under water.

B. Local Benchmarking (Typical vs. Good/Modern Farming)

B.1. Qualitative Parameters

A typical farm uses suckers while the modern/good farm uses tissue culture plantlets as planting materials. This gives an additional cost of P10.00 for the good farm.

A total of 1,000 abaca plants with a distance of 3.0 x 3.0m are being planted to one hectare on both farming practices - typical and good/modern farming. Care and maintenance of the plantation in typical farming is very minimal compared to good farming. A total of P29,750 gap was realized in the fertilizer application, weeding, under-brushing and pest diseases control in which all expenses were incurred in good farming .

The harvesting period is less frequent at twice a year at six months interval for typical farming compared to good farming which adopted the four times harvesting period at three months interval. First harvest was done on the second (2nd) year after planting for both practices.

Both abaca varieties used in good (Maguindanao) and typical farming (Abuab) have the characteristics of 1.5 percent fiber recovery. At the farm level, only primary processing was undertaken. This involves the extraction of fiber for harvested tuxies. The two methods of extracting the fibers were used, hand stripping for typical and mechanized stripping for good farming. Drying is done though air drying.

Average yield of 667 and 1,334 kg per hectare were produced from typical and good farming showing a 667 kg gap favoring the latter practice. The produced fibers were sold to trader processors/exporters at an average price of P60.00 per kilo. An average cash inflow of PhP36,000 was gained from typical farming while P86,400 was gained from good farming. There was a gap of PhP50,400 favoring good farming. After deducting the expenses incurred in typical farming at PhP22,610, the average net income of PhP13,390 per hectare was obtained which was lower compared to PhP34,470 with good

farming spending PhP 67,151 per hectare on the average. A noticeable gap of P24,545 between the two farming practices was realized.

Payback period for typical farm is 5.22 years compared to 4.03 years for good farm. The internal rates of return for the typical and modern farming are 39 and 44 percent respectively which shows that good farming is the better practice.

Local Benchmarking, Abaca Farming: Typical vs. Good (Qualitative Parameters)

PARAMETERS	TYPICAL	GOOD	GAP
Planting Density (hills/ha)	1000 @ 3.0x3.0m	1000 @ 3.0x3.0m distance	-
Plant Propagation Practice	Suckers @ P15/pc.	TC plantlets @	(P10/pc)
Fiber Extraction Method	Hand stripped	Machine-stripped	P3/kg fiber
Fiber Recovery	1.5 percent	1.5 percent	-
Fertilizer Application	No fertilization	3 times/year @ bags/app	P11,700[a]/Year
Weeding and Underbrushing	Occasional	regularly done every harvesting	much healthier plants
Pest and Disease Control	Not conducted	2 times/year @ 1liter/app	P 1,400[b]/year
First Harvest	Year 2	Year 2	-
Harvesting Frequency @ peak	2 times/year	4 times/year	twice as much

[a] Price of fertilizer @ Php 1,300/bag
[b] Price of insecticide @ Php 700/liter
Source of basic data: Actual farmer's field and Abaca Technoguide

Local Benchmarking, Abaca Farming: Typical vs. Good (Quantitative Parameters)
(in PhP per ha unless otherwise specified)

PARAMETERS*	TYPICAL FARM	GOOD FARM	GAP
Average yield per ha (kg)	667	1,334	667
Peak yield per ha (kg)	750	1,700	750
Average establishment cost per ha (Year 1)	38,295	68,045	29,750
Average cash outflow per ha per year	22,610	51,930	29,320
Price per kg (farmer's selling price)	60	60	0
Average cash inflow per ha per year	36,000	86,400	50,400
Average net cash flow per ha per Year	13,390	34,470	21,080
Average Area to get preferred net income of Php 94,000 (poverty threshold, 1st half 2012) (ha)	7.02	2.73	4.29
Average cost per kg (PhP/kg)	37.68	36.06	1.62
Payback period (years)	5.22	4.03	1.19
IRR (percent)	39	44	5

*Years 2-10 are considered in the average values
Source of basic data: Actual farmer's field and Abaca Technoguide

CHAPTER VI

COMPETITIVE ANALYSIS

Price competitiveness

Abaca produces highly exportable product that includes raw fiber, pulp, ropes & cordage, nanocellulose and fibercrafts.

Table 10 presents the price competitiveness of abaca raw fiber at different grades with respect to UK as a major exporter. In 2012, exports of raw abaca fiber to UK reached 2,477 MT valued at US$ 3,541,388 (FOB) which represented 56 percent of the total exports of raw abaca fibers.

Table 10. Abaca Fiber Competitiveness Under Export Trade Scenario, Philippines in United Kingdom, 2012

Item : **ABACA RAW FIBER**	GRADE S2	GRADE I	GRADE G	GRADE JK
Export price f.o.b. US$ /kilogram	US$ 1.54	US$ 1.55	US$1.40	US$1.45
x Foreign Exchange Rate (P/US$)	PhP 42.23	PhP 42.23	PhP 42.23	PhP 42.23
= Export Price	PhP 65.03	PhP 65.46	PhP 59.12	PhP 61.41
- Port Handling, hauling cost and margin	PhP 7.86	PhP 9.17	PhP 7.55	PhP 7.57
= Derived wholesale price (or Export Parity Price)	PhP 57.17	PhP 56.29	PhP 51.57	PhP 53.84
= Domestic wholesale price at Manila*	PhP 55.06	PhP 49.77	PhP 41.41	PhP 31.56
Export parity price/ Domestic wholesale price	1.04	1.13	1.25	1.71

Competitiveness exists if the ratio of the derived wholesale price (or export parity price) to the domestic
wholesale price is greater than one.

*GBE buying price of selected grades

Domestic Wholesale Price

The domestic wholesale price per kilogram of grades S2, I, G and JK in 2012 are PhP 55.06, PhP 49.77, PhP 41.41 and PhP 31.56, respectively. It should be noted that for the same year traders bought abaca fibers from the farmers at All-in Grade at PhP 50 per kilogram (Please see Value Chain).

Price Competitiveness of Abaca

Based on the 2012 exportation of grade S2 abaca raw fibers to UK which stood at 303.75 MT and valued at US$ 467,640 (FOB), the corresponding export price per kg to UK was US$1.54 which is equivalent to PhP 65.03 at an exchange rate of PhP42.23 = US $1. Deducting the cost of port handling and margin which is computed at PhP 7.86 per kg, the derived wholesale price of grade S2 abaca raw fibers to UK was PhP 57.17. Meanwhile, the domestic wholesale price or the GBE buying price of grade S2 fibers in 2012 was PhP 55.06 per kg. It should be noted that for the same year traders bought abaca fibers from the farmers at all-in grade at PhP 40.00 per kg (Please see Value Chain).

The export parity price to domestic wholesale price ratio was calculated to determine price competitiveness. The computed ratio of UK market for grade S2 was greater than one at 1.04 which would indicate price competitiveness.

The results for grades I, G and JK are the same with export parity price ratio of 1.13, 1.25 and 1.71, respectively indicating price competitiveness in all fiber grades.

CHAPTER VII

MARKET TRENDS AND PROSPECTS

The growing global interest and acceptability for "green" products open urgent and endless opportunities for natural fibers as these are alternative resources that can be utilized for a wide range of applications especially for the pulp and paper industry, in the composite market, textile and even in lifestyle products and other industries. The emergent green economy is creating a global demand of an estimated three million metric tons of natural fibers and in support to this, various international industry report revealed the following trends and prospects which favor the Philippine fiber industry:

A. PULP AND PAPER

A report on the United Nations Conference on Sustainable Development indicated that Kimberly Clark, the biggest consumer of wood fiber for tissue paper production, is one of the 24 major companies that committed to sustainable development and commits transition of 50 percent of its wood fiber consumption from natural forests to alternate natural fiber sources. The report further stated that in 2011, the company used nearly 750,000 MT of primary wood fiber for the manufacture of billions of its toilet paper and is now exploring alternative sources of fiber for its products. This presents an entry point for the Philippine natural fibers especially for abaca considering that it has a high tensile strength characteristic that manufacturers require in the production of tissue papers.

Tea and coffee filters

In Barcelona, Spain, a newly-established specialty paper manufacturing company, Terranova Papers, is into the production of various types of tea bags for high speed tea bag machines and coffee pods, pads and capsule grades made of abaca fiber. The company's representatives have been to the Philippines to evaluate the abaca fiber supply chain to ensure sustainability of the right grade, quality and quantity of Philippine abaca fiber. Likewise, negotiations with prospective suppliers are ongoing.

In the Philippines, Newtech Pulp Inc., the biggest abaca pulp mill, will increase its demand for abaca fiber to produce an additional four metric tons of abaca pulp. At present, the company's yearly production is 14,000 metric tons which, following the additional requirement of its specialty paper manufacturing partner based in Germany, plans to expand its output to 18,000

metric tons. Translated to fiber, demand for abaca fiber will expand to 8,000 metric tons per annum.

B. COMPOSITES FOR AUTOMOTIVE AND CONSTRUCTION

A report on Lucintel Brief: Opportunities in Natural Fiber Composites, about 20 to 25 kgs of natural fibers are indicated to be used as automotive component substrates in each of the 60 to 70 billion vehicles being produced globally each year. Even if 5 to 10 kgs will be used per vehicle, this would mean a requirement of 265,000 to 530,000 MT of natural fibers offering possibilities for our natural fibers. The Lucintel Brief further indicated that the total global natural fiber composite market is expected to grow to US$531.1 million in 2017 with an 11 percent compounded annual growth rate over the next five years. The natural fiber composites are currently utilized in automotive (door panels, seat backs, headliners, dash boards, trunk liners, spare wheel pan cover), electrical and electronics (mobile phone cases, laptop cases), sporting goods (tennis racket, bicycle frames, snowboards), construction (door panels, decking, railing, window frames), furniture and other products like cosmetic packaging (lipstick casing), funeral urns, etc. The automotive industry is expected to remain the largest market through 2017.

Currently, Daimler-Chrysler is using abaca fiber for the spare wheel pan cover for all models of their A- and B-class passenger cars and the yearly consumption for this purpose, according to its External Affairs and P ublic Policy Director, amounts to approximately 100 to 150 metric tons of abaca fiber. General Motors is another prospective market for natural fibers as part of its commitment during the United Nations Conference on Sustainable Development.

According to the Lucintel Brief, demand for natural fiber composites is expected to be high in automotive and construction applications due to awareness towards "green" products and increasing acceptability; reduction of global warming effect; need for light weight materials; greater emphasis on sustainability, biodegradability and recyclability; lower price; and, governmental support (tax credits are given on renewable resources).

Europe is the largest region for automotive applications and is expected to remain strong with the passage of the End-of-Life-Vehicle (ELV) Regulation. Car manufacturing companies in the European Union are expected to use natural fibers as material for their car parts in compliance with the ELV Regulation. The said Regulation requires them to design and make their car components easier to recycle and safer to dispose of at the end of life of every vehicle.

Asia is emerging as a big market for natural fiber composites due to the rapidly increasing demand particularly from China and India. Auto parts manufacturing companies based in the ASEAN specifically, in Malaysia, Indonesia and Thailand could be the target markets for Philippine natural fibers

as these countries have flourishing car manufacturing industries and considering their proximity to the Philippines, the world's dominant supplier of abaca.

Based on the report of the United Nations, the construction industry worldwide is moving to use natural fibers for a range of products including light structural walls, insulation materials, floor and wall coverings, and roofing. Accordingly, North America is the largest region for building and construction applications.

C. COMPOSITES FOR OTHER PURPOSES

Based on the report of Kafus Bio-Composites, there is now an emerging natural fiber mat-making facilities in Europe and North America having development programs with auto parts makers. This opens limitless possibilities for bast and leaf fibers as the present directives are toward the use of these fibers as replacement for wood and glass fibers. Across these continents, the mats being processed are made of 100 percent natural fibers or combined/reinforced (mostly 50-50) with polypropylene or other materials. A company, AS Technologies, which installed three mat-making lines in Belgium and another one in the United States uses kenaf, flax, sisal and abaca in making mat that is 100 percent natural fiber or blended with polypropylene in a 50/50 ratio. These mats are suitable for compression molding or thermoforming for applications for car parts like headliners, trunk liners and door-panel inserts.

D. TEXTILE

Various international reports on the textile industry indicated that the new trend gaining in the fashion industry is 'ethical clothing" combined with "green marketing". This provides a guiding principle among manufacturers to put premium on environmental and social concerns in their production practices. With this, manufacturers would have to go for sustainable fabrics made of natural fibers while at the same time supporting sustainable livelihoods, among others. While not all textile manufacturers will embrace this for now or in the very near future, production efforts for this kind of clothing materials are now in the drawing board and consumers' awareness and interests have been generated.

Furthermore, according to the World Draping Organic report, in the present day, there are several organic products available in the market ranging from organic food to organic clothes. The demand and supply for organic products has shown an upward trend in recent years, suggesting the strong interest of global markets and farmers in choosing to grow organic crops for textile industry. In another report from the New Dimension to Organic Clothing, likewise revealed that there is a surge in the demand for organic

clothing owing to fashion designers choosing more environment friendly fabrics on the ramp and retailers promoting such products. Organic clothes and apparels have now entered the mainstream, consumer-driven fashion. Natural fibers especially abaca can be easily considered organic because their production in the Philippines does not involve application of chemicals or if there is any due to disease, only green labels are being used at the farm level.

Abaca is among the natural fibers not traditionally known as textile fiber but is now being utilized in the textile industry. According to Mr. Mathew Lazaro, Vice President and Chief Executive Officer of Asia Textile Mills Inc. (Asiatex) located in Calamba City, Laguna, abaca fiber can be used for weaving abaca denim fabrics because it is very strong and has very porous property making it not only versatile but also very durable, breathable and very comfortable to use. This abaca-based denim, composed of 40 percent abaca and 60 percent recycled polyester, is so uniquely "Pinoy" considering that abaca is the only truly Filipino fiber. The abaca denims are initially being exported to Japan. Aside for denims, Asiatex has also developed fabrics made of 10 percent to 40 percent abaca that can be used for everyday wear such as shirts and blouses. Asiatex is continuing its research to make the fabrics anti-microbial and to develop a "stay cool and fresh" textile before commercial production. The company plans to use the stretch denim into fashionable jackets, skirts, vests, etc. and to produce abaca yarns for knitted fabrics like cardigans and socks. For their plans, Asiatex will need 15 metric tons of abaca fiber annually.

In order to boost the utilization of Philippine natural fibers in textiles, Republic Act No. 9242 otherwise known as "An Act Prescribing the Use of the Philippine Tropical Fabrics for Uniform of Public Officials and Employees and for Other Purposes" was enacted. The essence of the law is to strengthen the demand for our natural fibers, specifically abaca, silk, pineapple and banana fibers and with its full implementation, additional requirement per year for abaca fiber is around 101 metric tons.

In Japan, a textile company named OJI FIBER presents a new comfy touch of paper yarn called OJO+, a super natural filament fiber made of abaca. This yarn served as their contribution to the fashion and lifestyle material industries. They intends to create a worldwide paper yarn industry in the years ahead. The paper yarn OJO+ is very fine, light, fuzz free, easy to dye, inexpensive, and eco-friendly. The plus part of OJO+ connotes that this yarn is suitable to be combined with other fibers. It could be applied to various fields, like apparel, interior decorations, beddings and other applications.

E. NEW PRODUCT INNOVATIONS

Product development leads toward exploring ways to integrate product innovations with affirmative and proactive action directly incorporating socio- economic and environmental issues.

Concepts and designs involved in product development are shaped by the integration of environmental management systems specifically Life Cycle Analysis (LCA) interventions to produce environmentally sound, renewable and sustainable materials. According to a report on the Present Directives for Product Development, the leading contenders for replacement for wood and glass fibers are bast and leaf fibers which include abaca.

In home furnishings, results of the survey sponsored by the American Home Furnishings Alliance revealed that there is growing demand among U.S population for home furnishings made of environment-friendly materials and US consumers are willing to pay up to 10 percent more for furniture made from "green" materials. More than half of the consumers surveyed are currently taking steps to make their homes more environment friendly from furniture to upholstery fabrics and foam. The survey further revealed that buying environmentally-friendly home products ranked in the top three most important practices in US households, after conserving energy and recycling. The World Fiber Forecast 2030 pointed out that carpet usage will increase and its industry will dominate the market for home interiors. These indicate greater awareness and acceptance among consumers to patronize eco-friendly products.

F. OTHER PRODUCTS

Production of bio-ethanol using abaca stripping wastes is being looked into as part of zero waste management in abaca farms. A number of industry reports indicated that ethanol can be used as a fuel for vehicles in its pure form. Currently, it is usually used as a gasoline additive to increase octane and improve vehicle emissions. Bio-ethanol is now widely used in the United States and in Brazil and other parts of the globe. The use of bio-ethanol is expected to expand further due to the continuous increase in the prices of petroleum-based products. Based on Renewable Global Status Report, bio-fuels from renewable sources have contributed to a significant decline in oil consumption in the United States since 2006. The 93 billion liters of bio-fuels produced worldwide displaced an equivalent of an estimated 68 billion liters of gasoline, equal to about 5 percent of world gasoline production. According to articles, "As Ethanol Booms, Critics Warn of Environmental Effect" and "American Energy: The Renewable Path to Energy Security", nearly all the gasoline sold in the United States today are mixed with 10 percent ethanol, a

mix known as E10 and motor vehicle manufacturers already produce vehicles designed to run on much higher ethanol blends. Ford, Daimler AG, and General Motors are among the automobile companies that sell "flexible-fuel" cars, trucks, and minivans that can use gasoline and ethanol blends ranging from pure gasoline up to 85 percent ethanol (E85).

The market for renewable energy technologies has continued to grow. Climate change concerns, coupled with high oil prices, and increasing government support, are driving forces resulting in growing renewable energy legislation, incentives and commercialization.

In the Philippines, Republic Act No. 9367 known as Biofuel Act was passed in 2007 requiring oil companies to use biofuels in all "liquid fuels for motors and engines sold in the Philippines". As such, all gasoline sold in the country must contain at least 5 percent ethanol and 10 percent ethanol. With the enactment of this, the country will be needing 500 million liters of ethanol a year. However, the combined production of the three ethanol plants operating in the country is only 79 million liters and in the next one to two years, three more ethanol distilleries will operate with a combined capacity of 133.4 million liters. With the combined expected output of the six plants, there will still be a deficit of about 288 million liters annually.

Health and wellness products like bath soap and lotion as well as organic fertilizer, pesticide and disinfectant can be made from enzymes/sap/extract from extraction wastes and other plantation wastes. The upcycling of these agricultural wastes gives economic importance among farm families as these could provide supplemental income for them while at the same time solving their problem on waste management and disposal.

G. SUSTAINABILITY CERTIFICATION

Most consumers especially in the European Union and the United States are now demanding sustainability certification for the products they are buying. They want to be sure that the goods they acquire are produced from farms that are socially, economically and environmentally friendly.

The manufacturer of Lipton tea, the Unilever, which is sourcing tea only from Rainforest Alliance certified tea plantations is requiring also its abaca suppliers to be certified. Since abaca is being used in the production of Lipton tea bags, it is imperative to have abaca farms certified by a third party certifying body to ensure the future market of the Philippine abaca industry.

There are a number of third party certifying bodies like Forest Stewardship Council, Rainforest Alliance, World Wildlife Fund, Sustainable Forestry Initiative and Fair Trade among others but Rainforest Alliance is the most appropriate and preferred by foreign buyers of abaca. In response to the request of PH Glatfelter and Ahlstrom, two of the biggest foreign buyers and consumers of Philippine abaca fibers and pulp, PhilFIDA is now working toward certification of abaca farms in the Bicol, Panay, Eastern Visayas and Mindanao Regions. PhilFIDA, Department of Agriculture, Agricultural Training Institute and the German International Cooperation (GIZ) have closely partner to work on certification of abaca farms with support of the Glatfelter.

CHAPTER VIII

SWOT ANALYSIS

This chapter presents the industry's advantages as strengths and opportunities and the constraints as weaknesses and threats identified according to the supply chain segment.

On Input Supply

On input supply, the strength of the industry lies on the available technologies and facilities related to fiber production, extraction and postharvest. There are several government agencies, SUCs and research institutions involved in abaca R&D. PhilFIDA, in pursuit of its mandate to promote the accelerated growth and development of the abaca industry operates and maintains five tissue culture laboratories, three diagnostic laboratories, one immunology laboratory, one fiber processing and utilization laboratory and six experiment stations in carrying out its R&D activities in the upstream, mid-stream and downstream levels in all research disciplines including product development. The Agency also works closely with the Local Government Units (LGUs) for the maintenance of abaca nurseries. In addition, the National Abaca Research Center of the Visayas State University (VSU-NARC) conducts researches on abaca in the areas of crop breeding, crop production, pest management, engineering, among others. The University of the Philippines in Los Baños and in Diliman campuses are also engaged in abaca researches especially in the area of crop improvement, biotechnology and product utilization. Other service providers of the industry include accredited seed growers and machine/tool fabricators.

The high cost of labor, utilities, farm inputs such as fertilizers and pesticides, farm implements such as stripping devices serve as weaknesses to inputs of production. The limited access to credit is also a weakness. The stringent documentary bank requirements compels farmers to resort to local informal lenders who provide easy access to loans but at high interest rates.

On production

As of 2016, the total abaca production area is 176,548 hectares located in the hilly lands and mountains of Bicol (Catanduanes, Sorsogon, Albay, Catanduanes); Visayas (Leyte, Southern Leyte, Northern Samar, Samar, Aklan); Mindanao (Davao Oriental, Davao del Sur, Surigao del Sur, Sulu, Lanao del Sur, Bukidnon). Potential areas for abaca are in Palawan and in the Mindanao areas. Efforts to meet the market requirements for seal of sustainability of product for tea bags had been initiated by PhilFIDA in partnership with two abaca exporters. As of 2013, a total of 53 farmers in Catanduanes cultivating 334 hectares of abaca had been awarded certification on sustainable

agriculture by an international third party, the Rainforest Alliance. Application for sustainability certification is also in the process in Aklan and Iloilo for some 500 hectares which is being spearheaded by the German Government together with the Deutsche Gesselshaft for International Zusammenarbeit, Germany.

One of the major problems of the industry is the presence of virus diseases, namely: bunchy top, mosaic and bract mosaic. In spite of government efforts to eradicate these diseases, there is still disease prevalence because not all farmers have the initiative and willingness to control the disease even at the initial/minimal stage of infection. This is because farmers treat abaca only as an augmentation crop; they do not regularly maintain their farm but would only visit and harvest abaca whenever they need cash. Furthermore, the implementation of the Comprehensive Agrarian reform Program (CARP) limits ownership of landholdings; abaca, being a plantation crop is profitable when cultivated in vast tract of lands.

In response to the growing demand for abaca, the private manufacturing companies like the Newtech Pulp, Inc. is contemplating on establishing plantation type of abaca either as a company plantation or a cluster of farms owned by individual farmers. Corporate Social Responsibility (CSR) is also gaining popularity among private companies and as a way of giving back, these companies are providing funding support. A Japanese firm, Itochu Inc., in celebration of its centennial operation, granted PhP 1M assistance to a farmers' group based in Gubat, Sorsogon for the establishment of abaca nursery and provision of planting materials to replant abaca farms subjected for eradication.

Like other crops abaca is also affected by climate change specifically prolonged drought and strong typhoons that has adverse effect on fiber production. Likewise, the peace and order situation especially in Mindanao and some parts of Bicol and Eastern Visayas where insurgents are present poses threat to fiber production and limits abaca trading.

On Processing

The superior quality of abaca fibers in terms of strength and porosity makes it suitable raw materials for a diverse application especially for new emerging products. Abaca, being a natural fiber also offers zero-waste utilization. Stripping wastes can be converted into fertilizers and bio-ethanol. The extracts from the sap can also be utilized for wellness products.

The major problem in the processing and manufacturing sector such as the pulp mills and the cordage group is the high cost of investment in the equipment/machineries and utilities.

On Trade

There is an existing fiber quality standards that is acceptable to both the domestic and international markets. In addition, the industry has stable domestic and global markets. At present, the domestic markets include four pulp companies, six cordage companies, hundreds of handloom weavers, fibercraft and furniture makers, 58 GBEs, 522 local traders and 29 trader-exporters. Major foreign markets include for raw fibers and manufactures include UK, Germany, France, Spain, USA, Italy, Canada, Japan, China, UAE and South Africa. An opportunity to take advantage for the abaca industry is the implementation of R.A. 9242 otherwise known as an "Act Prescribing the Use of the Philippine Tropical Fabrics for Uniform of Public Officials and Employees and for Other Purposes". Its full implementation would entail additional requirement of 101MT per year of abaca fiber.

The increasing global awareness on green economy augurs well for the abaca industry; abaca, being a natural fiber can be used to an array of emergent applications such as panel boards of automobiles and yachts; needle-punched denims and in pharmaceutical products.

As the lead agency, PhilFIDA works closely with the farmers and the private sector to ensure strong linkages among the players in the supply chain. Regular stakeholders meeting with the farmers and private sector are being conducted by PhilFIDA.

As a natural fiber, abaca competes with other hard fibers such as sisal, kenaf and other bast fibers that are cheaper in the global market.

Cross-cutting

Abaca as an agro-industrial industry has both forward- and backward-linkages that promote a multiplier effect in terms of job generation in all segments of the value chain. With respect to the backward linkage, direct and indirect employment in the inputs segment would include suppliers of farm inputs and implements, abaca planting material propagators and their respective suppliers of laboratory chemicals and supplies. In the mainstream farming, there is the family labor and contract labor for harvesters, strippers and haulers. At the GBEs, workforce include tip cutters/sorters, classifiers, haulers aside from the indirect employees of the facility such as the security and janitorial and office staff. There are also people involved in the trading from the farm to the local traders to the GBEs then to the local processors or to the exporters.

For the forward linkage that is composed of the processors and manufacturers, employment opportunities are open to machine operators and plant maintenance. Meanwhile, the community-based livelihood industries such as the weavers and handicraft makers also provide employment to the women-folk and out-of-school youth in the rural areas.

Supply Chain Segment	Advantages	Constraints	Advantages	Constraints
	STRENGTHS	**WEAKNESSES**	**OPPORTUNITIES**	**THREATS**
INPUT SUPPLY	Available new and improved technologies particularly on planting materials	High cost of labor, farm inputs, machineries and utilities	Introduction of abaca seeds can support the needed planting materials	Distribution of tissue cultured and other materials that produce poor quality fibers.
		Limited access to credit	LBP is reviewing it policy to support abaca establishment. PRDP and other agencies provided grants in production and trading.	The government has to fulfill its obligation to support affordable credit
PRODUCTION	Existing and potential areas for abaca	Farmers treat abaca as augmentation crop	Growing need for plantation type approach to production	Climate change
	Third party certification on sustainability	Presence of pests and diseases	Introduce new approach in treatment of pest and diseases Increasing social consciousness for CSR by some private companies	Peace and order situation
		CARP limits land Ownership	DAR support projects for abaca in suitable areas	
PROCESSING		High cost of investment	Superior quality of abaca fiber	Use of chemicals in processing of fibers in the factories.
			Offers zero-waste utilization	

TRADE	Existing fiber quality standards	Poor farm to market roads Far and crossing rivers	Increasing awareness on green economy	Emergent substitute fibers for abaca
	Stable domestic and global markets	Lack of collective marketing System	Emerging new markets	
	Strong linkage between and among industry players	Abaca is not well promoted in the lowland areas.	R.A. 9242: "*Act Prescribing the Use of the Philippine Tropical Fabrics for Uniform of Public Officials and Employees and for Other Purposes*"	Imported fibers are cheaper compared to local fibers which hindered promotion of Philippine fibers.
Cross cutting	High multiplier effect on job generation	Abandonment of abaca farms by young farmers	Responsive to promoting gender equality & women empowerment	

CHAPTER IX

TARGET SETTING (WHERE DO WE WANT TO GO?)

A. Mission, Vision, Goals and Objectives

Based on the stakeholders' consultations and workshops, the vision, mission, goals and objectives of the Philippine abaca industry are as follows:

The Vision:

A progressive Philippine fiber industry that produce the world's best quality fiber to supply global demands for renewable, sustainable and environment-friendly products to achieve the country's inclusive growth.

The Mission:

- Improve the socio-economic condition of farmers, create livelihood and reduce poverty incidence through rural fiber-based enterprise development and business; and

- Maintain the country's status as the world's number one producer and supplier of quality abaca fibers.

Goals

- Produce sufficient quality abaca fiber to supply domestic and international markets;
- Establish rural livelihood and economic businesses that improve farming practices and land vegetation, rehabilitate the environment and mitigate climate change;
- Establish disease free abaca plantations in all regions to provide sustainable fiber supply for pulp millers, cordage companies and rural enterprises;
- Set new direction and agenda for R & D to improve varieties, increase fiber production, disease treatment, postharvest, processing, tensile strengths and utilization towards production of fiber by-products for industrial, commercial and other uses;
- Strengthen collaboration among industry stakeholders - international investors, local and national governments, farmer cooperatives/ associations, private sectors, non-government organizations, academe and corporations; and
- Promote an investment climate conducive for foreign and local direct investors for upstream and downstream processing.

Objectives

- To expand/rehabilitate a total of 146,248 hectares of abaca areas from 2017 to 2022;

- To mass produce planting materials thru tissue culture, micropropagation, conventional method and seeds;

- To increase fiber production by 36,482MT in 2020, 93,248MT in 2021 and 130,789MT in 2022 to address the projected 12% annual increase in demand;

- To adopt abaca tuxy buying scheme in the production of quality abaca fiber thru cooperative approach;

- To introduce new technologies in abaca production and treatment of abaca diseases;

- To accredit private, government (LGUs), and commercial abaca nurseries and distribute healthy planting materials;

- To train LGUs and NGOs agricultural technicians and farmers on new and improved fiber production technologies;

- To upgrade and modernize/mechanize post-harvest equipment and facilities to improve efficiency and increase fiber production;

- To strictly implement abaca grading standards;

- To conduct R&D for the production of quality and disease-free planting materials, new technologies on plantation establishment, treatment of diseases, production of by-products of abaca fibers, and processing and utilization in partnership with universities, corporation and private sectors; and

- Establish Monitoring and Evaluation Plan in partnership with abaca stakeholders, LGU, AAPMI, NGOs and other groups.

B. Targets

The demand for abaca fiber both in the local and international market is increasing exponentially because of the shifting in preference for natural rather than synthetic fiber materials. The utilization of natural fibers have also diversified from food packaging, textiles, furniture, stuffing material and many more.

To remain as the world top supplier of abaca, production has to be increased in various ways specifically through opening of new abaca areas and by invigorating old and less productive farms and plantations. There is also a need to control the spread of diseases which has become more prevalent in different abaca locations in the country.

Area Targets

In order to increase area planted to abaca, four major activities are targeted to be achieved. These are (1) use seeds as planting materials in addition to suckers, corms and tissue culture, (2) opening of new abaca areas from identified suitable agricultural lands and conversion of idle and unproductive lands, (3) rehabilitation of abaca areas, and (4) treatment of disease infected areas.

Based on inputs from various stakeholders during the three consultative meetings conducted in Mindanao, Visayas, and Luzon, and on the reported demands by our stakeholders, the targeted area to be rehabilitated is 86,884 hectares and area for expansion is 59,364 hectares or a total area planted to abaca of 239,666 hectares in 2022. The huge increase in abaca plantation area is aimed to accommodate the demands on abaca fiber especially the pulp sector.

To cater the increasing demand for abaca fibers, vast hectare of abaca farms which were cleaned from abaca diseases, old and less productive abaca farms, are targeted to be rehabilitated nationwide. A total of 69,364 and 44,167 hectares are aimed to be rehabilitated in 2018 and 2019, respectively. Further, disease management activities will likewise be conducted.

Abaca Areas for Expansion and Rehabilitation by Region (2017-2021)

Location	Expansion and Rehabilitation Areas (in hectares)					
	2017	2018	2019	2020	2021	Total
CAR/Ilocos	-	-	-	-	-	-
Central Luzon	-		250	175	-	425
Southern Tagalog	10	45	955	669	-	1,679
Bicol Region (Region V)	200	68,347	12,477	8,734	-	89,758
Western Visayas (Region VI)	100	70	2,120	1,484	-	3,774
Central Visayas (Region VII)	50	50	723	506	-	1,329
Eastern Visayas (Region VIII)	300	342	11,101	7,771	-	19,514
Zamboanga Peninsula (Region IX)	300	50	858	601	-	1,809
Northern Mindanao (Region X)	200	145	994	696	-	2,035
Davao Region (Region XI)	290	80	5,476	3,833	-	9,679
SOCCSKARGEN (Region XII)	100	70	1,800	1,260	-	3,230
Caraga Region	200	140	5,674	3,972	-	9,986
Autonomous Region of Muslim Mindanao (ARMM)	50	25	1,739	1,217	-	3,031
TOTAL	1,800	69,364	44,167	30,917	-	**146,248**

Production Targets

With all the targeted hectares for abaca farm establishment, rehabilitation and expansion, farms are estimated to produce around 76,385 metric tons in 2018 and 79,576 metric tons in 2019. Increased production will be achieved from 2020 to 2022 with 117,519 metric tons, 176,715 metric tons and 216,761 metric tons, respectively.

Extensive abaca expansion and rehabilitation efforts will be undertaken from 2018-2019 to meet the targeted 239,666 total abaca areas by 2022. Bulk of the expansion and rehabilitation activities will be conducted in Regions V and VIII and in the regions of Mindanao. For the targeted expansion and rehabilitation areas, a total of 146.28 million planting materials will be distributed nationwide. By 2022, a total of 216,761 MT of fibers is expected to be produced from all the new and rehabilitated abaca areas.

Physical Targets for Abaca, 2017-2022 (in ha unless otherwise specified)

Indicators	2017	2018	2019	2020	2021	2022	Total
Abaca Areas	180,302	181,302	191,000	220,666	239,666	239,666	
New Area Planted	1,000	39,364	10,000	9,000			59,364
Area Rehabilitated	800	30,000	34,167	21,917			86,884
Number of Planting Materials Required (in million)	1.80	69.36	44.20	30.92			146.28
Fiber Production (MT)	74,160	76,385	79,576	117,519	176,715	216,761	

Note: Yield assumption was based on the Abaca Statistical Bulletin, 2006 - 2015 and the National Abaca Survey, 2009

Income Targets

A farmer needs an average of 7.02 ha using the typical farming practice and 2.73 ha with good farming to get the preferred net income of PhP94,000.00 (poverty threshold, 1H 2012). A gap of negative 4.29 hectares between the two farming practices was realized.

Job Generation

In terms of job generation, a typical abaca farm can generate 0.5 job per hectare on the first year or during the establishment of the farm. It can then generate 0.64 job per hectare on its second year, wherein replanting occurs, and 0.61 job per hectare for minimal harvesting activities on the third year. At least 1.17 jobs per hectare will be generated from the fourth until the tenth year of abaca production. An average of 1.05 jobs per hectare is expected to be generated for a 10-year period of abaca fiber production in a typical farm.

Good abaca farms can generate one job per hectare during the first year of farm establishment. It will decreased to 0.76 job per hectare on the second year since replanting and farm maintenance require less labor. Needed jobs will then be increased to 4.21 per hectare on the third year for extensive harvesting. A total of 5.62 jobs per hectare will be generated from the fourth until the tenth year of abaca production. In these years, an average of 4.93 workers will be employed in which full abaca fiber production is obtained and the maximum number of jobs is generated. These will be achieved mainly because farmers will utilize fertilizers and pesticides and will perform good agricultural practices in maintaining their good abaca farms.

Table 14. Labor requirement in a hectare abaca farming

Activities	Man-Days (MD) Required							
	Year 1		Year 2		Year 3		Year 4 - onwards	
	Typical Farm	Good Farm	Typical Farm	Good Farm	Typical Farm	Good Farm	Typical Farm	Good Farm
Farm Establishment								
Land Preparation								
- Underbrushing & cutting of unnecessary trees	10	30						
- Burning and filing of debris	2	8						
Planting								
- Layouting and staking	5	5						
- Distribution of seedpieces, digging of holes & planting	20	20						
Maintenance								
- Underbrushing, ringweeding & removal of dry leaves	5	15	5	15	5	15	5	15
- Replanting	3	3	3	3				
- Application of fertilizer and pesticides		10		10		10		10
Harvesting, Extraction, Drying & Bundling								
- Topping of leaves			2	2	2	4	4	6
- Tumbling and piling			4	4	4	8	8	12
- Tuxying and hauling			18	18	18	36	36	54
- Stripping			24	14	24	302	48	403
- Drying and Bundling			2	2	2	4	4	6
TOTAL	**45**	**91**	**58**	**68**	**55**	**379**	**105**	**506**
Jobs Generated	**0.50**	**1.01**	**0.64**	**0.76**	**0.61**	**4.21**	**1.17**	**5.62**

Note: Job Generation was computed based on the given formula from NEDA, 90 MD = 1 job.

Source: Based on actual farmer's field and Abaca Technoguide

CHAPTER X

STRATEGIES AND POLICIES (HOW DO WE GET THERE?)

There are a number of critical key results areas which have to be addressed to enable the industry to meet the targets.

A. On Input Supply

- Adequate supply of disease free and high yielding abaca planting materials

In support to the opening of new abaca areas as well as rehabilitation of old, typhoon- damaged and disease-freed farms, disease-free planting materials of recommended abaca varieties will be made available to farmers. Abaca planting materials derived from the different methods of propagation such as seeds, seedpieces, corms and suckers will be sourced from the seedbanks of PhilFIDA and accredited nurseries of LGUs, private sectors, corporation, NGOs and farmers associations. Tissue culture laboratories of SUCs (UPLB, VSU, NORSU, LSU, UEP, CSU), national government (PhilFIDA) and private companies will be tapped for the supply of abaca plantlets. Support facilities like diagnostic laboratories and immunology laboratory shall likewise be operated to assist in testing planting materials for freeness of viruses.

The active involvement of the LGUs in planting material production and distribution for the benefit of their farmer-constituents as mandated by the Local Government Code shall be enlisted by encouraging them to establish abaca nurseries in their locality. In line with this, LGU MAOs and agricultural technicians will be trained on hardening of abaca plantlets and nursery establishment. In addition, screenhouses for hardening abaca plantlets shall be distributed to LGUs.

Certification of tissue culture laboratories, seedbanks and nurseries as reliable producers of abaca planting materials by BPI-PQS shall also be pursued.

Parallel to this, dynamic research undertaking will be pursued by research agencies and institutions to develop, innovate and improve technologies on clonal propagation of abaca to include antiserum production, virus detection techniques and diagnostic kits to achieve greater efficiency and effectiveness in the production of disease-free abaca plantlets.

- Introduction of new improved abaca varieties

To address the problem of the abaca industry on virus diseases the development and introduction of new abaca varieties possessing resistance

to virus diseases shall be pursued through conventional breeding and modern biotechnology. On-going research projects of UPLB-IPB and VSU on multi-locational trial of newly developed disease-resistant abaca hybrids will be continued and so with the the on-going project of PhilFIDA on the development of transgenic abaca possessing resistance to bunchy- top disease. Other research studies related to molecular biology and biotechnology to gain deeper understanding on the abaca as a crop, the insect vector and virus pathogens shall likewise be conducted. Further, establishment and upgrading of R&D laboratories and facilities coupled with the development of human capital will be undertaken to strengthen R&D capability.

B. On Farm Production

- Available production technologies for improved fiber yield, higher farm productivity and increased farm income

Dynamic research for the generation and dissemination of abaca production technologies that are climate-smart and resilient with the end view of improving fiber yield, enhancing farm productivity and increasing farm income shall be pursued especially in the areas of abaca-based sloping agriculture, farming systems, pest & disease management, bio-control agents, organic fertilizer application as well as indigenous knowledge, among others.

- Eradication of disease infected areas

A lot of abaca farms are infected with bunchy top, abaca mosaic and abaca bract mosaic. These are viral diseases caused by aphids. Infected abaca plants stay stunted thus no fiber can be harvested. The disease incidence ranges from 2-71 percent. Eastern Visayas is the hardest hit with 66-71 percent rate. To control the rapid spread of the disease, PhilFIDA (then FIDA) has implemented a 5-year "Abaca Disease Management Project "(ADMP) starting in 2009 in coordination with the concerned Local Government Units. The objective is to bring down the disease incidence to less than five percent, a level that is manageable by farmers to control by rouging. The eradication process makes use of green label insecticide spray to control the vector and by piercing glyphosate-soaked bamboo sticks into infected plants. Monitoring of the effectiveness of the treatment is conducted to provide information as bases for decision for retreatment if needed or to account for disease-freed abaca farms and consider for rehabilitation/ replanting.

- Trainings

Some farms are under harvested either due to low price or lack of manpower to do the harvest. In case of the latter, the employment of harvester brigade can also bring increased production especially in locations

where abaca is quite new. A harvester brigade is a group of experienced harvesters and fiber strippers from provinces that has long been producing abaca such as in Bicol or in Leyte who can be hired by plantation owners such as in Zamboanga or in relatively new abaca areas in the Regions.

- Information, Education and Communication (IEC)

The adoption of what is latest in production technologies is essential in improving quantity and quality of fiber produce. Here, capability building starts with the field personnel of PhilFIDA who will in turn train LGU Agricultural Extension Worker (AEW) and farmer leaders who will share the knowledge to the abaca farmers to level up their knowledge and skills to improve their production. The continued updating of the farmers and other stakeholders on the technology will be supported by distribution of IEC materials and through on-line technology access in areas with available internet service.

- On Fiber Quality Competitiveness

Maintained consistency of fiber quality makes our product competitive. Consistent best quality raw material produces the best product and the best product are the ones patronized by consumers. That at any market situation, whether supply and/or demand is low or high, fiber quality must be consistent.

C. On processing

- Establishment of Fiber Stripping Center & Abaca Drying Shed as Common Service Facilities (CSF) and Distribution of Stripping Knives and PhilFIDA- designed Improved Handstripping Devices

The production of abaca fiber is dependent on the processing techniques done manually using the traditional stripping knives or mechanically through the use of fiber extraction machines. Based on 2012 fiber statistics, the present level of mechanization computed as percent (%) machine-extracted fiber to total baling is 13.6 percent. To increase fiber production, the Roadmap shall establish 1,996 units of abaca stripping center and drying shed as CSF which will require a budget of PhP 399,200 million. By year 2020, additional 3,114 units will be established with budgetary requirement of P 622,800 million.

Moreover, stripping knives and improved handstripping devices totaling 620 and 840 units will be distributed by 2018 and 2020, respectively. This will require an amount of PhP 7.095 million for 2016 and 10.7 million for 2020.

- Researches on Fiber Processing/Extraction (Primary Processing)

Improvement of existing fiber extraction machines (three-series spindle stripping machines, autofed decorticating machine and tandem multi-fiber decorticating machine) shall be undertaken.

- Conduct of Training of Trainers

Trainings of farmers on pre-classification, safe use and maintenance of fiber extraction machines totaling to 400 trainings targeted by 2018 and additional 420 trainings by 2020 shall be conducted, which will require a budget of P 15.5 million and P 21.0 million, respectively. (Please refer to Annex 15 for details)

D. On Trade

- Ensure conformity with the established government standards

In order to supply the processor's and exporter's requirements with the right quantity and quality of fibers and to sustain the country's credibility as a responsible and reliable supplier of quality fibers. License issuances to traders, exporters, processors and classifiers ensure that all fibers coming the establishments are properly classified, graded, baled, inspected and certified as to established government prescribed standards. Permit to transport will eliminate mis-declaration of the district of production, kind and volume of fibers.

- Enforce and maintain a uniform and standard classification of abaca fibers

Strict monitoring of different grading and baling establishments (GBEs), trader's warehouses and processor's establishments shall be done by the PhilFIDA Regulatory personnel.

E. On Market

- Implementation of Republic Act 9242 or the Philippine Tropical Fabrics

The law was implemented through the issuance of the Implementing Rules and Regulations (IRR) stipulating the use of Philippine Tropical Fabrics or PTF with 5% fiber content of abaca, banana, pineapple and 15% silk for the uniforms of public officials and employees. The law is both significant and relevant as it will provide impetus for the growth of the Philippine tropical fabric industry and at the same time will contribute to the development of an environment-friendly agricultural and industrial sector.

- Provision of infrastructure facilities and automated machines/devices to promote our very own Philippine Handwoven Fabrics

The PhilFIDA in coordination with the private sector and local government units shall establish 16 units of Livelihood Training and Processing Centers in identified areas by 2018 in the amount of P 10.6 M. Along with the infrastructure is the provision of automated loom weaving machine that was developed by JRD Systems Incorporated with the view of helping the weaving industry cope with the increasing demand for indigenous fabrics by the growing wear and apparel market. A total of 12 units of automated loom weaving machines amounting to P 4.8 M will be fabricated by the company by 2018 and will be distributed to identified weaving communities.

- R & D on Market/Fiber Utilization

Development of different technologies to improve marketability of fiber products and value adding (i.e. simple machines/device for production of knotted fibers, ethanol production from abaca stripping waste) shall be undertaken.

- Conduct of trainings

Transfer of developed technologies and continuous training on value adding such as macramé-, handmade paper-and scrunch-making, and other fibercraft shall be done.

Table 15. Action Programs and KRAs for the abaca industry.

INPUTS: Improve quality and availability of planting material

Supply Chain Segment	Key Result Areas	Performance Indicator	Action Programs	Time Frame/ Working Group
INPUT SUPPLY	**Adequate supply of disease-free and high yielding abaca planting materials**			2018
	Establishment, Maintenance and operationalization of facilities for the production of high yielding and disease-free abaca planting materials	# of technicians trained - @ least 15 technicians per training and 4 trainings per year starting 2017 # of accredited producers - @ least 2 per year starting 2017 # of technicians trained - @ least 15 technicians per training and 4 trainings per year starting 2017	Investment in the establishment and operationalization of tissue culture laboratories, seedbank-cum-experiment stations, screen houses, nurseries, diagnostic laboratories and immunology laboratory Abaca planting material production and distribution	PhilFIDA, SUCs, LGUs, Farmers Associations
	Development of clonal propagation protocols for disease-free abaca planting materials	# of accredited producers - @ least 2 per year starting 2017		

	Development of clonal propagation protocols for disease-free abaca planting materials	# of technicians trained - @ least 15 technicians per training and 4 trainings per year starting 2017 # of accredited producers - @ least 2 per year starting 2017 # of researches conducted	Training on abaca plantlets acclimatization and nursery management Accreditation of abaca planting materials producers Investment in R&D for abaca micropropagation techniques and virus detection	PhilFIDA, SUCs, LGUs Farmers Associations PhilFIDA, SUCs, LGUs Farmers Associations BPI-PQS PhilFIDA, DA- Biotech PIU, DA-BAR, SUCs DOST- PCAARRD
	Introduction of improved abaca varieties	# of abaca cross breeding researches		PhilFIDA and SUCs
	Improvement of abaca varieties possessing resistance to virus diseases and other traits of interest	# of improved abaca varieties developed	Investment on abaca improvement R & D covering both conventional breeding and modern biotechnology to	PhilFIDA, DA-Biotech PIU, DA-BAR, SUCs DOST-PCAARRD

			include genebanking, molecular biology, confined screening and field trials of abaca; studies on insect vectors, pathogens; as well as bioinformatics.	
		# of researches on abaca improvement conducted	Investment on strengthening R & D capability of research institutions and agencies by establishing and upgrading laboratories and facilities and development of human assets	PhilFIDA, DA-Biotech PIU, DA- BAR, SUCs DOST-PCAARRD
			Investment and maintenance of R & D facilities	
	Available production technologies for improved fiber yield, higher farm productivity and increased farm income			
	Generation and dissemination of cost-effective package of technology for fiber production especially on climate change adaptation	# of researches conducted	Investment on Rand D on abaca-based sloping agriculture land, integrated farming/cropping system, on pest and disease management, bio-control agents, organic fertilizers as well as indigenous knowledge.	PhilFIDA, SUCs DA- BAR, DOST-PCARRD

PhilFIDA - Philippine Fiber Industry Development Authority
DA-BAR - Bureau of Agricultural Research of the Department of Agriculture
DOST-PCAARRD - Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology
DA-Biotech PIU - Biotech Program Implementing Unit of the Department of Agriculture
BPI-PQS - Plant Quarantine Service of the Bureau of Plant Industry SUCs - State universities & colleges
LGUs - Local Government Units

PRODUCTION: To increase fiber production.

Supply Chain Segment	Key Result Area	Performance Indicators	Action Programs	Time Frame/ Working Group	Budget (PhP'000)				
PRODUCTION					**2018**	**2019**	**2020**	**2021**	**2022**
	New abaca area	No. of hectares 2018 – 10,000 2019 – 9,000 2020 – 0 2021 – 0 2022 – 0	Support in the opening of new abaca farms	2018-2022 PhilFIDA, LGUs, SUCs, DENR	70,956	1,958,131	1,554,299	1,479,367	1,507,233
	Restored old and disease-freed abaca farms	No. of hectares 2018 – 34,167 2019 – 21,917 2020 – 0 2021 – 0 2022 – 0	Support for rehabilitation of old and disease- freed abaca farms	2018-2022 PhilFIDA, LGUs					
	Disease-freed abaca farms	No. of hectares treated 2018 – 4,350 2019 – 7,700 2020 – 8,700 2021 – 7,200 2022 – 5,800	Abaca Disease Management Program	2018-2022 PhilFIDA, LGUs, SUCs, ATI	43,500	77,000	87,000	72,000	58,000

	Trained PhilFIDA personnel, farmers and other stakeholders concerned on the requirements and procedures for certification on sustainability of abaca production	No. of participants trained 2018 – 400 2019 – 500 2020 – 500 2021 – 500 2022 – 500	Support to acquire certification for abaca on sustainable production	2018 - 2022 PhilFIDA, ATI, SUCs	800	1,000	1,000	1,000	1,000
	Farmers Certification	No. of farms/ farmers certified 2018 – 4 2019 – 40 2020 – 40 2021 – 40 2022 – 40	Support to acquire certification for abaca on sustainable production	2018-2022 PhilFIDA	5,000	10,710	11,246	12,400	13,200
	Capable Fiber Development Officers (FDO) on providing technical assistance to clients	No. of PhilFIDA field personnel trained	Training on Technology and Technical Assistance Processes for PhilFIDA Field personnel	2018-2022 PhilFIDA, LGUs, ATI, SUCs	2,200	5,000	5,000	5,000	5,000
	Farmers with updated knowledge and skills on production technologies of abaca.	No. of farmers trained	Capability building for farmers through training on updated abaca production and livelihood technologies	2018-2022 PhilFIDA, LGUs, ATI, SUCs	1,350	3,000	3,150	3,300	3,375
	Updated, informative and effective IEC materials	No. of IEC materials produced and distributed	Production and distribution of IEC materials	2018-2022 PhilFIDA, LGUs, ATI, SUCs, PTV	870	1,000	1,100	1,150	1,200

	Established On-line technology Access Facility	No. of facility established	e Fiber Online Technical Information Services	2018-2022 PhilFIDA, LGUs, ATI, SUCs	350	3,000	1,000	1,000	1,000
	Refurbished PhilFIDA Farmers' Training Center in Catanduanes	No. of farmers training Center refurbished	Repair/renovatio n of PhilFIDA Farmers Training Center in Catanduanes	2018 PhilFIDA	-	5,000	-		-
Sub-total					125,026	2,063,841	1,663,795	1,575,217	1,590,008

PROCESSING: To develop and improve processing and utilization of fibers.

Supply Chain Segment	Key Result Area	Performance Indicators	Action Programs	Time Frame/ Working Group	Budget (P '000)				
					2018	2019	2020	2021	2022
PROCESSING									
	Provision of Fiber Stripping Centers (with MSSM and drying shed) (10 units per cluster)	1996 units	Piloting/ Commercialization of developed stripping machine housed in Fiber Stripping Center with a Drying Shed	2019-2020 PhilFIDA-FUTD, LGUs PPP-collaboration with private sectors		195,200	204,000		
		3114 units	Piloting/ Commercialization of developed stripping machine housed in Fiber Stripping Center with a Drying Shed	2021-2022 PhilFIDA-FUTD, LGUs PPP-collaboration with private sectors				205,800	207,600
	Provision of Standard Stripping Knives/ Improved Handstripping Device (IHSD)	620 units	Identification of farmer, beneficiaries with LGUs, fabrication of the device and distribution to farmer- beneficiaries	2018-2020 PhilFIDA-FUTD, LGUs PPP-collaboration with private sectors	2,365	2,365	2,365		

		840 units	Identification of farmer, beneficiaries with LGUs, fabrication of the device and distribution to farmer- beneficiaries	2021-2022 PhilFIDA-FUTD, LGUs PPP-collaboration with private sectors				3,567	3,567
	Provision of Fiber Extraction Facilities needed for fiber production to be degummed, spun and woven to produce Philippine Tropical Fabrics (DA-DOST-PTRI- TRC) in compliance to Republic Act 9242	75 units of MFDM and other facilities	Fabrication of extraction machines machines for selected fibers in collaboration with LGU and the private sector	2018-2019 DA-PhilFIDA-FUTD DOST-PTRI-TRC PPP-collaboration with private sectors	35,000	1,000			
	Provision of degumming facility for selected fibers and transfer of technology on degumming	2 common service facilities	Establishment of degumming facilities as CSF in coordination with LGU and private sector	2018-2019 PhilFIDA-FUTD, PRDP, LGUs PPP collaboration Non- woven Philippines	25,000	25,000			

	Establishment of livelihood training centers in coordination with LGUs	4 centers/year 16 centers 25 participants/ session	Establishment of livelihood processing and training centers with LGUs for organized cooperatives/associations	2018-2021 PhilFIDA-FUTD LGUs	2,650	2,650	2,650	2,650	
	Development of automatic handloom weaving machine	3 units/year 12 units	Fabrication and identification of beneficiaries prior to distribution to farmers' associations'/ cooperatives	2018-2021 PhilFIDA-FUTD PPP-collaboration with private sectors	1,200	1,200	1,200	1,200	
	Improvement of existing fiber extraction machines for fuel efficiency (series-type stripping machine driven by a single diesel engine)	1 unit Prototype 1 unit Final Model	Design and fabrication Testing and evaluation	2018-2020 PhilFIDA-FUTD LGUs PPP-collaboration with private sectors	1,300	1,300	1,300		
	Improved tools/devices/machines fabricated distributed for semi-processing of fibers like twining, braiding and tinagak making	Three prototypes	Design and Fabrication of Prototype Units Commercialization of the final model	2018-2020 PhilFIDA-FUTD PPP-collaboration with private sectors	500	500	500		

	Production of natural dyes for fibers, yarn, pulp, fabrics, and other fiber products	powdered natural dyes	Piloting/ Commercialization of developed dyeing technologies using natural source for application to pulp, fibers, fabrics and other products	2018-2020 PhilFIDA-FUTD DOST- PTRI PPP-collaboaration with private sectors	500	500	500		
	Improved dyeing process through Low Temperature Plasma Treatment and	LTP-treated fibers Improved dyeing technology	Laboratory experiments/trials to validate results for verification	2019-2020 PhilFIDA-FUTD weavers PPP-collaboaration with private sectors		500	500		
	Development of non-woven materials for abaca	Developed technology for non-woven products Produced non-woven products	Laboratory experiments/tria ls to develop non- woven products as prototype Piloting/Commercialization of prototype for investment forum	2018-2022 PhilFIDA-FUTD PPP-collaboaration with private sectors (Processors/ Manufacturers	5,000	5,000	5,000	1,000	1,000

	Development of biocomposites using low grade abaca fiber and polymers for panel-boards and monoblock chairs	Number of developed technology on biocomposites	Piloting/Commercialization of developed technology thru establishment of manufacturing plant with the private sector	2018-2020 PhilFIDA-FUTD UPLB- CFNR PPP-collaboration with private sectors (Processors/ Manufacturers)	40,000	10,000	10,000		
	Development of biocomposites using low grade abaca fiber and polyester as reinforce-ment for Swiss- type E+E cab	Number of developed technology on biocomposites	Piloting/Commercialization of developed technology in collaboration with the private sector	2018-2021 PhilFIDA-FUTD- Torrex Development Corp.	4,000	2,000	2,000	2,000	
	Conduct of study on the use of abaca of stripping wastes for bioethanol	Number of developed processes and technology	Laboratory experiments/tria ls to develop extraction of bioethanol from abaca stripping wastes	2018-2022 PhilFIDA-FUTD, BAR DOE, PPP-collaboration with private sectors	5,000	3,000	2,000	1,000	1,000
	Development of cellulose acetate using abaca fiber for industrial application	Number of developed processes and technology	Laboratory experiments/trials for technology application	2018-2020	1,000	500	500		

	Identification of phytochemicals in abaca and its applications to initiate local manufacture of developed products	Number of Developed technology	Laboratory experiments/trials in the extraction of phytochemicals and identification of possible applications	2018-2020 PhilFIDA-FUTD PPP-collaboration with private sectors	500	500	200		
	Characterization of fatty acids from abaca and utilization as additive in industrial paints	Number of developed processes	Laboratory experiments/trials in characterizing fatty acid from abaca extracts and its utilization in industrial paints	2018-2020 PhilFIDA-FUTD PPP-collaboration with private sectors	1,000	500	500		
	Chemical modification of natural fibers (abaca) for minimum water uptake	Number of developed technology and information	Laboratory experiments/trials to modify surface of fibers to reduce moisture absorption	2019-2021 PhilFIDA-FUTD PPP-collaboration with private sectors		500	500	500	
	Electrospinning process developed for nanofibers from abaca	Number of developed processes and technology	Laboratory experiments/tria ls to come-up with nano fibers for special products	2018-2021 PhilFIDA-FUTD PPP-collaboration with private sectors	1,000	1,000	500	500	

	Characterization of the morphological, physical and chemical properties of abaca fibers for end-users	Number of requests	Laboratory services rendered to industry clients, researchers, farmers (continuing activity undertaken at the Fiber Processing and Utilization Laboratory)	2018-2022 DA-PhilFIDA-FUTD	9,000	5,000	2,500	2,500	2,500
	Transfer of developed technologies on fiber processing and utilization	Transferred technologies Miniature model	Technology demo Fabrication of Miniature Scale Model	2018-2022 PhilFIDA-FUTD, LGUs, private sectors	2000	500	500	500	500
	Upgrading of research facilities	Fiber Processing and Utilization Laboratory (FPUL) for ISO/IEC17025:2005	Maintenanace of FPUL Restructuring of FPUL for ISO/IEC 17025:2005	2018-2022 DA PhilFIDA-FUTD	10,000	5,000	2,000	2,000	2,000
	Capacity building and manpower development	No. Of trainings/ conferences/ Workshop/Study Tour	Trainings/Conferences Workshops/ Study Tour	2018-2022 DA PhilFIDA-FUTD	700	500	400	400	400
Sub-total					**147,715**	**264,215**	**239,615**	**223,617**	**218,567**

TRADE: To enhance fiber quality competitiveness

Supply Chain Segment	Key Result Area	Performance Indicators	Action Programs	Time Frame/ Working Group	Budget ('000)				
TRADE					**2018**	**2019**	**2020**	**2021**	**2022**
	Fiber Industry Regulation Services								
	1. Permit Issuance				2,400	1,540	2,194	1,863	3,249
	Number of permits, licenses and accreditation acted upon								
	- licenses (Trader Exporters, Processors, Classifiers)	No. licenses issued	Inspection	Traders2018-2022 , Exporters, Processors, Classifiers					
	- Permit to transport Fiber	No.of permit to transport fibers	Inspection	2018-2022 Traders, Exporters					
	- Primary Certificates of Fiber inspection (PCFI)	No.of primary certificates	Certification	2018-2022 Traders, Exporters					

	percent of authorized/ accredited entities without detected violations of licenses or accreditation conditions (PTF and Primary Certificates)	Percent Accredited Entities	Inspection	2018-2022 Traders, Exporters, Processors, Classifiers					
	percent of applications for permits, licenses, or accreditations acted upon within 3 weeks of application	Percent Application Acted (percent)	Verification / Inspection	2018-2022 Traders, Exporters, Processors, Classifiers					
	2. Monitoring				3,820	1,650	2,415	1,996	4,195
	- No. of sites and facilities monitored and/or inspected with reports issued (inspected and approved bales)	Number of facilities inspected	Inspection of facilities	2018-2022 Traders, Exporters, Processors					
	- Number of products monitored and/or inspected with reports issued (inspected and approved bales)	Number of bales inspected/ verified	Inspection of approved bales	2018-2022 Traders, Exporters					

	- percent of submitted reports that resulted in the issuance of notice of violations and penalties imposed	Percent submitted reports (percent)	Investigation						
	- percent of recommendations for prosecution that are acted upon	Percent recommendation acted upon (percent)	Investigation	2018-2022 Traders, Exporters, Processors					
	- percent of sites and products that have been inspected more than twice in last 2 years		Inspection	2018-2022 Traders, Exporters, Processors					
	3. Enforcement				3,400	3,190	3,909	3,860	5,246
	Number of enforcement actions undertaken								
	- facilities of participants	No. of inspection reports issued	Monitoring and Inspection	2018-2022 Traders, Exporters, Processors					
	- fiber bales inspected	No. of inspection reports issued	Monitoring and Inspection	2018-2022 Traders, Exporters					

	- percent of submitted reports that resulted in the issuance of notice of violations and/or cases filed/litigated		Investigation	Traders, Exporters, Processors, Classifiers					
	- percent of permit/licenses holders of accredited agencies/ establishments with 2 or more violations over last 3 years	Percent detected violations	Investigation	2018-2022 Traders, Exporters, Processors, Classifiers					
	- percent of detected violations that are resolved or referred for prosecution within 7 working days	Percent detected violations	Investigation						
Sub-Total					***9,620***	***6,380***	***8,518***	***7,719***	***12,690***

F. Major Problems and Solutions with New Approaches

1. **Lack of Planting Materials.** This is the main problem of the PhilFIDA because of its dependence to tissue culture planting materials, low seedbank seedling production and disease infected planting materials. Private sectors, Indigenous People and upland farmers need millions of planting materials for their farms.

   Solution 1: Use abaca seeds as planting materials in response to the needs of the clients. The Regional Directors, Division Chiefs, Researches, Technicians and Extension workers were trained on seed propagation and nursery establishment. PhilFIDA Regional offices are now collecting seeds for nursery propagation and will give seeds to farmers and private sectors for their nurseries. A seed protocol was already developed.

   Solution 2. Increase number of nurseries per region that will be accredited by the Bureau of Plant Industry and PhilFIDA. Accredited nurseries shall be established in each municipality. Agriculture staff of LGUs and NGOs will be trained on seedling production and nursery management.

   Solution 3: PhilFIDA shall tap Land Bank of the Philippines and other financial institutions for possible financing for abaca plant production with low interest rate of less than 7 percent and long gestation payment of 5-7 years so more farmer groups and private sectors can benefit. Eligibility of farmers groups must also be changed and with no collateral. Farmers organizations must be responsible for collection and payment of loans.

2. **Prevalence of Abaca Diseases such as Bunchy-top, Bract Mosaic and Mosaic.**

   Solution 1: Introduce a zero percent virus disease incidence in all abaca farms.

   Solution 2: Promotion of efficient farm management by intensive and sustainable farmers' training. Agricultural Training Institute (ATI) will be tapped to support the trainings for farmers, LGU technicians and NGOs to improve their technical knowledge and skills on abaca farming.

   Solution 3: Conduct exploration of new pest management technology and establish an Integrated Pest Management Program for Abaca.

3. **Low Farm and Fiber Production.** Majority of abaca farms are far from the farmer's residences and harvesting is only done 2 times a year in some areas. Century-old harvesting device and tools, spindle and decorticating machines are used during post-harvest and needs to be improved to produce more quality fibers.

   Solution 1: Increase yield per hectare by optimizing planting distance in current abaca areas.

   Solution 2: Improve efficiency and fiber recovery of post-harvest equipment and facilities. The PhilFIDA, PhilMECH and SUCs will collaborate to fabricate

machines and conduct researches to improve the performance of abaca fiber extraction machineries.

Solution 3: Availability of good and high yielding variety planting materials to support a reasonable increase in farm productivity of existing abaca hectarage.

Solution 4: Distribution of spindle stripping machines, knives and improved hand-stripping devices and conduct more researches on fiber processing/extraction.

4. **Low Fiber Quality.** According to Germany's Glatfelter, the world's biggest manufacturer of specialty paper from abaca pulp, the quality of Philippine fiber has deteriorated compared to fibers from Ecuador and Puerto Rico.

   Solution 1: Strict enforcement of abaca fiber grading standards.

   Solution 2: Promote production of quality fibers.

5. **Insufficient Supply of Abaca Fiber**. Abaca production has to be increased in various ways specifically through opening of new abaca areas and by invigorating old and less productive farms and plantations.

   Solution 1: Establishment of abaca nurseries and model abaca farms.

   Solution 2: Establishment of stripping centers and drying facilities near abaca farms and promote the fabrication of spindle-stripped fibers. Farmers organizations with huge abaca farms will be encouraged to established post-harvest facilities with stripping machines and drying centers.

   Solution 3: Active provision of technical assistance to industry players by PhilFIDA.

   Solution 4: Aggressive campaign for abaca farming. Encourage private sectors, farmers' associations/cooperatives and corporations to invest in abaca trading business and engage in farm service providers. Land Bank of the Philippines must support financing of abaca producers with low interest rate and payable in long years.

G. New Policies

PhilFIDA will introduce new directives and policies to increase fiber production, improve fiber quality, and strengthen partnership with all sectors of the industry.

- The Abaca Tuxy Buying Project. This will ensure the survival of abaca which is indigenous to the Philippines. This project aims to organize and empower most of the abaca farmers nationwide as a cooperative, produce their own abaca fibers as a group which will redound to better competitive price, quality and quantity and sell their harvest directly to GBEs and local processors.

The traditional way of abaca fiber extraction/harvesting by the abaca farmers has Twelve (12) stages. The project intends to lessen it to only six (6) steps -- Topping, Tumbling, Tuxying, Tuxy Bundling, Tuxy Transporting/Hauling and Tuxy Trading /Selling -- thereby removing and easing the burden of the abaca farmers of the other six (6) activities and just let them continue producing all the abaca tuxies they want for the day before selling it to their cooperative that same day. This will surely increase abaca fiber production.

This will also strengthen the cooperativism approach which is an effective tool in the implementation of government projects and interventions. This will create additional benefits and advantages to all members.

- Provision of disease-free abaca planting materials shall be given and distributed only to those interested stakeholder who are member of a farmer's association or cooperative.

- Encourage more farmers, private sectors, NGOs, corporations and big land owners to plant abaca in their areas identified under National Color-Coded Agricultural Guide Map launched by AMIA.

- Introduce an intensified disease management program that will revive and nurture abaca plants. An improved approach in the treatment of abaca diseases such as bunchy-top, bract mosaic and mosaic through prevention and medication.

- Introduce a Disease-Free Abaca Plantation. The X Method was used in several years to decide pursuing disease eradication based on the degree of infestation. In this roadmap, all abaca areas infected with the disease shall be geotagged periodically to effectively monitor the progress of infection and provide immediate action under the Integrated Pest Management Program.

- Finalize the "Plant-Now-Pay-Later" Scheme to abaca planting to be supported by the Land Bank of the Philippines and other financial institutions.

- Conduct research (PhilFIDA, PhilMECH and other actors) to come-up with improved and efficient machineries that can sufficiently increase the production of quality fibers. Other researches mentioned in partnership with SUCs, private sectors needs support from DOST, PCIERD, BAR and other donor agencies.

- In terms of seedling supply, at present, very few planting materials are available for abaca farms and there are few commercial nurseries that are accredited by PhilFIDA and Bureau of Plant Industry (BPI). With the large number of interested groups to plant abaca this 2018, private sectors, NGOs and farmer groups are encouraged to undertake early planting so that many suckers will be produced. There must be adequate planting materials that are of disease-free and high yielding varieties derived from tissue culture and seeds. New and improved nursery management technologies, quality abaca varieties, new technologies to improve fiber yield and increase farm productivity will also be introduced.

- For processing, the focus will be on the establishment of fiber stripping centers and abaca drying sheds as Common Service Facilities (CSF); Conduct training of farmers on fiber pre-classification, safe use and maintenance of fiber extraction machines; and harvesting brigades will be organized.

H. Required Investment and Funding Support

The total investments for the input supply, fiber production, fiber processing, fiber quality competitiveness and fiber trade aspects of the abaca industry are estimated at PhP5.63 billion from 2018-2022.

Table 16. Estimated Investment Cost, 2018-2022 (Php)

	2018	2019	2020	2021	2022	TOTAL
Fiber Production	1,515,486,520	964,965,000	885,821,000	224,112,000	70,000,000	**3,660,384,520**
Fiber Processing and Utilization	229,235,000	170,465,000	10,000,000	10,000,000	10,000,000	**429,700,000**
Research and Development	6,344,000	6,344,000	6,344,000	6,344,000	6,344,000	**31,720,000**
Fiber Trade	-	750,000,000	-	750,000,000	-	**1,500,000,000**
Fiber Quality Competitiveness	2,261,000	2,261,000	2,261,000	2,261,000	2,261,000	**11,305,000**
TOTAL	**1,753,326,520**	**1,894,035,000**	**904,426,000**	**992,717,000**	**88,605,000**	**5,633,109,520**

Investment amounting to PhP750 million in 2019 and 2021 or PhP1.50 billion from 2018-2022 on the fiber trade to improve the quality and sustain the availability of high-grade abaca raw fibers, the "Abaca Tuxy Buying Project" shall be adopted which include the following:

- ✓ Establishment and operationalization of abaca farmers cooperatives in strategic location nationwide;
- ✓ Technical assistance in the establishment and operationalization of cooperatives;
- ✓ Capability building for cooperative officers and members through training on 4Ws and 1H of abaca tuxy buying project and how to be a successful cooperative, updated abaca production and livelihood technologies, etc;
- ✓ Procurement of inputs, equipment, warehouse, logistics and other tools necessary in the operationalization of cooperative activities; and
- ✓ Development of systematic Information System (IS) prior to the operationalization of the project.

Investment amounting to PhP6.34 million in 2018 or PhP31.72 million from 2018-2022 on the research and development to improve the quality and sustain the availability of clean planting materials include the following:

- ✓ Establishment and operationalization of TCLs, immunology& diagnostic laboratories, seedbank cum experiment stations, and screenhouses;
- ✓ R&D for abaca micropropagation techniques and virus detection;

- ✓ Abaca varietal improvement and R&D by conventional breeding and modern biotechnology inclusive of gene-banking, molecular biotechnology, confined screening and field trials;
- ✓ Strengthening of R&D capability of research institutions and agencies by establishing/upgrading laboratories/facilities and capability building of human assets; and
- ✓ R&D on abaca-based sloping agriculture land, integrated farming/cropping system, on pest and disease management, bio-control agents, organic fertilizers as well as indigenous knowledge.

Investment amounting to PhP1.51billion in 2018 or PhP3.66 billion from 2018-2022 to increase fiber production consist of the following:

- ✓ Provision of required diseased-free abaca planting materials;
- ✓ Technical and production support in the opening of new abaca areas;
- ✓ Technical assistance and production support in the rehabilitation of old and disease-freed abaca farms;
- ✓ Abaca Disease Management Project;
- ✓ Support to acquire certification for abaca on sustainable production;
- ✓ Training on Technology and Technical Assistance Processes for PhilFIDA Field personnel;
- ✓ Capability building for farmers through training on updated abaca production and livelihood technologies;
- ✓ Production and distribution of IEC materials; and
- ✓ eFiber Online Technical Information Services;

Investment amounting to PhP229.23 million in 2018 or PhP429.70 million from 2018-2022 to improve fiber extraction techniques, fiber utilization and technology development consist of the following:

- ✓ Piloting/Commercialization of developed stripping machine housed in Fiber
- ✓ Stripping Center with a Drying Shed;
- ✓ Fabrication of extraction machines for selected fibers in collaboration with LGU and the private sector;
- ✓ Establishment of degumming facilities as Common Service Facility in coordination with LGU and private sector;
- ✓ Establishment of livelihood processing and training centers with LGUs for organized cooperatives/associations;
- ✓ Fabrication of automatic handloom weaving machine and identification of beneficiaries prior to distribution to farmers' associations/cooperatives;
- ✓ Design and fabrication of improved fiber extraction machines for fuel efficiency and testing and evaluation;

- ✓ Design and fabrication of prototype units of improved tools/devices/machines for semi processing of fibers for twining, braiding and tinagak making and commercialization of the final model;
- ✓ Piloting/ Commercialization of developed dyeing technologies using natural source and applicable to pulp, fibers, fabrics and other products;
- ✓ Laboratory experiments/trials of improved dyeing process through low temperature plasma treatment and minimization of wash water utilization to validate results for verification;
- ✓ Laboratory experiments/trials to develop non-woven products as prototype;
- ✓ Piloting/Commercialization of prototype for investment forum;
- ✓ Piloting/Commercialization of developed technology thru establishment of manufacturing plant with the private sector;
- ✓ Piloting/Commercialization of developed technology of the development of biocomposites using low grade abaca fiber and polyester as reinforcement material in collaboration with the private sector;
- ✓ Laboratory experiments/trials to develop extraction of bioethanol from abaca stripping wastes;
- ✓ Laboratory experiments/trials on the development of cellulose acetate using abaca fiber for industrial application;
- ✓ Laboratory experiments/trials in the extraction of phytochemicals in abaca and identification of possible applications;
- ✓ Laboratory experiments/trials in characterizing fatty acid from abaca extracts and its utilization as additives in industrial paints;
- ✓ Laboratory experiments/trials to chemically modify the surface of abaca fibers to reduce moisture absorption;
- ✓ Laboratory experiments/trials to come-up with nano fibers from abaca for special products;
- ✓ Laboratory services rendered to industry clients, researchers, farmers (continuing activity undertaken at the Fiber Processing and Utilization Laboratory);
- ✓ Technology transfer/demo through the fabrication of Miniature Scale Model;
- ✓ Maintenance of FPUL and upgrading/restructuring of FPUL for ISO/IEC
- ✓ 17025:2005; and
- ✓ Capacity building and manpower development through trainings/conferences/workshops/study tour.

Investment amounting to PhP2.26 million in 2018 or PhP11.30 million from 2018-2022 to enhance fiber quality competitiveness are on the following:

- ✓ Issuance of Primary Certificate of Fiber Inspection and Permit to Transport Fibers to traders, classifiers, exporters and processors;
- ✓ Monitoring of sites and facilities of traders, exporters and processors; and
- ✓ Enforcement of rules and regulations governing fiber quality standards and permits/licenses of participating establishments.

CHAPTER XI

IMPLEMENTATION AND MONITORING

A. Implementation of the Roadmap

The Philippine Fiber Industry Development Authority (PhilFIDA) under the management of the Executive Director and a Deputy Executive Director is the lead agency in the implementation of the Fibercrop Roadmap. The implementing units within PhilFIDA are nine Regional Offices and four Technical Divisions assisted by two (2) Support Divisions as shown in Figure 22.

The Executive Director (ED) is the prime mover that shall direct all operating units of the agency to perform the innovative planned programs, project and activities stipulated in the roadmap and agreed upon with the stakeholders during the various consultations. The ED shall report to the Secretary of the Department of Agriculture and the USEC of the High Value Commercial Crops regularly the progress of the implementation and the accomplishment of the plans in the roadmap.

The Technical Divisions are composed of the following:

1. Research Division;
2. Technical Assistance Division;
3. Regulatory Division; and
4. Fiber Utilization and Technology Division.

The technical division shall oversee the implementation of the various programs, projects and activities (PPA) of the Fibercrop Roadmap. The regional offices shall implement the PPAs in coordination and cooperation with the various players and stakeholders of the country's fiber industry both in the public and private sectors of the economy.

The Regional Offices and their geographical coverage are composed of the following:

1. Region I - covering the political regions I, II and CAR;
2. Region IV - covering regions III, IV-A, IV-B and NCR;
3. Region V for region V;
4. Region VII - covering also region VI;
5. Region VIII for region VIII;
6. Region IX - including ARMM;
7. Region X for region X;
8. Davao Region - including SOCCSKSARGEN; and
9. CARAGA

The cooperating and collaborating institutions are the following:

1. National and Local Government
   a. Department of Agriculture (DA), its concerned bureaus and attached agencies such as BPI, BAR, BSWM, BAFS, PhilMech, PCA, ITCAF,PCIC, NIA, among others;
   b. Department of Budget and Management (DBM);
   c. Department of Agrarian Reform (DAR);
   d. Department of Trade and Industry (DTI);
   e. Department of Science and Technology-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (DOST-PCAARD)
   f. Institute of Plant Breeding, University of the Philippines Los Baños (UPLB);
   g. University of the Philippines Diliman (UP Diliman);
   h. National Convergence Initiative for Sustainable Rural Development (NCISRD);
   i. Philippine Textile Research and Development (DOST-PTRI);
   j. Sericulture Research and Development Institute (SRDI)-Don Mariano Marcos State University (DMMSU);
   k. National Abaca Research Center (NARC)-Visayas State University (VSU); and
   l. Local government units at the barangay, municipal, city and provincial levels.

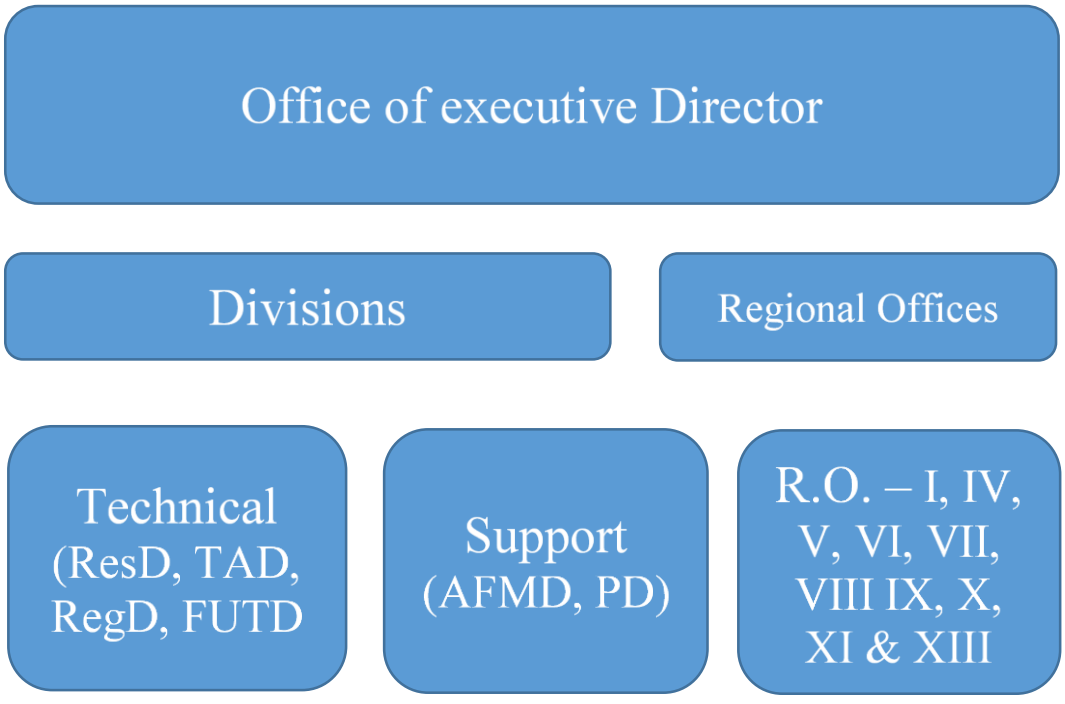
2. Industry Mainstream Players
   a. Fibercrop farmers and fiber producers;
   b. Fiber Traders;
   c. Fiber Exporters;
   d. Grading and Baling Establishments (GBEs); and
   e. Fiber based product processors and manufacturers, namely, Cordage Manufacturers, Pulp Millers, Fibercraft Manufacturers, Fiber Weavers, Fiber Reinforced Composite Manufacturers, among others.

3. Public Private Partnership Entrepreneurs
   a. Fibercrop tissue culture producers;
   b. Several international importers such as Glatfelter, Ahstrom, Celesa, etc;
   c. Philippine Chamber of Handicraft Industries;
   d. JRD Systems Technology, Inc;
   e. Torrex Development Corporation;
   f. FF Cruz Construction;
   g. Lynx Media Laboratories;
   h. Non-wovens Philippines, Inc.;
   i. CFNR;
   j. Several other clients (individual/organizations); and
   k. Farmer cooperatives and abaca private sectors

The private sector plays a critical role since it is the principal sustaining element of the fibercrop industry. The fibercrop farmers are the producers of the fibers together with their attendant workers such as the tumblers, tuxers, strippers, stripping machine operators, driers and haulers. The barangay fiber traders purchase the fibers from the farmer producers then sells the same to municipal traders that in turn sells them to provincial traders or to trader exporters or to grading and baling establishments (GBEs). Some farmer organizations, both associations and cooperatives, that are able to consolidate fibers into economical volume sell their produce to the trader exporters or GBEs by themselves, thus eliminating the middlemen and obtaining higher returns on their produce.

The fiber processors that include pulp millers, makers of cordage and related products, handicraft makers, weavers and users of by-products and other fibercrop derived substances like the enzymes, seed oil and bioethanol are the converters of the raw materials from fibercrops into value added goods. Processors shall be encouraged to organize themselves so that they can develop transactional strength and negotiating power. The pulp millers have an established organization called the Association of the Abaca Pulp Mills Inc. (AAPMI).

Figure 25. Fibercrop Roadmap Organogram



B. Internal Monitoring

The Support Divisions are composed of the following:

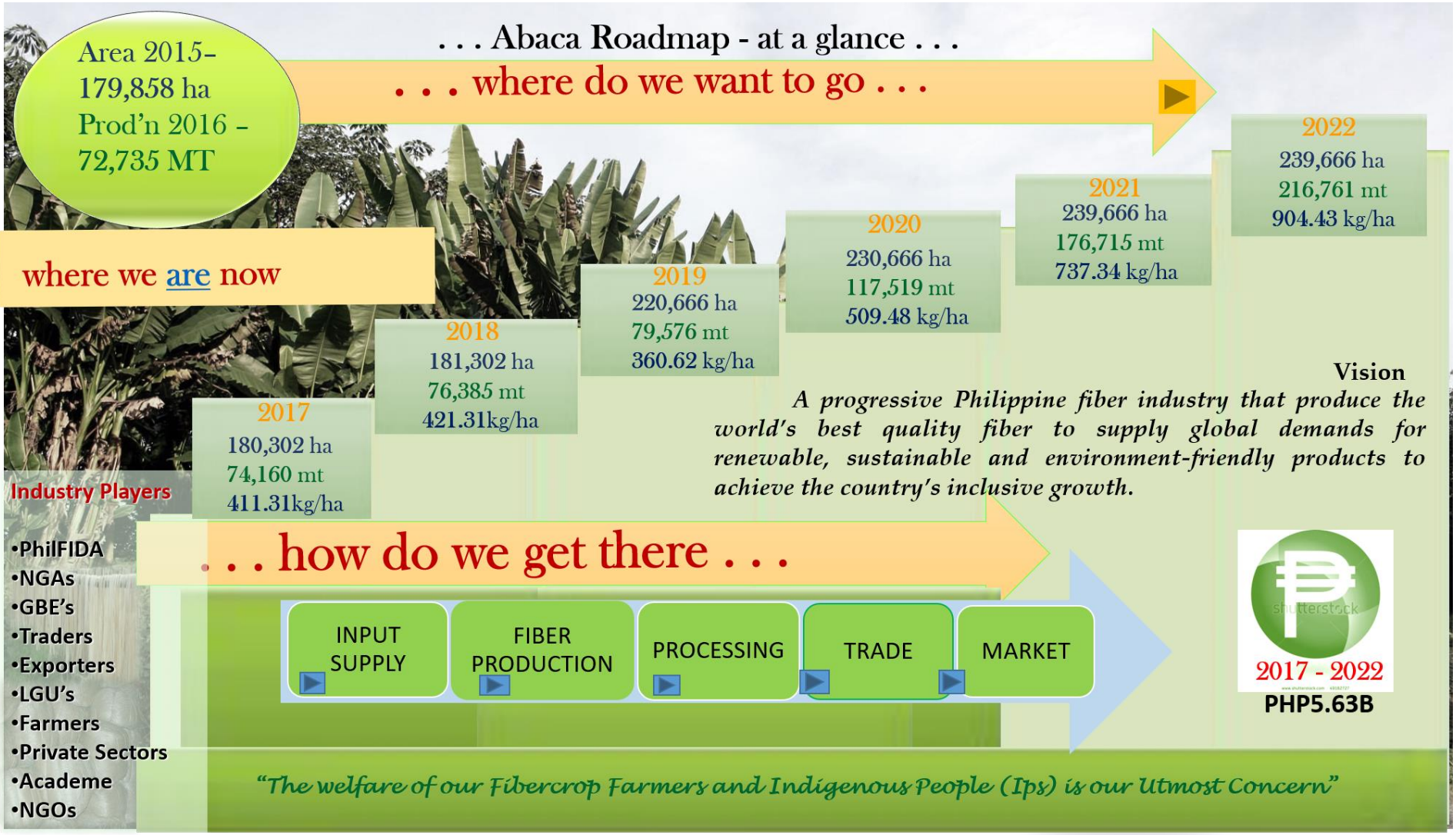
1. Administrative, Financial and Management Division; and
2. Planning Division.

The roles of the support divisions are to assist the technical divisions and to undertake internal monitoring of the implementation of the roadmap's planned programs, projects and activities.

C. External Monitoring

The Presidential Management Staff of the Office of the President, DA, DBM, National Economic and Development Authority and Commission on Audit shall conduct monitoring of the implementation of the action plans of the Fibercrop Roadmap (FR).

Impact assessment by external assessors shall be conducted three years after the implementation of the roadmap considering that the abaca starts commercial fiber production only after two years from planting.


. . . Abaca Roadmap - at a glance . . .
Area 2015–
179,858 ha
Prod'n 2016 –
72,735 MT
. . . where do we want to go . . .
where we are now
2017
180,302 ha
74,160 mt
411.31kg/ha
2018
181,302 ha
76,385 mt
421.31kg/ha
2019
220,666 ha
79,576 mt
360.62 kg/ha
2020
230,666 ha
117,519 mt
509.48 kg/ha
2021
239,666 ha
176,715 mt
737.34 kg/ha
2022
239,666 ha
216,761 mt
904.43 kg/ha
Vision
A progressive Philippine fiber industry that produce the world's best quality fiber to supply global demands for renewable, sustainable and environment-friendly products to achieve the country's inclusive growth.
Industry Players
•PhilFIDA
•NGAs
•GBE's
•Traders
•Exporters
•LGU's
•Farmers
•Private Sectors
•Academe
•NGOs
. . . how do we get there . . .
INPUT SUPPLY
FIBER PRODUCTION
PROCESSING
TRADE
MARKET
2017 - 2022
PHP5.63B
"The welfare of our Fibercrop Farmers and Indigenous People (Ips) is our Utmost Concern"

ANNEXES

Annex 1. Annual Production of Abaca Fiber by Region, 2006-2015 (MT)

ABACA FIBER PRODUCTION, BY REGION OF PRODUCTION, 2006-2015
(in metric tons)

Year	Philippines	CAR	Central Luzon	Southern Tagalog	Bicol	Western Visayas	Central Visayas	Eastern Visayas	Zambo Peninsula	Northern Mindanao	Davao Region	Soccsk-sargen	Caraga	ARMM
2006	66,471	14	55	101	20,027	1,588	325	23,521	117	1,658	8,379	675	5,547	4,465
2007	60,723	28	51	95	15,695	1,693	348	23,571	172	1,244	8,006	648	5,517	3,655
2008	77,389	72	69	84	21,972	2,281	789	23,588	251	2,318	10,229	1,282	9,958	4,494
2009	54,584	41	77	103	21,169	1,991	416	14,091	265	2,239	5,842	728	3,657	3,967
2010	57,223	0.5	65	69	21,061	1,513	531	14,094	508	2,359	6,952	1,280	4,754	4,036
2011	73,274	16	81	105	27,109	2,459	529	18,718	647	2,284	7,765	1,421	6,586	5,554
2012	64,806	2	53	133	22,246	2,355	700	15,472	656	3,180	8,614	1,380	4,524	5,489
2013	55,958	-	46	126	23,352	1,930	495	11,093	530	2,113	5,408	890	4,175	5,799
2014	66,004	-	62	138	27,886	1,636	462	10,380	642	3,205	8,417	1,610	5,945	5,620
2015	67,329	-	55	147	25,134	1,933	592	8,418	636	4,171	11,255	1,423	6,785	6,780
Average	64,383	25	61	110	22,565	1,938	519	16,295	442	2,477	8,087	1,134	5,745	4,986
% Share	100.0	0.04	0.1	0.2	35.0	3.0	0.8	25.3	0.7	3.8	12.6	1.8	8.9	7.7
Annual Growth Rate (%)	0.1	(26.8)	(0.1)	4.2	2.6	2.2	6.9	(10.8)	20.7	10.8	3.3	8.6	2.3	4.8

Annex 2. Area Planted to Abaca by Region, 2006-2015 (in ha)

AREA PLANTED TO ABACA, BY REGION, 2006-2015
(in hectares)

Year	Philippines	CAR/ Ilocos	Central Luzon	Southern Tagalog	Bicol	Western Visayas	Central Visayas	Eastern Visayas	Zambo Peninsula	Northern Mindanao	Davao Region	Soccsk-sargen	Caraga	ARMM
2006	141,711	801	428	1,528	43,591	4,640	3,523	44,099	2,007	5,674	12,104	4,453	10,536	8,327
2007	146,273	801	654	1,748	44,216	5,114	3,692	44,717	2,749	6,288	13,380	5,112	10,890	6,912
2008	152,707	814	682	2,006	44,968	4,905	3,920	45,928	3,435	6,878	14,538	5,606	11,971	7,057
2009	162,576	787	627	2,391	51,352	7,668	1,785	44,024	1,942	4,572	14,782	5,999	20,026	6,621
2010	167,145	848	730	2,670	50,212	8,183	2,023	45,122	2,217	5,369	15,414	6,193	21,205	6,959
2011	172,528	862	853	2,885	51,884	8,463	2,078	45,708	2,397	5,761	15,699	6,337	22,470	7,131
2012	176,793	860	861	3,058	52,032	8,616	3,014	46,148	2,630	6,115	16,240	6,533	23,476	7,210
2013	172,934	774	827	3,129	52,214	8,728	3,041	46,367	2,819	2,694	16,444	6,683	23,653	5,560
2014	176,548	776	800	2,826	52,352	8,830	3,073	46,481	2,953	3,195	18,994	6,277	23,270	6,721
2015	179,858	775	809	2,880	52,493	8,927	3,045	46,680	3,117	3,323	21,204	6,327	23,372	6,906
Average	164,907	810	727	2,512	49,531	7,407	2,919	45,527	2,627	4,987	15,880	5,952	19,087	6,940
% Share	100.0	0.5	0.4	1.5	30.0	4.5	1.8	27.6	1.6	3.0	9.6	3.6	11.6	4.2
AGR (%) 2006-2015	2.7	(0.4)	7.3	7.3	2.1	7.5	(1.6)	0.6	5.0	(5.8)	6.4	4.0	9.3	(2.1)

Annex 3. Annual Export Earnings From Abaca Fiber And Manufactures 2006-2015 (in FOB US$)

EXPORT EARNINGS FROM ABACA FIBER AND MANUFACTURES, 2006-2015
(in F.O.B. US$)

Year	Total	Raw Fiber	Manufactures	Pulp	Cordage	Fabrics	Fibercrafts
2006	90,681,106	12,820,692	77,860,414	52,539,850	11,454,093	480,102	13,386,369
2007	79,349,414	14,471,974	64,877,440	44,820,172	13,088,557	866,964	6,101,747
2008	99,462,995	22,232,835	77,230,160	57,346,582	13,824,592	1,110,558	4,948,428
2009	68,508,909	9,802,084	58,706,825	42,174,835	11,224,537	766,331	4,541,122
2010	104,534,310	13,431,420	91,102,890	71,243,330	14,769,942	816,248	4,273,370
2011	140,113,595	13,428,641	126,684,954	104,140,707	16,957,861	988,925	4,597,461
2012	108,743,186	5,462,185	103,281,001	75,003,246	16,265,192	1,273,267	10,739,296
2013	81,994,806	4,445,441	77,549,365	60,689,408	10,178,728	1,430,558	5,250,671
2014	111,334,294	14,092,953	97,241,341	71,086,367	12,725,928	1,844,238	11,584,808
2015	114,792,629	19,260,652	95,531,977	79,437,172	11,436,702	867,238	3,790,865
Average	99,951,524	12,944,888	87,006,637	65,848,167	13,192,613	1,044,443	6,921,414
% Share	100.0	13.0	87.0	65.9	13.2	1.0	6.9
Annual Growth Rate (%)	2.7	4.6	2.3	4.7	(0.02)	6.8	(13.1)

Annex 4. Annual Exports of Abaca Fiber By Country of Destination, 2006-2015 (in MT)

EXPORTS OF ABACA FIBER, BY MAJOR COUNTRY OF DESTINATION, 2006-2015
(in metric tons)

Destination/ Year	Total	United States	United Kingdom	Japan	South Korea	India	Indonesia	China	Other Countries
2006	12,886.9	25.7	6,731.1	5,171.9	9.4	208.7	67.5	562.9	109.7
2007	13,731.0	50.0	6,328.4	5,277.0	-	135.7	138.8	1,627.5	173.6
2008	13,385.5	22.5	6,325.8	5,287.5	-	78.8	75.0	1,383.8	212.1
2009	7,397.6	-	3,329.0	1,501.6	-	146.3	77.5	1,770.1	573.1
2010	11,293.1	-	4,216.2	4,680.0	12.1	174.8	20.6	2,068.1	121.3
2011	9,792.1	-	3,578.7	3,866.5	-	90.0	-	2,093.5	163.4
2012	4,456.2	-	2,477.0	1,296.5	-	56.0	82.8	406.3	137.6
2013	3,344.9	-	1,936.1	960.5	1.0	33.8	76.3	77.8	259.4
2014	9,762.8	-	4,107.5	3,625.0	-	125.0	83.8	825.4	996.1
2015	12,009.9	-	5,817.5	4,846.6	-	134.1	25.3	411.9	774.5
Average	9,841.4	32.7	4,484.7	3,651.3	7.5	118.3	72.0	1,122.7	352.1
% Share	100.0	0.3	45.6	37.1	0.1	1.2	0.7	11.4	3.6
Annual Growth Rate (%)	(0.8)	-	(1.6)	(0.7)	-	(4.8)	-	(3.4)	24.3

Annex 5. Annual Exports of Abaca Pulp By Country of Destination, 2006-2015 (*in MT*)

EXPORTS OF ABACA PULP BY DESTINATION, 2006-2015
(in metric tons)

Destination / Year	Total	Japan	Germany	United Kingdom	France	South Korea	Taiwan	China	United States	Other Countries
2006	22,526.3	3,610.9	9,348.6	5,522.5	1,885.4	46.7	223.7	247.1	957.3	684.1
2007	18,260.2	3,931.3	7,672.8	2,941.1	2,072.9	6.9	203.0	483.8	778.5	169.9
2008	18,102.9	3,595.1	7,293.2	2,679.7	1,477.6	1.2	140.8	351.8	846.2	1,717.3
2009	12,025.3	2,664.9	4,564.7	2,112.9	1,317.7	21.5	69.0	153.7	112.9	1,008.0
2010	20,879.0	4,024.9	7,116.8	5,175.8	1,542.6	16.2	95.4	1,045.3	1,498.0	364.0
2011	29,772.7	4,002.7	9,000.1	7,796.8	1,945.1	37.9	122.3	2,264.8	2,837.1	1,765.9
2012	21,524.8	3,179.2	6,001.4	5,992.2	1,221.9	37.3	51.2	1,686.1	1,413.9	1,941.6
2013	17,617.6	3,255.6	6,815.5	3,505.1	1,753.6	43.9	72.7	968.1	914.9	288.2
2014	20,915.7	3,521.7	7,755.8	4,750.7	1,240.9	95.0	91.6	1,406.2	1,436.7	617.1
2015	22,200.0	2,870.6	8,630.6	6,385.4	1,437.8	16.2	107.4	1,365.2	1,216.7	170.1
Average	20,382.5	3,465.7	7,420.0	4,686.2	1,589.5	32.3	117.7	997.2	1,201.2	872.6
% Share	100.0	17.0	36.4	23.0	7.8	0.2	0.6	4.9	5.9	4.3
Annual Growth Rate (%)	(0.2)	(2.5)	(0.9)	1.6	(3.0)	(11.1)	(7.8)	20.9	2.7	(14.3)

Annex 6. Annual Exports of Abaca Cordage & Allied Products By Country of Destination, 2006-2015 (in MT)

EXPORTS OF ABACA CORDAGE, BY MAJOR DESTINATION, 2006-2015
(in metric tons)

Destination / Year	Total	United States	United Kingdom	Canada	Germany	Singapore	Malaysia	United Arab Emirates	Australia	Other Countries
2006	8,299.9	5,094.9	168.1	251.3	224.3	537.3	216.8	207.7	173.0	1,426.5
2007	9,480.5	6,470.6	211.9	236.0	200.8	781.0	240.7	277.9	56.3	1,005.3
2008	7,474.6	4,915.8	158.8	154.5	159.9	523.2	151.3	110.9	43.1	1,257.1
2009	5,340.9	3,321.4	48.0	145.5	105.3	446.3	139.3	91.0	33.6	1,010.5
2010	6,954.7	4,657.3	142.5	143.3	112.5	588.6	141.4	163.3	26.3	979.5
2011	7,524.3	4,661.7	109.4	185.1	160.2	731.1	86.0	177.4	27.8	1,385.6
2012	4,987.3	2,935.2	134.0	171.0	109.9	501.4	103.8	89.6	34.7	907.7
2013	4,240.3	2,443.2	79.6	181.7	100.3	462.5	70.4	150.3	7.4	744.9
2014	5,093.0	3,467.9	226.0	177.6	43.5	253.3	78.3	196.0	28.0	622.4
2015	4,458.5	3,028.5	201.9	218.3	41.0	211.0	13.6	70.0	83.2	591.0
Average	6,385.4	4,099.7	148.0	186.4	125.8	503.6	124.2	153.4	51.3	993.0
% Share	100.0	64.2	2.3	2.9	2.0	7.9	1.9	2.4	0.8	15.6
Annual Growth Rate (%)	(6.7)	(5.6)	2.1	(1.6)	(17.2)	(9.9)	(26.5)	(11.4)	(7.8)	(9.3)

Annex 7. Annual Exports of Abaca Fabrics By Country of Destination, 2006-2015 (in sq. m.)

Destination	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*Average*	*% Share*
TOTAL	**185,450.0**	**350,078.0**	**629,656.0**	**698,335.0**	**575,668.0**	**545,113.0**	**393,474.0**	**266,632.0**	**240,862.0**	**81,539.0**	**38,504.0**	**400,531.1**	**100**
												-	
United States	-	226.0	29,706.0	80.0	439.0	-	910.0	4,477.0	1,620.0	656.0		3,811.4	1.0
Japan	182.0	2,226.0	2,984.0	15,044.0	2,403.0	684.0	104.0	-	17,158.0	52.0	1,033.0	4,187.0	1.0
United Kingdom	5,687.0	49.0	1,179.0	7,203.0	2,269.0	11,732.0	8,274.0	24,003.0	17,900.0	30,557.0	4,614.0	11,346.7	2.8
France	1,467.0	4,034.0	-	3,554.0	5,442.0	3,226.0	3,127.0	3,321.0	4,524.0	295.0	185.0	2,917.5	0.7
Hong Kong	14,284.0	145,249.0	406,514.0	455,051.0	361,033.0	270,643.0	181,228.0	169,217.0	92,804.0	47,269.0	26,633.0	216,992.5	54.2
Spain	4,111.0	15,390.0	-	15,837.0	2,992.0	-	5,094.0	503.0	387.0	777.0		4,509.1	1.1
Italy	133,445.0	156,169.0	96,869.0	160,872.0	136,496.0	111,839.0	112,657.0	34,035.0	70,828.0	131.0	445.0	101,378.6	25.3
Lebanon	-	-	-	-	-	-	-	-	-	-		-	-
China	5,715.0	-	68,656.0	27,019.0	57,207.0	114,671.0	69,461.0	20,658.0	32,435.0	239.0	5,594.0	40,165.5	10.0
Nigeria	19,892.0	25,089.0	13,716.0	13,675.0	5,960.0	4,981.0	4,374.0	890.0	3,206.0	1,563.0		9,334.6	2.3
Other Countries	667.0	1,646.0	10,032.0	-	1,427.0	27,337.0	8,245.0	9,528.0				5,888.2	1.5

Annex 8. **Annual Philippine Abaca Fiber Imports, 2006-2015**

PHILIPPINE ABACA FIBER IMPORTS, 2006-2015
(Quantity in metric ton, Value in FOB US $)

Year	Quantity	Value	FOB Price (US$/kilo)
2006	965.1	743,425	0.77
2007	252.3	282,710	1.12
2008	639.4	961,531	1.50
2009	240.6	431,343	1.79
2010	166.3	193,970	1.17
2011	631.3	1,031,372	1.63
2012	95.0	93,597	0.99
2013	718.3	1,078,342	1.50
2014	1,039.5	1,773,803	1.71
2015*	650.5	1,272,983	1.96

*Preliminary
Source: Philippine Statistics Authority
based on the weighted average Pesos/US$ rate

Annex 9. Annual Domestic Consumption of Abaca Fiber By Sector, 2006-2015 (in MT)

DOMESTIC CONSUMPTION OF ABACA FIBER, 2006-2015
(in metric tons)

Year\Sector	Total	Pulp	Ropes & Cordage	Fiber-crafts
2006	56,175	40,200	10,625	5,350
2007	47,362	30,312	12,950	4,100
2008	51,722	38,702	10,120	2,900
2009	40,684	31,074	7,435	2,175
2010	47,107	35,306	9,151	2,650
2011	63,972	51,779	9,900	2,293
2012	49,546	37,435	6,601	5,510
2013	40,865	30,639	5,579	4,647
2014	48,783	36,375	6,701	5,707
2015	46,383	38,608	5,866	1,909
Average	49,260	37,043	8,493	3,724
% Share	100.0	75.2	17.2	7.6
Annual Growth Rate (%)	(2.1)	(0.4)	(6.4)	(10.8)

Annex **10. Weighted Average Export Prices Of Abaca Fiber By Grade 2006 – 2015 (in F.O.B. US$/BALE)**

HAND-STRIPPED

Year	EF	S2	S3	I	G	H	JK
2006	196.67	140.59	110.95	145.73	127.73	87.95	119.04
2007	188.00	154.13	107.75	157.32	135.69	116.70	125.46
2008	-	239.08	181.02	235.17	221.93	168.79	202.22
2009	-	183.16	149.52	205.30	160.93	122.19	165.37
2010	-	172.73	97.04	159.53	153.87	106.34	134.29
2011	-	188.02	154.93	189.70	170.55	144.36	157.43
2012	-	196.69	148.00	195.10	173.98	117.79	117.62
2013	-	220.54	141.21	184.69	174.14	135.20	152.42
2014	-	210.26	180.96	193.40	189.28	178.07	168.11
2015	-	249.48	199.60	195.67	206.09	199.34	192.49

Annex **11. Weighted Average Export Prices of Abaca Fiber By Grade 2006 – 2015 (in F.O.B. US$/BALE)**

SPINDLE-STRIPPED

Year	EF	S2	S3	I	G	H	JK
2006	205.00	143.22	112.70	141.47	125.97	106.18	121.98
2007	225.00	157.69	127.03	158.32	137.05	120.16	143.75
2008	-	238.94	214.70	227.28	211.50	-	-
2009	337.51	183.77	-	193.07	160.00	158.00	-
2010	-	164.56	155.68	170.06	154.00	140.00	-
2011	-	189.87	161.33	202.04	181.50	151.00	-
2012	-	192.25	-	-	174.00	-	-
2013	-	171.23	166.87	236.26	188.17	-	-
2014	-	223.86	169.96	228.14	-	-	-
2015	-	270.12	195.00	-	238.12	-	-

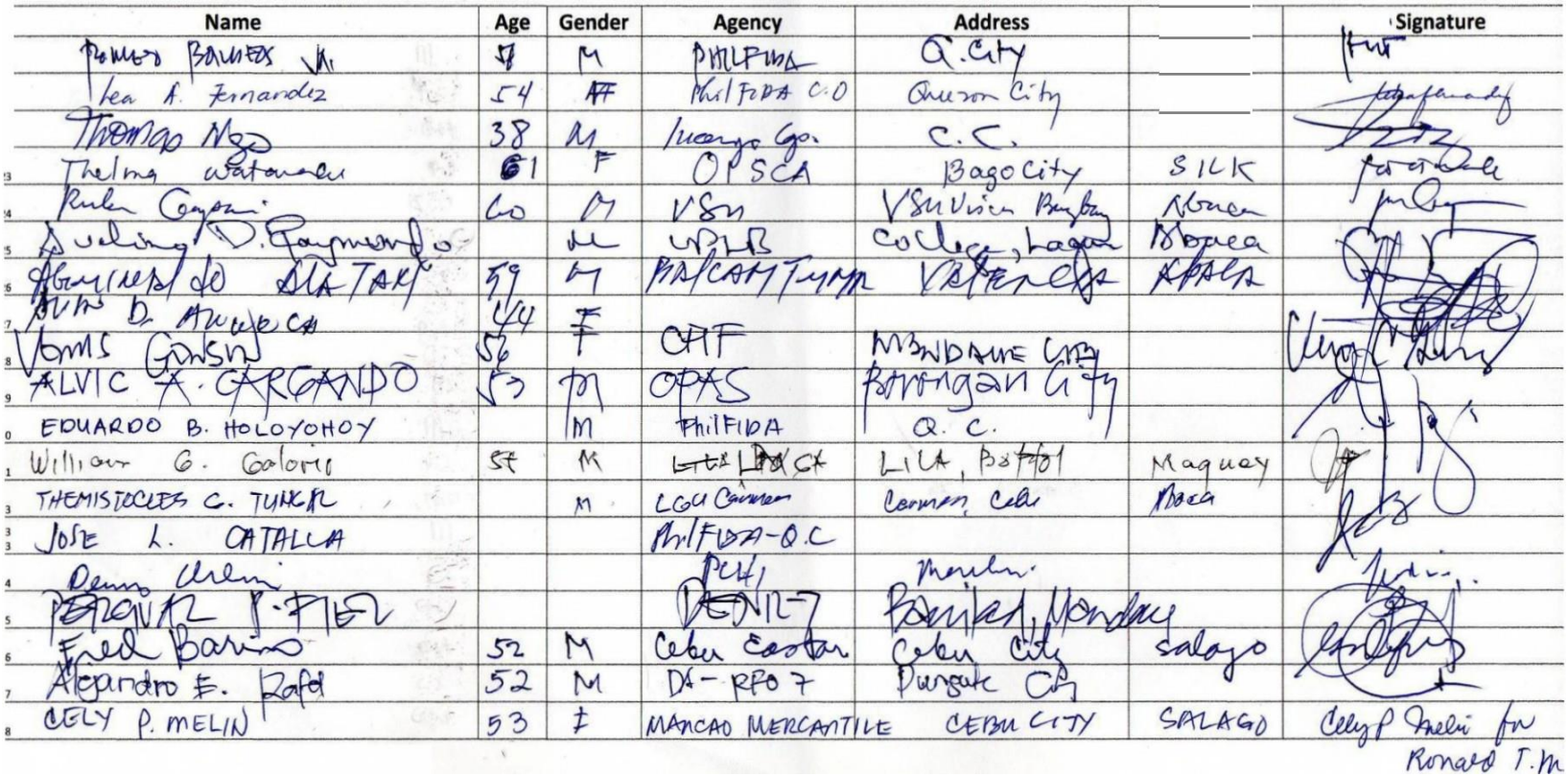
* replaced Y1 & Y2 which were abolished
** replaced O & T which were abolished

Annex **12. Attendance sheet during the Roadmap Consultative Meetings**

Republic of the Philippines
Department of Agriculture
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
Region VII, Cebu City

FIBERCROP ROADMAP STAKEHOLDERS' CONSULTATIVE MEETING
Mandaue City, Cebu
October 11, 2013

Name	Age	Gender	Agency	Address	Fibercrop	Signature
[illegible]	46	M	[illegible]	[illegible]	ABACA	
PAUSANOS, HANNAH MAE E.	20	F	LGU MAHAPLAG	MAHAPLAG, LEYTE	ABACA	
TOLOMBO L. ZABALDA	34	M	[illegible]	AKLAN	ABACA	
ELPEDIA R. PAUSANOS	51	F	LGU MAHAPLAG	MAHAPLAG LEYTE	ABACA	
Marina E. Gador	53	F	Profi-So. Leyte	Maasin City	Abaca	
Edgardo C. Manda	[illegible]	M	Phil. Bamboo foundation	Makati City Mla.		
Mark Anthony P. Sunga	26	M	Phil. Bamboo foundation	Makati City Mla.		
Marian Joy Gray	35	F	PhilFIDA	QC.		
VIRMILA B. ALVAREZ	F	F	PhilFIDA	San Andres Mla		
Adelfa M. Basaca	57	F	PhilFIDA	Sandang Mla		
LENY C. GALVEZ	4	F	PHILFIDA	QC		
PETRONILO JABAY	53	M	-do-	Q.C.		
Emelly I. Lanzon	50	F	ASMPCO	Kalibo, Aklan	Abaca cloth	
Evelyn B. Cayam	51	F	FWPA VI	Iloilo, Iloilo City		
EXPEDIZITAS LENARES	46	F	LGU	Dalaguete, Cebu	Abaca	
REMEDIOS V. ABOGNA	56	F	PhilFIDA	Quezon City		
RUBELVE C. CASTELLANES	35	M	[illegible]	Iloilo city	Abaca / Bamboo	
WILARDO O. SINAHON	53	M	PhilFIDA RTO 8	Tacloban	Abaca	
NOEL T. CAMOSBOC	41	M	BISU-Bilar	Bilar, Bohol	ABACA	



	Name	Age	Gender	Agency	Address		Signature
	[illegible]	[illegible]	M	PHILFIDA	Q. City		
	Lea A. Fernandez	54	[illegible]	PhilFIDA C:O	Quezon City		
	[illegible]	38	M	Iloilo Go.	C.C.		
13	Thelma Watanabe	61	F	OPSCA	Bago City	SILK	
14	[illegible]	60	M	VSU	VSU Visca Baybay	Abaca	
15	[illegible]		M	[illegible]	Cotabato, Lagun	Abaca	
16	[illegible]	59	M	[illegible]	[illegible]	Abaca	
17	[illegible]	44	F				
18	[illegible]	56	F	CAF	[illegible]		
19	ALVIC A. GARCANDO	53	M	OPAS	Barangay City		
20	EDUARDO B. HOLOYOHOY		M	PhilFIDA	Q. C.		
21	William G. Galorio	54	M	[illegible]	LILA, Bohol	Maguey	
23	THEMISTOCLES C. TUNGAL		M	LGU Carmen	Carmen, Cebu	Abaca	
33	JOSE L. CATALCA			PhilFIDA-O.C			
34	[illegible]			[illegible]	[illegible]		
35	[illegible]			[illegible]	[illegible]		
36	Fred Barino	52	M	Cebu Castor	Cebu City	Salago	
37	Alejandro E. Rafol	52	M	DA - RFO 7	Pursat City		
38	CELY P. MELIN	53	F	MANCAO MERCANTILE	CEBU CITY	SALAGO	Cely P. Melin for Ronald T. M

Republic of the Philippines
Department of Agriculture
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
Region VII, Cebu City

FIBERCROP ROADMAP STAKEHOLDERS' CONSULTATIVE MEETING

Mandaue City, Cebu
October 11, 2013

	Name	Age	Gender	Agency	Address	Fibercrop	Signature
39	EDGARDO C. CONILLA	54	M	RAFC-8			
40	Benjamin S. Gomo	51	M	PhilFIDA 7	Cebu City		
41	EDILBERTO O. ALVARADO	57	M	RAFC	Talisay City		
42	Joselito Fernando	49	M	CHC	CARMEN, BOHOL		
43	RUSSELL ERONG	44		UCAMPCO	CARMEN, CEBU	Abaca	
44	Cheryl Judilla		F	CFIF	Balamban, N. C.		
45	Mirasol M. Mayores	39	F	PhilFIDA 7	Cebu City		
46	Jane M. Alun	37	F	PhilFIDA-7	Cebu City		
47	Mary Christine Jane F. Perez	22	F	PhilFIDA-7	Cebu City		
48							
49							
50							
51							
52							
53							
54							
55							
56							
57							

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
Region XI

2F CAM Building, Monteverde Street, Davao City

REGIONS 9/10/Caraga

	NAME	OFFICE/ORGANIZATION/ AFFILIATION	ADDRESS	GENDER	AGE	SIGNATUR
1	MARTIN AURESTILA	Trader	Zamboanga City	M	54	
2	NEIL ESTELLORE	Processor	Zamboanga City	M	39	
3	OLIVER SANTOS	DTI	Zamboanga City	M	38	
4	HECTOR IGOT	Farmer	Pagadian City	M	55	
5	LITO GAMIT	Officer, Matling MPC	Matling, Malabang, Lanao del Sur	M	44	
6	ENGR. ROY BUSTAMANTE	Class A Trader	Aurora, Zamboanga del Sur	M	36	
7	ENGR. PETER ANDALAHAO	RTD for Reg, Res & Devt., DA RFO 9	Pagadian City, Zamboanga del Sur	M	58	
9	ENGR. VIVIAN B. LIBAO	Processor, Mis Oriental Multi Fiber	Misamis Oriental	F	48	
10	NELSON S. DYCHAUCO JR.	Farmer	Camiguin, Misamis Oriental	M	26	
11	ENGR. ALFREDO CABAHUG	Chairman, Iligan Abaca Prod Coop	Iligan, Lanao del Norte	M	69	
12	ROSALITO A. QUIRINO	MOSCAT	Misami Oriental State College of Agriculture			
13	SOMELO A. LOBITAÑA	Class A Trader	Bayug, Iligan City	M	64	
14	ROBERT C. SOMERS	Managing Dir., Newtech Pulp	Balo-I, Lanao del Norte			
15	REMEDIOS SARZUELO	City Agriculturist	Malaybalay City, Bukidnon			
16	MARIE ANN J. BELEY / Geonesto Narciso	Supvg. Agricultusit	CAO. Iligan City		53	
18	LEONORA MILA	Manager, SIUFMULCO	San Isidro, Caraga	F	42	
19	CATHERINE MILA	Staff, SIUFMULCO	San Isidro, Caraga	F	21	
20	Rhel Brua	Manager, Matling MPC	Matling, Malabang, Lanao del Sur	M	30	

21	MANUEL REBLANDO	Officer, Klowil Abaca Ent. (KAE)	Surallah, SC	M	56	
22	ADOLFO TANCO, JR./ FERNANDO FAJA	Officer, T'boli Multi Fruit Growers Coop Lake Sebu	T'boli, South Cotabato	M		
23	(GEMMA GALOR) Nenita Kinanah	President, (South Cotabato) Handicraft Sector	Lake Sebu, SC	F	46	
24	BEVERLY GRACE PACQUIO	Secretary/Treas. UMFMPC	Maligang, Kiamba, SP	M	40	
25	Emelita B. Mora	PhilFIDA	Region XI	F	42	
26	Analyn D. Bolivar	PhilFIDA	Region XI	F	56	
27	LORYNOLO P. POSEÑADO	JTC FIBRE	REGION XIII	m	34	
28	Sharon Claire Ayon	PHILFIDA	Region XI	F	50	
29	~~ELINO T. CASTRO~~	~~FIDA~~	Reg XI	M	57	
30	FERNANDO FAJA	T'BOLI Farm Owners Coop.				
	HENRY M. TUERLO	FIDA- Sec.		M	72	
	MARTIN D. SORDILLA	FIDA - DAVAO NORTE	Tagum City	M	53	
	Zenarosa A. Andresio	PhilFIDA XI, Davao City		F	37	
	PERLITA S. VIOLA	-do-		F	53	

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
Region XI
2F CAM Building, Monteverde Street, Davao City

ATTENDANCE
FIBERCROP ROADMAP STAKEHOLDERS' CONSULTATION
October 4, 2013
Grand Regal Hotel, Lanang, Davao City

REGION XI

	NAME	OFFICE/ORGANIZATION/ AFFILIATION	ADDRESS	GENDER	AGE	SIGNATURE
1	SATURNINO POLISTICO	Farmer Leader	Lopoy, Toril, Davao City	M		
2	EDWARD MANATAD	Manager, TAG Fibers Inc.	Catalunan Pequeno, DC	M		
3	LUISA ALVAREZ	Manager, Ching Bee Trading Inc.	Ilang, Tibungco, DC	F		
4	LETECIA LU	Manager, Davao Rope Factory	New Salmonan, Agdao, DC			
5	ENGR. JUVY FERNANDEZ	Sales & Mktg. Manager, TADECO	DAMOSA, Lanang, DC	F	NA	
6	DR. BENNY M. CORCOLON	VP, Res. Info, Compliance Division, TADECO	Panabo City, DN	M		
7	AVITO MAGDALAGA/ BERNARDO JALAMANA	Officer, Marsman Agrarian Reform MPC	Sto. Tomas, Davao del Norte	M		
8	ROEL OTAO	Farmer Leader	~~Talaingod~~ Kapalong, DN	M	37	
9	LEMUEL LAGDANGANON	Farmer/Trader	Maragusan, CV	M		
10	JAY TAGALOG	Farmer Leader	Maragusan, CV	M		
11	RUEL MAKILING	Farmer /Trader	Curvada, Bansalan, DS	M		
12	RICARDO GASCON	Farmer/Trader	Little Baguio, Malita, DS	M	47	
13	ARTURO BALASILA	Farmer	Demoloc, Malita, DS	M	79	
14	VIVENCIA MANIPES MANITES	Processor	Bitaog, Bansalan, DS	F	48	
15	~~CRISTOBAL SARABIA~~ / VERONICA GEGONIO	Farmer Leader/Kagawad	Anonang, Bansalan, DS	M/F	47	
16	JOCELYN PILI	Farmer/Trader	udaya, Sibulan, Sta. Cruz, DS	F	33	
17	GERALDO TASONG	Farmer Leader	Ompao. Tarragona, DO	M	52	
18	MAXIMO BUALAN	Farmer Leader	Limot, Tarragona, DO	M	39	
19	ERNESTO MANUAY / ALVINO MANUAY	Trader	Manay, DO	M	37	
20	RENATO UNTANG	Farmer Leader	Lake Sebu, SC	M		

NENITA ELNAR