The Study

for

Strategic Food and Fuel Production with Sunflower

Republic of the Philippines

Study Report

March 2009

Engineering and Consulting Firms Association, Japan

NIPPON KOEI CO.,LTD.

SUN CARE FUELS CORPORATION

KEIRIN

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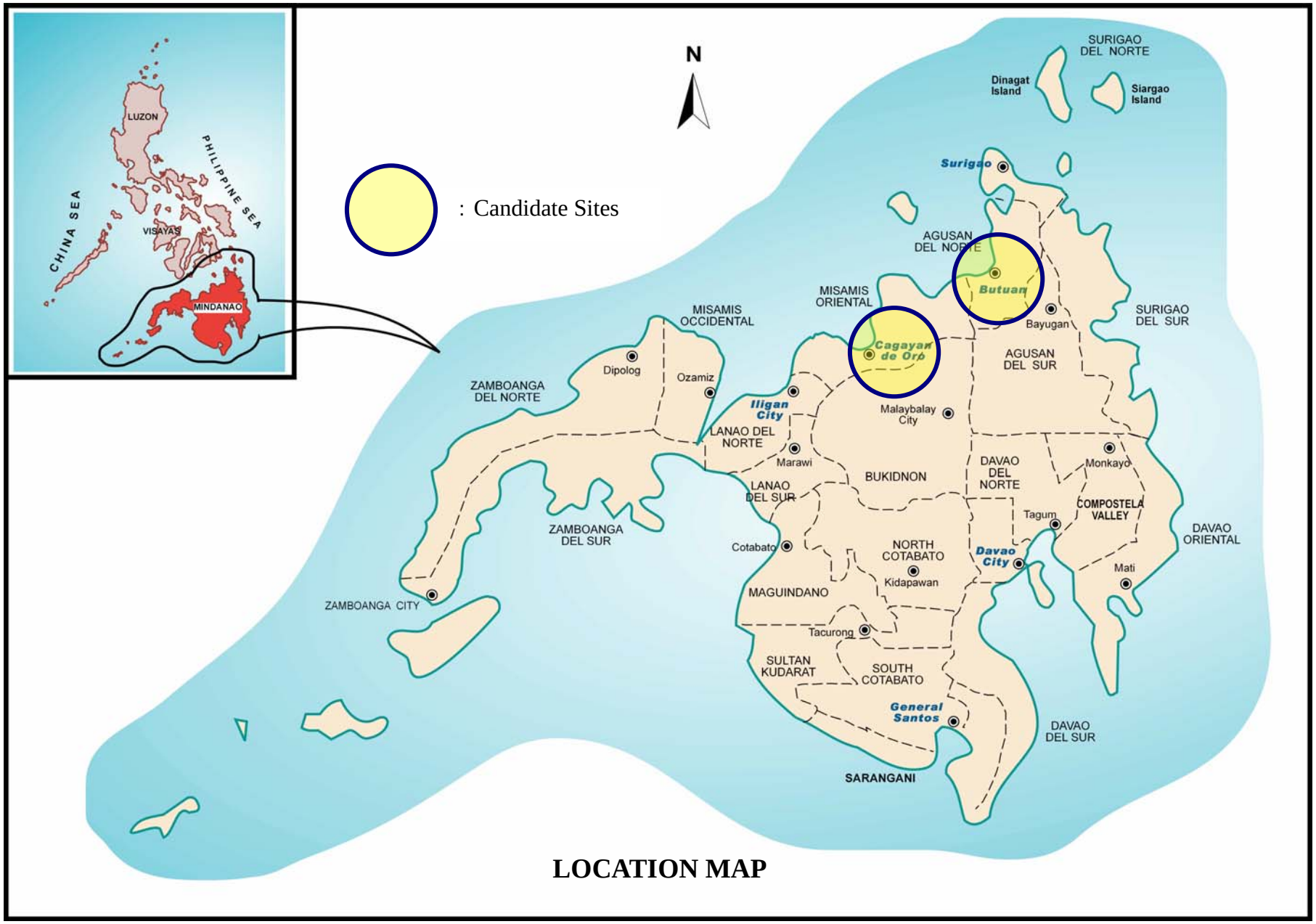

LOCATION MAP

THE STUDY FOR
STRATEGIC FOOD AND FUEL PRODUCTION WITH SUNFLOWER
THE REPUBLIC OF PHILIPPINES

STUDY REPORT

Location Map

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Abbreviations

AD	Accelerated Depreciation
AFMA	Agriculture and Fisheries Modernization Act
ARC	Agrarian Reform Community
ARSCP	Agrarian Reform Support Credit Program
BAR	Bureau of Agricultural Research
BOI	Board of Investments
BP 68	Batas Pambansa 68 (Corporation Code)
BSWM	Bureau of Soils and Water Management
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFAR	Certificate of Fuel Additive Registration
CLAJAVITA	Municipalities of Claveria, Jasaan, Villanueva and Tagoloan
CLSU	Central Luzon State University
CLUP	Comprehensive Land-Use Plan
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DIP	Development and Investment Plan
DOE	Department of Energy
DOST	Department of Science and Technology
ECC	Environmental Compliance Certificate
EMB	Environmental Management Bureau
EO 1016	The Withdrawing the Inspection, Commodity and export Clearance on Philippine Exports
EO 226	Executive Order 226 (Omnibus Investment Code)
FINL	Foreign Investments Negative List
GBDA	Gingoog Bay Development Area
GMA	Ginintuang Masaganang Ani
ITH	Income Tax Holiday
LBP	Land Bank of the Philippines
LGU	Local Government Unit
LLC	Limited Liability Company
MISORET	Municipalities of Balingasag, Lagonglong, Salay, Binuangan
MTPDP	Medium-Term Philippine Development Plan
NBB	National Biofuel Board

NOLCO	Net Operating Loss Carry-Over
NOMIARC	Northern Mindanao Agricultural Research Center
NPAAAD	Network of Protected Areas for Agricultural and Agro-Industrial Development
NPV	Net Present Value
ODA	Official Development Assistance
PAFMI	Philippine Association of Feedmillers, Inc.
PCARRD	Philippine Council of Agriculture and Resources Research and Development
PD 1151	The Philippine Environmental Policy Act of 1977
PD 1152	The Environment Code of 1977
PD 1586	Environmental Impact Statement System Law
PD 442	The Labor Code of 1976
PD 856	The Sanitation Code
PD 930	The Simplifying Export Procedure and Documentation
PDD	Project Design Document
PEZA	Philippine Economic Zone Authority
RA 7042	Foreign Investments Act of 1991
RA 7160	Local Government Code of 1991
RA 7196	Republic Act 7196 (PEZA Law)
RA 765	The Foreign Investor's Lease Act
RA 7716	The Expanded VAT Law
RA 7844	The Export Development Act of 1994
RA 7916	Special Economic Zone Act of 1995
RA 8041	The Water Crisis Act of 1995
RA 8424	The Tax Reform Act of 1997
RA 8435	Agriculture and Fisheries Modernization Act of 1997
RA 8748	The Clean Air Act of 1999
RA 9003	The Solid Waste Management Act of 2000
RA 9637	Republic Act 9637 (Biofuels Act of 2006)
ROI	Return on Investment
SAFDZ	Special Agriculture and Fisheries Development Zone
SCFP	Sun Care Fuels Philippines
SEC	Securities and Exchange Commission
SPAED	Support Program for Agri-Enterprise Development
UNFCCC	United Nations Framework Convention on Climate Change
UPLB	University of the Philippines, Los Baños
USDA	United States Department of Agriculture
VAT	Value-Added Tax

Glossary

Accelerated Depreciation (AD) - involves using a depreciation rate twice as fast as the normal rate in accordance with the NIRC of 1997, as amended. It enhances the rate of return of projects due to a faster recovery of the cost of fixed assets within a shorter period of time.

Baseline - the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed [CDM] project activity

Captan - the name of a general use pesticide (GUP) that belongs to the phthalimide class of fungicides. Though it can be applied on its own, captan is often added as a component of other pesticide mixtures. It is used to control diseases on a number of fruits and vegetables as well as ornamental plants. It also improves the outward appearance of many fruits, making them brighter and healthier-looking. Captan is utilized by both home and agricultural growers and is often applied during apple production. It was phased out of general usage as a pesticide in the United States in 1989.

Certified Emission Reduction (CER) Credits - equivalent to one tonne of CO2 and can be traded and sold to industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol

Certified Emission Reductions (CER) - calculated as the difference in emissions between the baseline and the project. Upon issuance of CERs, the CDM registry administrator shall promptly forward the CERs to the registry accounts of project participants involved, in accordance with their request, having deducted the quantity of CERs corresponding to the share of proceeds to cover administrative expenses for the Executive Board and to assist in meeting costs of adaptation for developing countries vulnerable to adverse impacts of climate change, respectively.

Corona – a system for classification of weather types.

Type I. Two pronounced seasons: Dry from November to April, wet during rest of the year.

Type II. No dry season with a very pronounced rainfall from November to April and wet during rest of the year.

Type III. Seasons are not very pronounces; relatively dry from November to April, wet during rest of the year.

Type IV. Rainfall is more or less distributed through the year.

Dole Philippines - a branch of Dole Food Company in the Philippines. Produces no less than 25 million cases of processed pineapple – slices, chunks, tidbits, crushed, juice and concentrate. Products are shipped from Dolefil to pineapple markets around the world every year. Dole Cannery, the processing plant of Dole Philippines is located in South Cotabato, Mindanao, specifically in the municipality of Polomolok. Dole Philippines is currently operating on 15,600 hectares, including independent farms in the area. Almost 6,000 people work full-time on Dolefil Farm. Half of them are men and 90% are members of a union. All workers are at least 18 years old. In line with Dole's worldwide labor policy, no children are allowed to work on the farm.

Executive Board (EB) - establishes and maintains a CDM registry to ensure the accurate accounting of the issuance, holding, transfer and acquisition of CERs by Parties not included in Annex I.

Ginintuan Masaganang Ani (GMA) - also known as Golden, Bountiful Harvest program. It is one of the targets of the government's economic plan entitled "Agriculture and Fisheries Modernization with Social Equity". It aims to improve the flow of credit to the rural areas, as well as self-sufficiency in rice and corn.

Karate - a pesticide used in farming. It is basically composed of the chemical lambda-cyhalothrin, a colorless to beige solid that has a mild odor. It is an insecticide registered by the US Environmental Protection Agency (EPA). Products come in various forms including powders, pellets, liquids, small capsules, and ear tags containing the chemical.

Lannate - a trade name for methomyl, a white crystalline solid with a slight sulfurous odor. Methomyl was introduced in 1966 as a broad spectrum insecticide. It is also used as an acaricide to control ticks and spiders. It is used for foliar treatment of vegetable, fruit and field crops, cotton, commercial ornamentals, and in and around poultry houses and dairies. It is also used as a fly bait. Methomyl is effective in two ways: (a) as a 'contact insecticide,' because it kills target insects upon direct contact, and; (b) as a 'systemic insecticide' because of its capability to cause overall 'systemic' poisoning in target insects, after it is absorbed and transported throughout the pests that feed on treated plants. It is capable of being absorbed by plants without being 'phytotoxic' or harmful, to the plant. It is one of a class of chemicals called 'carbamates'. The carbamates work by inhibiting cholinesterase, an essential enzyme for proper functioning of the nervous system.

Medium – Term Philippine Development Plan (MTPDP) - The basic task of the Medium-Term

Philippine Development Plan (MTPDP), 2004-2010 is to fight poverty by building prosperity for the greatest number of the Filipino people. The country must open up economic opportunities, maintain sociopolitical stability, and promote good stewardship—all to ensure better quality of life of its citizens. The country will focus on strategic measures and activities, which will spur economic growth and create jobs. This can only be done with a common purpose to put the economic house back in working order.

Net Operating Loss Carry-over (NOLCO) - Net operating loss of a business, that is the excess of allowable deduction over gross income of a business in a taxable year, can be carried over as deduction from gross income for the next 3 consecutive taxable years following the year of such loss subject to certain conditions. NOLCO shall be allowed as a deduction from GI of the same taxpayer regardless of change in its ownership and shall not be transferred or assigned to another person.

Off-bar – a farming method wherein the sand is wet thoroughly and run back and forth many times across the surface with a tractor, a riding mechanical rake with the cultivator bar removed, or a utility vehicle of some type.

Quedancor - Quedan & Rural Credit Guarantee Corp. It is a financing institution that has been in the financing service for 26 years. It offers certain programs for Agri-fishery Small & Medium Enterprises, Income Augmentation & Livelihood, DA Infrastructure Projects and many more.

Roguing - The purpose of roguing is to:

- Remove plants of a variety different from that planted in the field
- Remove diseased plants that will produce diseased seed tubers or which represent inoculum sources for disease spread within the field
- Ensure the seed field passes inspection.

The process of roguing requires:

- Experienced individuals, who are capable of recognizing the symptoms of the important potato diseases
- Appropriate timing
- Environmental conditions which contribute to the expression of visible disease symptoms.
- In addition, roguing is costly, as the field may have to be walked several times to remove the off variety or diseased plants.

Roguing for viral diseases is best done prior to flowering and during overcast weather.

Although roguing is considered to be a valuable tool in the maintenance of seed quality, it is

rarely completely effective. Only those plants that are manifesting visually recognizable symptoms can be rogued. Symptom expression can be influenced by many factors including environmental conditions and varietal characteristics. In addition, not all pathogen-infected plants (even those from seed pieces cut from the same tuber) express disease symptoms to the same degree or at the same stage of growth. The end result is that much of the roguing is conducted to provide a visually clean field that will satisfy the seed certification specifications.

Tuber-unit planting is a tool that has been used to improve the effectiveness of the roguing process. All seed pieces cut from a single tuber are manually fed into a planting mechanism, which places them consecutively in a low. A gap is sometimes left between the seed pieces generated from different tubers. If the plants originating from any of the seed pieces cut from a single tuber express symptoms of disease, then all the seed pieces cut from the tuber are removed from the field. This ensures that all seed is removed from the field even if only one piece is manifesting symptoms of disease or has characteristics of a foreign variety. Since tuber-unit planting is slow and very labor intensive, its use is limited to small plots of high value seed. This practice was a regulatory requirement for the first and second field generations of seed. Regulatory amendments approved in May 2002, resulted in the removal of this requirement from seed regulations, due to cost, and time consideration, relative to industry benefits. However, it is considered an important management tool for seed growers, particularly when a grower has concerns for the level of virus that may be present in seed planted.

UNFCCC Secretariat - It has responsibility, under the authority of the Board, for implementing and operating the CDM registry.

フィリピン国

ひまわり栽培による食料と燃料の

戦略的生産事業計画調査

要　約

要　約

1.　背景

フィリピン政府はバイオ燃料生産を奨励している。このバイオ燃料生産の奨励は、輸入石油系燃料への依存度を下げ、地方の経済活動を活発化させ雇用を増やし、さらに国家のエネルギー消費による二酸化炭素排出量の削減を目標としている。

サンケアフューエルス（株）では、フィリピンにおいてひまわりの種を原料としたバイオディーゼル関連事業を企画しプロモートしてきた。事業の内容は、ひまわりの栽培、ひまわりの種からひまわり油の生産、ひまわり油からバイオディーゼルの生産、および搾油粕など副産物の生産、およびそれらの販売である。

フィリピンでは 1987 年以降、包括的農地改革計画が進められており、それを支援する農地改革コミュニティーが存在する。この農地改革コミュニティーの主要開発プログラムを日本政府は円借款により支援しており、日本工営はこの円借款の下、農地改革インフラ整備計画（ARISP）のコンサルタント業務を 10 年以上継続して実施している。

日本工営とサンケアフューエルスは、バイオ燃料事業をこの農地改革コミュニティーとの連携によって実現させる構想を 2006 年より持っていた。

以上のような背景の下、本調査を実施した。

2.　調査団員

調査団は日本工営とサンケアフューエルスによる合同調査団で、団員は以下の 5 名である。

調査団員

団員名	担当	所属
1. 福地　智恭	団長/事業計画	日本工営
2. 関口　洋二郎	組織制度	日本工営
3. 松村　正利	栽培/農業機械	サンケアフューエルス
4. 若林　恒平	経済財務評価	サンケアフューエルス
5. 中川　由香	市場調査/CDM	日本工営

上記に加え、5 名のローカルメンバーが調査に加わった。

3.　バイオ燃料に関する国家方針

フィリピンではバイオ燃料法（Republic Act 9367）が 2007 年 2 月 6 日に施行された。当初、この法令はディーゼル燃料にバイオディーゼルを少なくとも 1%混ぜることを義務付け、2009 年 2 月 6 日からこの混合比率を 2%に引き上げている。混合比率はさらに高められていくこと

になっている。

バイオエタノールについては、2009 年 2 月 6 日までに全てのガソリンに対し体積比率で最低 5%のバイオエタノールを混合させることを義務付けている。さらに、2011 年 2 月 6 日までにこの混合比率を 10%にすることを義務付けている。

4. 計画候補地

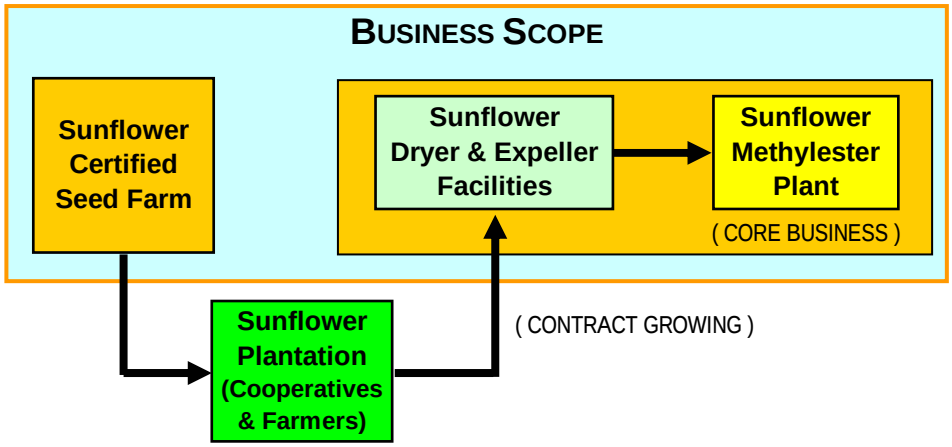
計画候補地は以下の基準により選定した。

- 台風の襲来が少ないこと
- 活用できる土地があること
- 農業のための気象条件がいいこと
- 工業団地のあること
- 海上輸送へのアクセスのいいこと

台風のリスクを避けるため、まず、ミンダナオ島が選定された。ミンダナオはフィリピンの中で唯一台風襲来のほとんどない地域である。さらに、利用可能な土地の存在、ひまわり栽培のための気象条件がいいこと、工業団地の存在、海上輸送へのアクセスが良好なことから、北部ミンダナオに地域がしぼられ、県としてはミサミスオリエンタルとブキドノンが選定された。

5. ビジネスモデル

本計画ではコアビジネスとして、ひまわりの種からバイオディーゼルを生産することとその販売に焦点を当てている。ビジネスモデルを下図に示す。



ビジネスモデル

図に示すように計画の業務範囲の中に、(i) 育種による認定種の生産、(ii) 1 次処理として種の集荷・乾燥・搾油、(iii) 2 次処理としてひまわり油のエステル化（バイオディーゼル製造）を含む。

育種によって生産された認定種は、契約農業組合や契約農家に渡される。これら契約組合や契約農家が栽培した種を 1 次処理のプラントに集荷し、そこで乾燥・搾油を行う。搾油されたひまわり油を 2 次処理プラントに集荷し、そこでエステル化工程を経て、バイオディーゼルが生産される。

6. 農業計画

ひまわりの栽培は、主にコーンとの輪作により実施する。1 次処理は農業コミュニティーに設置されたプラントで行われる。この 1 次処理プラントは本事業の事主体により設置され保守される。事業主体はさらに、契約農家・組合に対しひまわり栽培に係わる支援やトレーニングを実施していく。

7. ODA プロジェクトとの連携

フィリピンにおける土地所有の制度から判断し、ひまわり種の安定的な供給を確保するためには、契約栽培が重要である。契約栽培を実施するにあたり、日本の ODA プロジェクトとの連携が最も効果的な方法のひとつと言える。特に、農地改革省の ARISP III と Land Bank の SPAED（Support Program for Agri-Enterprise Development）との連携が効果的と考える。

8. 事業の実現可能性と次のステップ

本調査で見積もった事業コストと予想売高によって本事業の財務評価を行った。その結果は、本事業の実現可能性、つまり事業の収益性が非常に高いことを示している。しかし、今回の調査は非常に限られた調査時間と限られたインプットによる、調査の段階で言えば、案件形成調査である。このため、事業コストの見積もりや売上高の予測には多くの仮定と一般的な数値を採用している。

事業を実現させるための次のステップとして、事業のモデルと事業実施のためのフォーメーションを確定し、詳細なフィージビリティー調査を実施することが重要である。このフィージビリティー調査において、事業コストの見積もりと売上高の予測を詳細に行い、事業の実現可能性を高い精度で見極めることが、事業実現のために必須の条件となる。

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. Background

The Philippine government promotes investments on biofuel production to reduce the Philippines' dependence on imported oil, increase the economic activity and employment in the country, and to improve energy efficiency.

Sun Care Fuels Co., has been promoting the business relating to biodiesl by sunflower seed in Philippine: cultivating sunflower; producing sunflower oil; manufacturing bio-fuel from sunflower oil; and developing the by-product. Nippon Koei has been working for Agrarian Reform Infrastructure Support Project (ARISP) for more than 10 years under Japanese Yen loan scheme. Nippon Koei and Sun Care Fuels have had the idea to collaborate with Federation of Agrarian Reform Communities Cooperatives (FEDARCO) for establishing biodiesel business since 2006.

Under such background, this study was conducted.

2. Study Team

The study team consists of joint team of Nippon Koei Co., Ltd (NK) and Sun Care Fuels Corporation (SCF). The members of the study team are shown in the table below.

Member of the Study Team

Name	Title in the Study	Company
1. Mr. Tomoyasu Fukuchi	Project Design, Team Leader	NK
2. Mr. Yojiro Sekiguchi	Institution and Organization	NK
3. Dr. Masatoshi Matsumura	Farming and Agricultural Machinery	SCF
4. Mr. Kohei Wakabayashi	Economic and Financial Evaluation	SCF
5. Ms. Yuka Nakagawa	Marketing and CDM	NK

Besides the above, the four local team members worked for the study.

3. National Policy for Biofuel

Republic Act 9367 (Biofuels Act) became effective on February 6, 2007. This Act mandates to blend biodiesel to all diesel fuel at least 2%; this rate became effective February 6, 2009 and will increase.

For bioethanol, the law mandates a nationwide minimum of 5% bioethanol blend in all gasoline-fed engines by February 6, 2009. By February 6, 2011, a minimum of 10% blend of bioethanol by volume shall be mandated by the Department of Energy (DOE) upon recommendation of National Biofuel Board (NBB).

4. Candidate Project Site

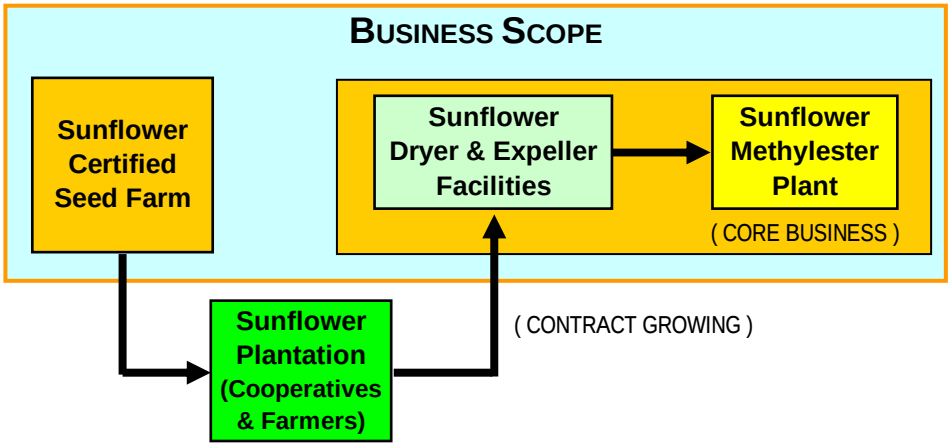
The criteria for selection of the candidate project sites are:

- minimum risk of typhoon;
- availability of land;
- good agro-climatic condition;
- existence of industrial estate; and
- access to sea transportation.

Mindanao was selected for the candidate project site due to the criterion of minimizing risk of typhoon. Mindanao is only the area that is typhoon-free in Philippines. Based on the criteria of availability of land, good agro-climatic condition, existence of industrial estate, and access to sea transportation, the area of the candidate project sites was narrowed downed to Northern Mindanao, and further to provincial level: Misamis Oriental and Bukidnon.

5. Business Model and Formation

The project shall focus on the manufacture and marketing of biodiesel from sunflower seeds as its core business. The business model is shown in the following figure. Its scope of business operation includes primary and secondary sunflower seed processing as well as production of certified seeds of sunflower. It shall establish business relations with cooperatives and individual farmers in Misamis Oriental and Bukidnon through a contract growing/marketing arrangement to assure itself of supply of sunflower seeds for processing.



Business Model for the Project

6. Agricultural Plan

The production of sunflowers will be rotated with corn, root-crops and vegetables. The seed of sunflower will be produced by contract farmers in Misamis Oriental and Bukidnon. Initial processing such as drying, threshing and oil extraction will be conducted in the farming community. The processing plant will be established and maintained by the project firm. The firm will also extend input support to contract farmers and provide training programs.

7. Collaboration with ODA Projects

In consideration of the Philippines land ownership regulation, the adoption of contract-growing scheme will be crucial for the stable and sustainable sunflower seeds supply. To implement the contract-growing scheme of the project, the collaboration with Japanese ODA projects is one of the most effective strategies. Specifically, the collaboration with ARISP Phase III of Department of Agrarian Reform and Support Program for Agri-Enterprise Development (SPAED) of Land Bank of the Philippines is recommended.

8. Project Feasibility and Next Step

The outcome of the study shows that the project is feasible based on the financial evaluation with the estimated project cost and the sales. Since the study period and the input to the study were limited as the initial promotion stage in this time, a lot of assumptions and typical data are applied to the cost estimation and sales estimation. As the next step for the project promotion, the detailed feasibility study needs to be conducted with the finalized project model and the executing formation. In the feasibility study, the feasibility of the project shall be examined with the refined project cost and sales.

MAIN TEXT

CHAPTER 1 INTRODUCTION

1.1 Background

In the world, Biofuels and other forms of green energy are becoming more and more viable as an alternative to petroleum oil. The Philippine government promotes investments on biofuel production to reduce the Philippines' dependence on imported oil and increase the economic activity in the country. The government ordained Republic Act 9367 (Biofuels Act of 2006) which became effective on February 6, 2007. This Biofuel Act mandates to blend biodiesel to all diesel fuel at least 2%; this rate became effective February 6, 2009 and will be increased. By this Act, the market of biodiesel in Philippines currently exists and is surely increasing in the future.

Sun Care Fuels Co., has been promoting the business relating to biodiesl by sunflower seed in Philippine: cultivating sunflower; producing sunflower oil; manufacturing bio-fuel from sunflower oil; and developing the by-product. Nippon Koei has been working for Agrarian Reform Infrastructure Support Project (ARISP) for more than 10 years under Japanese Yen loan scheme. Nippon Koei and Sun Care Fuels have had the idea to collaborate with Federation of Agrarian Reform Communities Cooperatives (FEDARCO) for establishing biodiesel business since 2006.

Under such background, this study was conducted.

1.2 Objectives of the Study

The objectives of the study are:

(1) to describe the present status of the biodfuel industry in the Philippines;

(2) to select the best site for construction of sunflower biodiesel plant;

(3) to present a scheme to obtain and sustain raw materials for the plant;

(4) to explore the financial sustainability of the project; and

(5) to select the best investment climate for sunflower in the Philippines based on primary and secondary data.

1.3 Study Team

The study team for Strategic Food and Fuel Production with Sunflower consists of joint team of Nippon Koei Co., Ltd (NK) and Sun Care Fuels Corporation (SCF). The members of the study team are shown in Table 1.1.below.

Table 1.1 Member of the Study Team

Name	Title in the Study	Company
1. Mr. Tomoyasu Fukuchi	Project Design, Team Leader	NK
2. Mr. Yojiro Sekiguchi	Institution and Organization	NK
3. Dr. Masatoshi Matsumura	Farming and Agricultural Machinery	SCF
4. Mr. Kohei Wakabayashi	Economic and Financial Evaluation	SCF
5. Ms. Yuka Nakagawa	Marketing and CDM	NK

Besides the above, the following local team members worked for the study.

(1) Dr. Domingo E. Angeles: Agriculture

(2) Professor Rex B. Demafelis: Alternative Energy (chemical engineer)

(3) Mr. Jose Tomas M. Cabagay: Agribusiness

(4) Ms. Johanna Marie P. Reaño: Assistant (chemical engineer)

1.4 Record of Major Activities

The study was conducted from December 2008 through March 2009.

The local study members started their activities in December 2008. They made site visit two times in December and collected the data and compiled their local team report.

The study team left Narita on January 16, 2009, conducted the site study in Philippines and came back to Japan on January 25, 2009.

The record of the site study is shown in Table 1.2 below. The photographic record of the site study is shown in Appendix-1.

Table 1.2 Site Survey Record of the Study

Members
- Mr. Tomoyasu Fukuchi
- Dr. Masatoshi Matsumura
- Mr. Kohei Wakabayashi
- Mr. Yojiro Sekiguchi
- Ms. Yuka Nakagawa
- Mr. Rex Demafelis

	Date (Yr 2009)		Itinerary	Stay
1.	16-Jan (Fri)	1:35 PM	Arriving at Manila (PR431)	Manila
		4:30 PM	Meeting at PKII Office: Presentation of study results and free discussion)	
2.	17-Jan (Sat)	7:10 AM	Leaving Manila for Cagayan de Oro City (PR281) --> Flight canceled due to flood	Davao
		1:30 PM	Leaving Manila for Davao (PR817)	
		3:20 PM	Arriving at Davao	
		4:30 PM	Internal meeting for site trip	
3.	18-Jan (Sun)	5:00 AM	Leaving Davao for Butuan	Cagayan de Oro
		10:00 AM	Arriving at Butuan	
			Meeting with FEDARCO (ARISP supported Federation of Cooperatives)	
		1:00 PM	Site inspection of possible farm lands (300 ha) managed by FEDARCO	
		7:00 PM	Leaving Butuan for Cagayan de Oro City	
		11:00 PM	Arriving at Cagayan de Oro	
4.	19-Jan (Mon)	8:30 AM	Site Inspection of PHIVIDIC Industrial Estate (Economic Free Zone) and Meeting with PHIVIDIC Industrial Authority	Cagayan de Oro
		10:00 AM	Leaving Cagayan de Oro for Municipality of Calaveria	
		11:00 AM	Meeting with Mayor of Claveria	
	19-Jan (Mon)	1:00 PM	Site Inspection of potential pilot farm and production areas of sunflower with Mayor	
		3:00 PM	Leaving Calaveria for Cagayan de Oro	
		4:30 PM	Meeting with Land Bank in Cagayan de Oro	
5.	20-Jan (Tue)	9:40 AM	Leaving Cagayan de Oro for Manila (PR282)	Manila
		11:20 AM	Arriving at Manila	
		1:00 PM	Member Meeting	
6.	21-Jan (Wed)	10:00 AM	Meeting with JETRO (Mr. Itho and Mr. Yoneyama) for Investment Environment of New Energy (Bio-Diesel/Fuel) in the Philippines	Manila
		11:00 AM	Meeting with JICA (Mr. Togo) for Possible Linkage Scheme with Japanese ODA in the Philippines	
		2:00 PM	Meeting with ITOCHU (Mr. Yamaguchi) for Present Situation of Bio-diesel in the Philippines	
		4:00 PM	Meeting with PNOC (Philippine National Oil Company) for possible partnership (Mr. Tupas, General Manager of AFC)	
7.	22-Jan (Thu)	9:30 AM	Meeting with Land Bank for ACCESS scheme (Mr. Liduvino S. Geron, Vice President)	Manila
		1:00 PM	Meeting with ARISP project members for possible agrarian cooperative cooperation scheme	
		3:00 PM	Meeting with Department of Agriculture (Mr. Marviz Agbon, Head of Bio-fuel Group)	
			Meeting with NK Manila Office (Mr. Ogawa, Representative)	
8.	23-Jan (Fri)	6:30 AM	Leaving Manila for Muños (by Car)	Manila
		11:00 AM	Arriving at Muños (Inspection of Experimental Farm for Sunflower and Meeting at CLSU)	
		3:00 PM	Leaving Moños for Manila (by Car)	
		8:00 PM	Arriving at Manila	
9.	24-Jan (Sat)	10:00 AM	Summarizing collected materials and information	Manila
		2:00 PM	Wrap-up meeting	
10.	25-Jan (Sun)	2:55 PM	Leaving Manila for Tokyo (PR432)	Tokyo

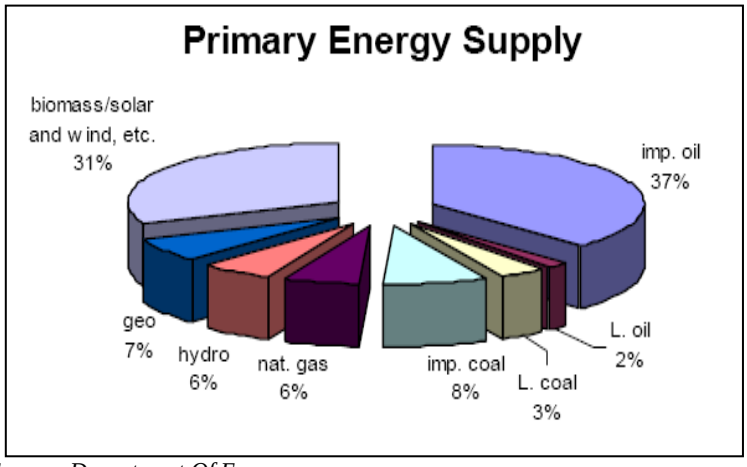
CHAPTER 2 BUSINESS ENVIRONMENT

2.1 Policy and Present Situation of Energy Sector

2.1.1 Present Situation of Energy Sector

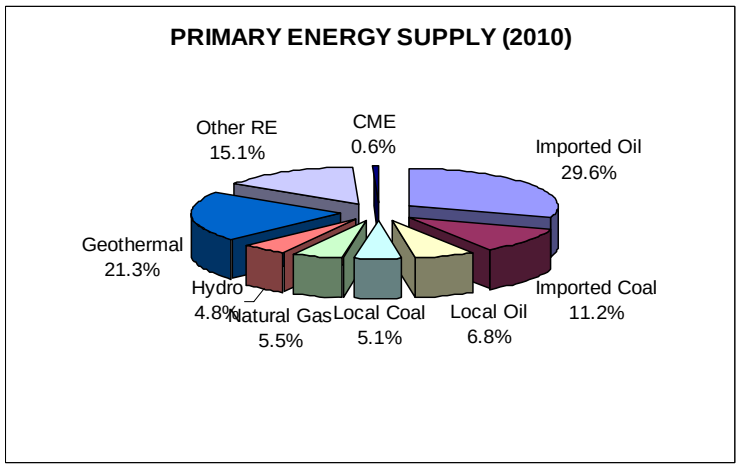
The energy sector is a preferred area of investment as listed in the 2007 Investment Priorities Plan under EO 226 or Omnibus Investments Code. The Republic Act No. 7638, also known as the DOE Law, promotes developing and using indigenous and environment-friendly energy resources and reducing dependence on imported energy. Pursuant to this law, the aggressive development and utilization of renewable and alternative energy (RE and AE) resources is proclaimed as State policy directing to energy security and energy independence.

The primary energy supply and the projected primary energy supply in 2010 are shown in the following figures (Figures 2.1 and 2.2). With current development in the energy independence of the country, imported oil is estimated to decrease from 37% this year to 29.6% in 2010 while local oil and coal are expected to increase from 2% to 6.8% and from 3% to 5.1%, respectively.



Source: Department Of Energy

Figure2.1 Primary Energy Supply of the Philippines in 2006



Source: Department Of Energy

Figure 2.2 Primary Energy Supply of the Philippines in 2010

2.1.2 National Policy for Biofuel

Republic Act 9367 (Biofuels Act of 2006) which became effective on February 6, 2007, aims to reduce the Philippines' dependence on imported oil; to increase the economic activity in the country and boost employment and to improve energy efficiency, to contribute in improving air quality.

The Biofuels Act of 2006 mandates a nationwide minimum of 1% biodiesel blend in all diesel-fed engines within three months (effective May 6, 2007) from the effectivity of the law. Within two years (Feb. 6, 2009) upon effectivity, a minimum of 2% blend of biodiesel by volume shall be mandated by the Department of Energy (DOE) upon recommendation of National Biofuel Board (NBB).

For bioethanol, the law mandates a nationwide minimum of 5% bioethanol blend in all gasoline-fed engines within two years (Feb 6, 2009) from the effectivity. Within four years (Feb. 6, 2011), a minimum of 10% blend of bioethanol by volume shall be mandated by the Department of Energy (DOE) upon recommendation of National Biofuel Board (NBB).

2.1.3 Present Situation of Biofuel

The Philippines is one of the largest producers of coconut oil. The country's coconut oil production on the average is 1.475 million kiloliters per year. Eighty percent or 1.182 million kiloliters per year is exported while the balance of 20% is used for domestic consumption. Mindanao accounts for almost 60% of the country's total coconut oil production.

Currently, there are 10 accredited biodiesel plants with a total capacity of 323,620 kiloliters/year and there are 10 ethanol companies endorsed to the Board of Investments (BOI) and Philippine Economic Zone Authority (PEZA) for incentives. Seven of the accredited biodiesel plants in the Philippines with their respective annual capacity and locations are shown in Table 2.1.

Table 2.1 Accredited Biodiesel Suppliers in the Philippines

Manufacturer	Annual Rated Capacity (kl)	Location
With Certificate of Fuel Additive Registration (CFAR)		
1. Chemrez Technolgy, Inc.	75,000	65 Industria St., Bagumabayan, Quezon City
2. Senbel Fine Chemical, Inc.	70,000	Crgy. Cotta, Lucena City
3. Mt. Holly Coco	4,000	Lucena City
4. Pure Essence	60,000	Pasig City
Provisional Accreditation (ongoing review/ evaluation		
5. Altson Coco, Inc. (provisional CFAR)	24,000	Maharlika Highway, San Pablo City
6. Lion Chemical Corp.	6,000	Ugong, Valenzuela City
7. Freyvonne Milling Services	15,000	Toril, Davao City
Total Capacity	254,000	

Source: Department Of Energy

So far, the country's biggest coco-biodiesel plant with a Certificate of Fuel Additive Registration (CFAR) is owned by Chemrez Technology Inc. which has 75,000 kiloliters capacity expandable to 100,000 kiloliters per year as shown in Table 2.1.

Biodiesel production capacity within the Philippines exceeds the requirement of the mandatory volumes from the Biofuels Act and biodiesel producers have been eyeing the growing market for clean fuels overseas. Total estimated biodiesel consumption as of 2008 is 77,760 kiloliters per year. By 2010, the biodiesel requirement at 2% blending with diesel fuels in the Philippines would be 163,920 kiloliters per year.

2.1.4 Institutional Support for Introducing Biofuel Business

As mandated in the Biofuels Act of 2006, government financial institutions, such as Development Bank of the Philippines (DBP), Landbank of the Philippines (LBP) and Quedancor, shall accord high priority to extend financing to Filipino citizens or entities, at least sixty percent (60%) of the capital stock of which belongs to citizens of the Philippines that shall engage in activities involving production, storage, handling and transport of biofuel and biofuel feedstock, including the blending of biofuels with petroleum, as certified by DOE.

The institutional support for introducing biofuel business can be seen in the many incentives that a biofuel plant can avail. Incentives in the biofuel production include income tax holidays, taxable income deductions, and tax exemptions. Under EO 226 or the Omnibus Investments Code, a biofuels project registered with the BOI, will not pay the 35% income tax. This incentive is known as Income Tax Holiday (ITH). If it is a pioneer firm, that is, with investment of over PhP1Billion, it is entitled to six years ITH, otherwise, a non-pioneer firm gets four years ITH. If the registered firm is expanding, it will be given additional 2 to 3 years ITH. Moreover, under Republic Act 7916 or the PEZA Law, after a period of 4 or 6 years Income Tax Holiday (ITH), the firm will be exempted from 5% tax on Gross Income in lieu of all national and local taxes. These include exemptions from duties and taxes on imported capital equipment, spare parts, supplies, raw materials; from wharfage dues and export taxes, imposts and fees, from payment of local government fees (Mayor's Permit, Business Permit, etc.) and zero Value Added Tax (VAT) rate on local purchases to include telecommunications, power, and water bills. Under the Tax Code, the following may be availed of by biofuels producers: Net Operating Loss Carry-over (NOLCO RR 14 – 2001) and Accelerated Depreciation (AD).

In the sale of biofuel products, several incentives are listed in RA 9637 or the Biofuels Act of 2006. The specific tax on local or imported biofuels component per liter of volume shall be zero, subjecting the gasoline and diesel fuel component to the prevailing specific tax rate. The sale of raw materials used in the production of biofuels such as, but not limited to coconut, jathropha, sugarcane, cassava, corn and sweet sorghum shall be exempted from the value added tax.

2.2 Policy and Present Situation of Food and Agriculture

2.2.1 Present Status of Food and Agriculture

The country has an agriculture based economy. It has a total land area of about 30 million hectares of which 13 million hectares are devoted to agriculture. The Department of Agriculture (DA) reported that 4.01 million hectares or 31% of this area is devoted to rice and corn, 8.33 million hectares or 52% for food crops and 2.2 million hectares or 17% for non-food crops. Farms are generally small with few large farms in the island of Mindanao. Farming system is diverse depending on agro-ecological conditions.

From the total agricultural area, total of 3.31 million hectares is devoted to rice, 4.25 million hectares to coconut, 673,000 hectares to sugarcane, 591,000 hectares to industrial crops, 148,000 hectares to fruit crops, 270,000 hectares to vegetables and root crops and 404,000 hectares to pasture crops (Government of the Philippines, undated). There is a total of 6 million hectares of plain alluvial lands where the most efficient and cost-effective production systems can be sustained. Of this, only 1.5 million hectares are irrigated. Such land has 67% more production than the rain-fed uplands. Besides, cropping intensities in irrigated areas are high in contrast to only one in non-irrigated areas where farming is dominated by small-hold farmers with average landholdings of about 1.2 ha per farmer.

The country is a net importer of rice and has yet to attain self-sufficiency. The total rice *palay* (rice grain) harvest reached 17.3 million metric tons or 11.26 million metric tons of rice. Total annual rice consumption is 12.19 million metric tons or 33,000 metric tons daily with a deficit of 930,000 metric tons. To meet the total requirement, the Philippine government resorts to importation from rice producing countries in Asia. This exposes the country to the risk of not meeting its requirements if anything adverse happens to rice production from these countries. Thus the surge in rice prices in May to July 2008 was brought about by a production shortfall in other countries exacerbated by a strong demand for rice in China and India.

Research and development to improve production in the areas of variety improvement, propagation and seed technology, biotechnology, production, crop nutrition, irrigation, crop protection, post-harvest handling and marketing is carried out by research units of the Department of Science and Technology (DOST), the DA and the academic institutions. Multinational corporations have their respective research facilities to undertake research according to their peculiar problems and needs. Agricultural extension is devolved to the local government units. The national research centers are run by the Bureau of Agricultural Research (BAR) of DA and the Philippine Council of Agriculture and Resources Research and Development (PCARRD) of DOST.

Availability of credit to farmers to finance agricultural production is restricted. Only about 33% of small farmer borrowers were served by credit institutions. The rest of the farmers accessed credit from informal lenders with more liberal loan policies. The country has complicated and chaotic marketing systems. Marketing efficiencies result to low farmer income and high losses. This is exacerbated by

poor roads, lack of suitable transport and storage facilities.

2.2.2 National Policy for Food and Agriculture

One of the objectives of transforming agriculture and modernize it is to attain food security, promote competitiveness, alleviate poverty and protect the environment. Food security means making food available to the general public. Such can be achieved by increasing production, reducing losses and adopting cost effective productions systems. Efficient food production ensures availability of food at affordable price. It is also achieved by providing higher employment and income generating opportunities to people.

Realizing that the food security can be achieved by increasing access of the people to food, the government formulated the Medium-Term Philippine Development Plan (MTPDP) 2001-2004 and MTPDP 2004-2010. Through its Agriculture and Fisheries Modernization with Social Equity program, the MTPDP 2001-2004 aims to create one million new jobs while the MTPDP 2004-2010 aims to create 10 million jobs again to fight poverty and build opportunities for the greatest number of people. The government is developing agriculture according to the provisions of Agriculture and Fisheries Modernization Act (AFMA) which ensures the improvement of credit flow to rural areas, self-sufficiency in rice and corn through the *Ginintuan Masaganang Ani* (GMA) or "Golden Bountiful Harvest" program, the commercialization of biotechnology, the expansion of food subsidy, the improvement of irrigation systems, access to fertilizers, and seeds of improved varieties, and improvement of extension services.

The implementing rules and regulations of AFMA explicitly states a policy that supports productivity as one of the key factors in raising the quality of life for all especially the underprivileged. It also stipulates the pursuit of industrialization and agriculture-based employment that will ensure efficient use of resources to produce products that are competitive in the local and foreign markets. In this connection, the government also recognizes the role of private enterprises and other those who belong to agriculture sectors and adopts a policy that will allow them "equitable access to assets, income, and basic support services and infrastructure"

2.2.3 Institutional Support for Developing Agro-Industry

The government is clear to "promote food security, including self-sufficiency in our staple food, namely rice and corn." However it also "promotes market-oriented policies in agricultural production to encourage farmers to shift to more profitable crops" It adopts sustainable development of agriculture based on poverty alleviation and social equity, food security, rational use of resources, global competitiveness, people empowerment and protection from unfair competition.

The government also promotes rural industrialization where agriculture provides the impetus that will push the industry and rural development through the markets, services and employment that it will create. It also recognizes Local Government Units (LGUs) to prepare its own land use plan according

to what it considers as best for their own development. The Bureau of Soils and Water Management (BSWM) also identifies Network of Protected Areas for Agricultural and Agro-Industrial Development (NPAAAD) and in the process identified the SAFDZ for production, agro-processing and marketing activities. This will ensure efficient utilization of land for agriculture and agro-industrial development. The SAFDZ will be based on agro-climatic conditions of the region that lends competitive advantage for the cultivation, culture, production and processing of agricultural crops and considers the strategic location of the area for the establishment of agricultural infrastructures (industrial complex, processing) and marketing. Extension services are being expanded while credit facilities are instituted for private investors and entrepreneurs.

2.2.4 Present Situation of Sunflower Cultivation

The sunflower is relatively unknown in the Philippines. It is grown in academic institutions to showcase the crop and its potential for confectionary purposes. From its isolated space in the academe, the Central Luzon State University (CLSU) brought it out from anonymity and grew it. Its beginnings started with modest research on breeding, production and processing for culinary oil. Soon, a compilation of research outputs shed light on how it can be grown locally. While the foreign literature is replete with information as to how it can be successfully grown, CLSU fills in the information vacuum for local growers. Agustin et al (1996) described the production guide for sunflower in Appendix 2 (detailed farming practices) and as follows:

1) Agro-climate: Suitable sites have climate based on 1923 Corona's climatic classification that is either Type I, II, or III (see Figure 3.2 on Chapter 3). Such climatic type is based on rainfall distribution. They are areas with distinct wet and dry season or an extended rain period of 9 months. It can be grown in places up to 700 meters above sea level with temperature that does not go lower than 17°C. Its rainfall requirement reaches up to 2000 mm.
2) Soils: Best soil is well drained, silty to clay loam with a pH of 5.5 to 6.5. Flat to slightly undulating land is required. Being deep-rooted, the crop is tolerant to drought and should be grown in deep soils.
3) Varieties: Except for CLSUN-1 which matures in 90-95 days after planting, there is no known variety of sunflower in the Philippines. Hybrids from China performed well and could produce between 3 to 4 tons/ha
4) Growing season: Under Type I climate, the first crop can be raised from October to January and the second crop from February to May. In case the land is to be prepared, the second crop may be raised from March to June, provided that the farm is irrigated during the March and February dry periods.

2.2.5 Application of Organic Fertilizer for Sustainable Sunflower Cultivations

As pointed out in European Conference on Environment for large-scale plant cultivation, we should pay much attention to the disruption of microbial ecosystem in soil caused by massive and prolonged use of chemical fertilizer. Microbes are creators of soil nutrients and require organic matters to maintain their activity. The average organic matter content of arable land should be higher than 5%. At the level of 2% the biological activity is nil thereby adversely affecting of soil nutrients. In consideration of the importance of soil conditioning we started the cooperative research works on application of organic fertilizer together with CLSU from 2007.

Figure 2.3 Cooperative Research for Sunflower with CLSU

Among several organic fertilizers “Biodynamic Compost” produced by Havilah gave a very excellent result in the test cultivation of sunflower at CLSU. We used the organic fertilizer at a dosage of 1000 kg/ha. As shown in the following picture, the soil prepared with this organic fertilizer supported the healthy growth of sunflower without any application of chemical fertilizer. The soil showed the following nitrogen and phosphorous content; Total N: 0.11 %, Available N: 39 mg/kg, Total P: 1.2 g/kg, Available P (Olsen): 120 mg/kg. Since nitrogen is the nutrient of greatest need for optimum sunflower production, this excellent result must be due to the high available nitrogen content.

Organic fertilizer is also known as an excellent soil conditioner making the soil more friable, so that it makes land preparation easier, promotes better root penetration, encourages better soil aeration and also enhances the moisture retention by increasing the water holding capacity. The soil’s organic matter or humus behaves like a sponge, absorbing water more than twice its own weight. The moisture is release slowly at about the same rate as the roots can absorb. This is critical especially in rain-fed or in areas where water is scarce. We have to use even idle lands without irrigation system for the construction of large-scale sunflower plantation. The soil of idle land is usually highly clay and its fertility is low. Since “Biodynamic compost” contains high organic matter around 56%, we are

expecting it will works as an excellent soil conditioner for these idle lands.

2.3 Related Laws and Tax

2.3.1 Foreign Investment

The important laws for the foreign investment concerns in the Philippines are as follows:

1) The Omnibus Investments Code of 1987 (Executive Order No. 226),
2) The Foreign Investments Act of 1991 (Republic Act No. 7042, as amended by Republic Act No. 8179), and
3) The Special Economic Zone Act of 1995 (Republic Act No. 7916).

Among of the laws above, R.A.7042 is the basic law that governs and liberalizes the entry of foreign investments in the Philippines. Under this law, foreign investors are allowed to invest 100% equity (without incentives) in companies engaged in almost all types of business activities subject to certain restrictions as prescribed in the Foreign Investments Negative List (FINL) below:

1) List A consists of areas of activities reserved to Philippine nationals where foreign equity participation in any domestic or export enterprise engaged in any activity listed therein shall be limited to a maximum of 40% as prescribed by the Constitution and other specific laws.
2) List B consists of areas of activities where foreign ownership is limited pursuant to law such as defense or law enforcement-related activities, which have negative implications on public health and morals, and small and medium-scale enterprises.

The R.A.7042 clearly states that if the activity to be engaged in: is not included in FINL (Appendix 3), is more than 40% foreign-owned, and will cater to the domestic market, the capital required is at least US$200,000.00. The capital may be lowered to US$100,000.00, if activity involves advance technology, or the company employs at least 50 direct employees. If the foreign company will export at least 60% of its output, or a trader that purchases products domestically will export at least 60% of its purchases, the required capital of US$200,000.00 paid-in is not applicable. If the company is at least 60% Filipino - 40% foreign owned and will cater to the domestic market, paid-up capital can be less than US$200,000.00.

On the other hand, EO 226 sets forth the rules and parameters for the foreign investments with emphasis on the grant of incentives to certain areas. The RA 7916 treats of incentives granted to industries and enterprises operated in the Special Economic Zones.

2.3.2 Establishing Business Organization

In the Philippines, a person or group of persons may engage in business in several ways and may take the form of a sole proprietorship, a partnership and a private corporation. There is no Limited Liability Company (LLC) in the country. Among the said forms of business organizations, the most popular form is the private corporation which is governed by the Corporation Code (Batas Pambansa Bilang 68) which took effect on May 1, 1980. It defines the corporation as "an artificial being created by operation of law, having the right of succession and the powers, attributes and properties expressly authorized by laws or incident to its existence". The corporation can only act through its directors who are chosen by its stockholders. The directors elect their officers and make policies. The officers hire employees and agents.

This law similarly grants ample powers to the Securities and Exchange Commission (SEC) to enable it to exercise adequate supervision over the operations and activities of the private corporations. The law allows several persons (Filipino nationals and/or Foreign Nationals/ Corporations) to pool their capital investments in the form of capital stock. The Philippine Government requires these persons to secure a certificate of incorporation to enable them to act as a legal unit. The issuance of the certificate of incorporation requires first the filing of the articles or incorporation with the Securities and Exchange Commission. For the SEC registration, an application form together with the following documents shall be submitted:

1) In the case of new domestic corporation or a partnership
    a) Articles of Incorporation/Partnership,
    b) Name Verification Slip,
    c) Bank Certificate of Deposit,
    d) ACR/ICR, SIRV, Visa No. 13 of the alien subscribers, and
    e) Proof of Inward Remittance.
2) In the case of a foreign corporation (all documents executed abroad should be authenticated by the Philippine Embassy or Consular Office)
    a) Name verification slip,
    b) Certified Copy of the Board Resolution,
    c) Certified Financial Statements for the immediately preceding year,
    d) Certified copies of the Articles of Incorporation/Partnership,
    e) Proof of inward remittance,

The attractiveness of this form of business organization is that it exempts the incorporators from personal liability beyond the amount of their capital investments.

2.3.3 Taxation Law on Foreign Investment

Important taxation laws for foreign investment in the Philippines are as follows:

1) Tax on Corporations: The foreign corporations and similar entities engaged in business or trade within the Philippines, shall be subject to an income tax equivalent to 32% of the taxable income derived in the preceding taxable year from all sources within the Philippines.
2) Tax on Individuals: The incomes of the individual resident foreigners derived from all sources in the Philippines and in foreign countries taxed from 5 to 33% on gross compensation income and net on non-compensation income.
3) Value-Added Tax (VAT): Every person or entity who in the course of his trade or business, sells or leases goods, properties and services subject to VAT, if the aggregate amount of actual gross sales or receipts exceed 550,000.00 Pesos for any twelve month period.

Aside from tax above, there are other related taxes for the foreign investment such as Tariff, Percentage tax, Excise tax on certain goods, Fixed property tax, Documentary stamp tax, Local tax, etc.

2.3.4 Sunflower Cultivation

For the cultivation of sunflower, there is no limitation if private land is used. However, only persons or entities considered Philippine nationals or Filipino citizens can acquire private lands. Therefore, the cultivation of sunflower to be undertaken by the foreign investor could be made the following options or combination of these options:

1) Option-1: Establishment of corporation with at least 60% of the shares are owned by Filipinos and acquire private lands. Because a corporation owned 60% by Filipino is treated as a Philippine national.
2) Option-2: Leasing of private lands on a long term basis.
3) Option-3: Contract growing through production, technical and marketing agreement.

2.3.5 Food and Oil Production and Selling

The Agriculture and Fisheries Modernization Act of 1997 (R.A.8435) supports the development of agro-industries in the Philippines. The development of sunflower oil processing and marketing has to comply with national and local laws and policies. First, it has to be approved by the city or municipality in terms of its location and as a project after submission of requirements from various national government agencies.

The Local Government Code of 1991 (R.A.7160) empowers the local government units to formulate their own agricultural and agro-industrial development programs and projects. If sunflower oil manufacturing is not yet included in their current plans (Comprehensive Land Use Plan, Development and Investment Plan), then the LGU should promulgate a local ordinance as an amendment to the plan

to serve as basis for approving the project.

Other national laws and policies that will apply to the project are:

1) The Water Crisis Act of 1995 (R.A.8041),
2) The Clean Air Act of 1999 (R.A.8748),
3) The Sanitation Code (P.D. 856),
4) The Expanded VAT Law (R.A.7716),
5) The Solid Waste Management Act of 2000 (R.A.9003),
6) The Environment Code of 1977 (P.D.1152),
7) The Philippine Environmental Policy Act of 1977 (P.D.1151),
8) The Environmental Impact Statement System (P.D.1586),
9) The Labor Code of 1976 (P.D.442);
10) The Simplifying Export Procedure and Documentation (P.D.930),
11) The Withdrawing the Inspection, Commodity and export Clearance on Philippine Exports (E.O.1016),
12) The Omnibus Investment Code of 1987 (E.O.226),
13) The Foreign Investments Act of 1991 (R.A.7042),
14) The Tax Reform Act of 1997 (R.A.8424),
15) The Export Development Act of 1994 (R.A.7844), and
16) The Foreign Investor's Lease Act (R.A.765).

2.3.6 Biofuel Production and Selling

Various laws that give incentives for biofuel investments are the E.O.226 - Omnibus Investments Code, R.A.7916 as amended - PEZA Law, RA 9367 - Biofuels Act of 2006, R.A.9337 - Reformed Value Added Tax (VAT) Law and the National Internal Revenue Code (NIRC). Incentives in the biofuel production include income tax holidays, taxable income deductions, and tax exemptions.

Under E.O.226 or Omnibus Investments Code, a biofuels project registered in the Board of Investment (BOI), will not pay the 35% income tax. This incentive is known as Income Tax Holiday (ITH). If it is a pioneer firm, that is, with investment of over 1 billion Pesos, it is entitled to 6 yrs ITH, otherwise, a non-pioneer firm gets 4 yrs ITH. If the registered firm is expanding, it will be given additional 2 to 3 yrs ITH.

Moreover, under R.A.7916 or the PEZA Law, after a period of 4 or 6 years ITH, the firm will be exempted from 5% tax on Gross Income in lieu of all national and local taxes. These include exemptions from duties and taxes on imported capital equipment, spare parts, supplies, raw materials; from wharfage dues and export taxes, imposts and fees, from payment of local government fees

(Mayor's Permit, Business Permit, etc.) and zero VAT rate on local purchases to include telecommunications, power, and water bills.

Under the Tax Code, the following may be availed of by biofuels producers:

1) Net Operating Loss Carry-Over (NOLCO RR 14 – 2001) and Accelerated Depreciation (AD).
2) In the sale of biofuel products, several incentives are listed in R.A.9367 or the Biofuels Act of 2006.
3) The specific tax on local or imported biofuels component per liter of volume shall be zero, subjecting the gasoline and diesel fuel component to the prevailing specific tax rate.
4) The sale of raw materials used in the production of biofuels such as, but not limited to coconut, jatropha, sugarcane, cassava, corn and sweet sorghum shall be exempted from the value added tax.

There are certain permits and certification requirements that need to be satisfied before starting biofuel production. Detailed information on this matter can be seen in Appendix-4: Permits and Certifications.

2.3.7 Exporting Products

The Philippine Exports Development Plan (PEDP) is a three-year rolling plan that defines the country's export strategies and programs which are embodied in the Medium Term Philippine Development Plan (MTPDP). It draws its legal mandate from Republic Act 7844 known as the Export Development Act of 1994. It serves as a guide to the private sector to design their industry- and firm-level exporting strategies with the end-in-view of sustaining exports and job creation. The PEDP in its action plan lists agribusiness as one of the priority investment areas. It aims to maximize exports and investment opportunities offered by trade agreements such as ASEAN, JPEPA, RP-US Trade and Investment Framework Agreement (RP-US TIFA), ASEAN-China FTA, Trans-Regional EU-ASEAN Trade Initiative (TREATI), among others. Likewise, the PEDP strives to maintain existing and develop more competitive products and services and diversify markets. It also has provided for the simplification of export and import procedures and facilitation. The PEDP also intends to pursue market driven strategy that will link Philippine supply capacity closer the high impact markets.

2.4 Clean Development Mechanism (CDM)

2.4.1 Current Status of CDM

Clean Development Mechanism (CDM) is one of the arrangements under the Kyoto Protocol. CDM allows emission-reduction projects in developing countries to earn Certified Emission Reduction (CER) credits, each equivalent to one tonne of CO_2. The Philippines signed the protocol in 2003 and thru Executive Order No. 320 in June 2004, the Department of Environment and Natural Resources Environmental Management Bureau (DENR-EMB) was established as the Designated National

Authority on CDM.

Since 2006, a total of 20 project activities have been registered with the United Nations Framework Convention on Climate Change (UNFCCC) thus, making the Philippines rank No. 7 in terms of the number of project activities registered globally. All 19 project activities, most of which are swine wastewater treatment projects with onsite power from biogas, are expected to generate a total of 732,000 tons CO_2-e/year. As of November 24, 2008, there are 1,231 registered projects for CDM worldwide.

Among the registered CDM projects, more than half, that is 56.35%, is under the scope of energy industries involving renewable and non-renewable sources.

2.4.2 Procedure of CDM Application

In registering a project for CDM to the CDM Executive Board, the Project Design Document (PDD) needs to be prepared. PDD is a document covering project description, justification on why the project is a CDM project, calculation of carbon emission reductions, monitoring protocol, environmental impact, stakeholders' consultation, and finance. This is then submitted to the Department of Environment and Natural Resources (DENR) for evaluation to get a Letter of Approval. Submission to the Philippine National Authority on CDM (DENR-EMB) includes pertinent permits for the project, such as business permit, Environmental Compliance Certificate (ECC), Permit to Discharge, Permit to Operate, etc., Stakeholders' Consultation documentation, Sustainable Development Benefits Description, vicinity map, and the PDD. The project application will be evaluated by a technical working group from the concerned agencies (DOE or DENR) and endorsed to the inter-agency and multi-sectoral CDM Steering Committee for evaluation. The Steering committee will then assess the project, with more focus on the sustainable development benefits for the country. They may have further questions for the project proponent or choose to endorse the project for a Letter of Approval signed by the Secretary of the DENR.

The PDD will also be sent to the validators for the auditing. Third party independent auditors will be validating everything that is written in the PDD. They will be asking for specific project details, supporting data for calculations, and evidence of every statement in the PDD, specifically those that might significantly affect the project. They will also go to the site to inspect the baseline situation before the CDM project was implemented or the actual implementation of the project itself.

After all their review queries are properly answered and satisfied, they will then request for the registration of the project with the Executive Board of CDM, the UNFCC. The UN EB will then deliberate before they decide to register. Once registered, the project is officially listed on the UNFCCC website as a registered Clean Development Mechanism project.

2.4.3 Possibility of CDM Application

Project participants willing to validate or register a CDM project activity shall use a methodology previously approved by the Executive Board or propose a new methodology to the Executive Board for consideration and approval.

Many CDM methodologies has been proposed for biodiesel fuel, however, there are many issues to apply. The typical problem is specifying consumers such as double counting (CER is clamed both from producers and consumers). Counting method for project emission and leakage during plantation of biodiesel material is also controversial.

At present, there are two possible methodologies applicable for the project using sunflower oil for fuel as follows:

(1) AMS-III.T.: Plant oil production and use for transport applications Version 1; and

(2) AM0047: Production of biodiesel based on waste oils and/or waste fats from biogenic origin for use as fuel --- Version 2

Among the approved methodologies, the closest methodology corresponding to the Sunflower project to be proposed for CDM is AMS-III.T. However, the methodology only covers project activities involving the cultivation of oilseeds, the production of plant oil and the use of plant oil for transportation. Plant oil in contrast to bio-diesel is not trans-esterified but only pressed and filtered from oilseeds. In addition, this methodology is only applicable to plant oil that is used in blends of up to 10% by volume of plant oil or used as pure. The application of the plant oil is limited to transportation. Accordingly, proposing modifications to the existing approved methodology would be needed such as the secondary processing (transesterification of plant oil to biodiesel) prior to blending with diesel. Plant oil must comply with national quality regulations or in absence of the latter with the quality standards stipulated in Table 2.2.

Table 2.2 Proposed Quality Control Parameters for Plant Oil

Properties	Unit	Proposed Limiting Value		Possible Testing Method
		Min	Max	
Acid Value	Mg KOH/g	-	2.0	DIN EN ISO 660
Oxidation Stability (110^{o}C)	h	5.0	-	ISO 6886
Ash Content	Mass (%)	-	0.01	DIN EN ISO 6245
Contamination	mg/kg	-	25	DIN EN 12662
Phosphorus Content	mg/kg	-	15	ASTM D3231-99
Water Content	Mass (%)	-	0.075	Pr EN ISO 12937
Kinematic Viscosity (40^{o}C)	mm^{2}/s	-	variable	DIN EN ISO 3104

Source: UNFCCC AMS-III.T.: Plant oil production and use for transport applications

The project participants should demonstrate that the area where the biomass is grown is not a forest (as per DNA forest definition) and has not been deforested, according to the forest definition by the national DNA, during the last 10 years prior to the implementation of the project activity.

The other methodology, AM0047, can apply to the energy alternative using biodiesel fuel with esterification process. However, the material is limited to waste food oil. In 30th Methodology Panel, new version (AM00047 Ver. 3) is submitted and under discussion. The new version indicates that material from new plantation exclusively for project is applicable. If this new version is adopted, AM00047 Ver. 3 would be the most suitable to sunflower project.

For both methodologies, following studies are needed to prepare PDD and to apply CDM:

- Setting of baseline scenario,
- Setting of project boundary (farm area, oil mill, biodiesel plant (for AM00047 Ver. 3)),
- Calculation of leakage and project emission (input of methanol, transportation, electricity and fuel use for plantation and plant, fertilizer, etc.),
- Calculation of baseline emission, and
- Emission reduction of the project
- Preparation of monitoring plan and required base parameter and data

If new methodology is suggested other than above, it would take longer time than to adjust the project to the approved CDM methodology.

CHAPTER 3 PROJECT DESIGN

3.1 Selection of Candidate Project Site

The criteria for selection of the candidate project sites are:

- minimum risk of typhoon;
- availability of land;
- good agro-climatic condition;
- existence of industrial estate; and
- access to sea transportation.

Mindanao was selected for the candidate project site due to the criterion of minimizing risk of typhoon. Mindanao is only the area that is typhoon-free in Philippines. Based on the criteria of availability of land, good agro-climatic condition, existence of industrial estate, and access to sea transportation, the area of the candidate project sites was narrowed downed to Northern Mindanao, and further to provincial level: Misamis Oriental and Bukindon.

The following sub-chapters present the detailed information and the result of the site inspection of Misamis Oriental and Bukindon province.

3.1.1 Provincial Candidate Sites In Northern Mindanao

Northern Mindanao comprises the provinces of Misamis Oriental, Misamis Occidental, Lanao del Norte, Camiguin and Bukidnon (Figure 3.1).

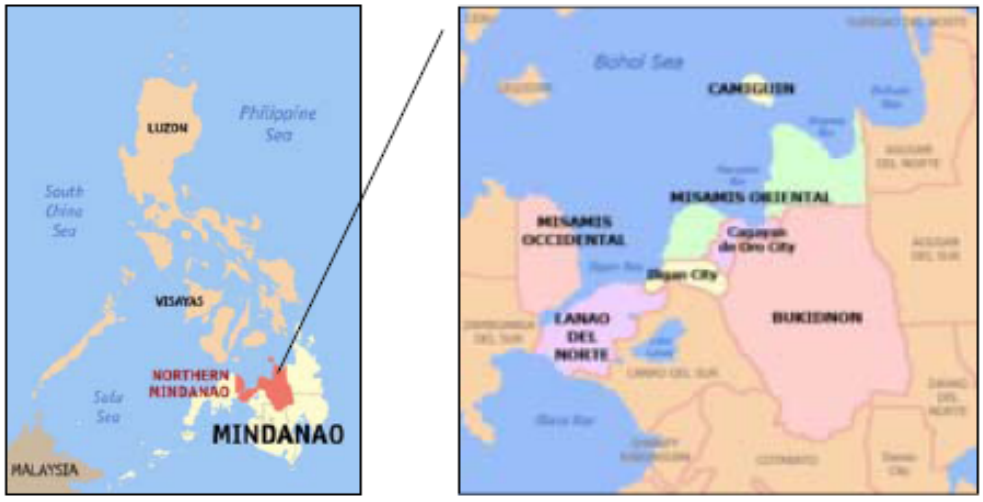


Figure 3.1 The provinces comprising Northern Mindanao (Region X)

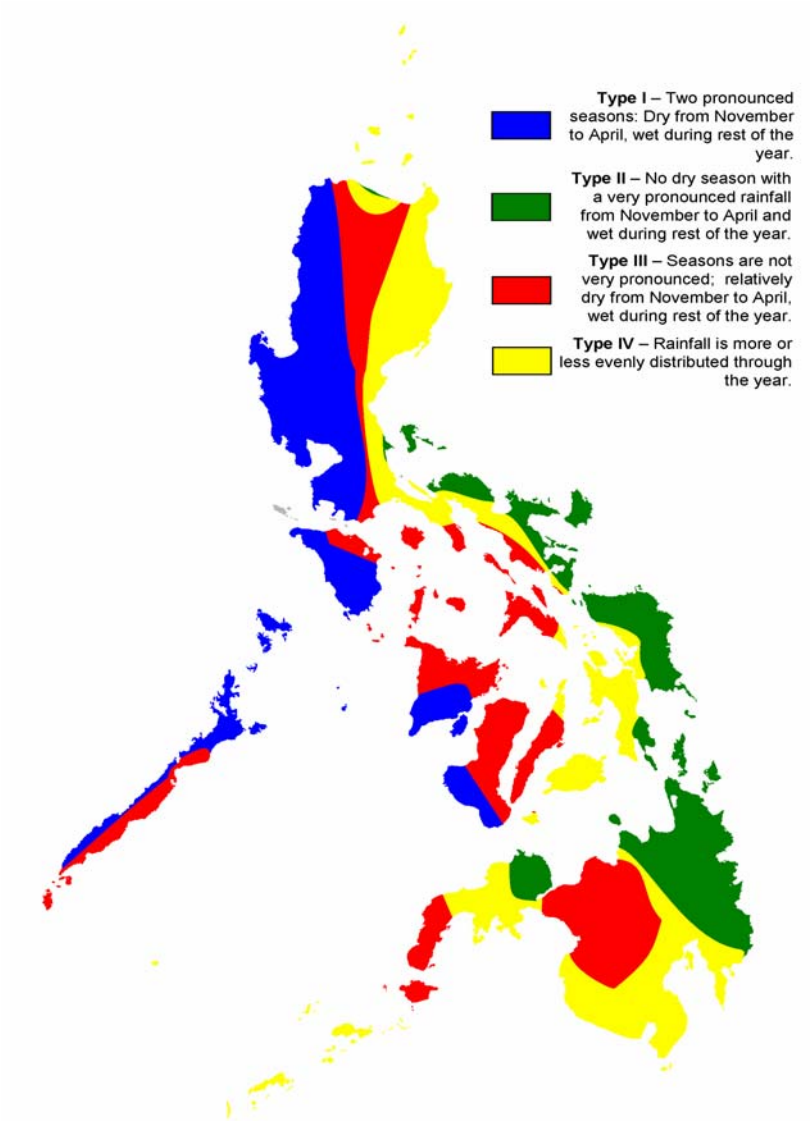
Bukidnon has a total population of 1.06 million while Misamis Oriental has a population of 0.486 million. The region is predominantly agricultural with booming industries in Cagayan de Oro City and an electrical facility in Iligan city. The biggest area is Bukidnon followed by Misamis Oriental (Table 3.1).

Table 3.1 Area and population of Northern Mindanao provinces

Province	Population	Area (km^2)
Bukidnon	1,190,284	10,498.6
Camiguin	81,293	238.0
Lanao del Norte	538,283	4,159.9
Misamis Occidental	531,680	2,055.2
Misamis Oriental	748,885	3,544.3

Source: Philippines Atlas

The climate in the region is classified as Type II and Type III which is characterized by having longer rainy periods (Figure 3.2). It has predominantly cool climate due to the region's natural endowment of forests and luxuriant vegetation.



Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration.
Note: Type II (green) for eastern provinces and Type III (red) for central and western provinces

Figure 3.2 Climatic Map of the Philippines.

(1) Province of Misamis Oriental

The province is located in the northern part of the region and is bounded in the north by the Mindanao Sea(Figure 3.3). Cagayan de Oro City is the Capital city and is about 475 miles south of Manila. The province is mountainous with rugged surface. The hills are planted to coconut and bananas while the lowland areas are planted to corn, bananas, vegetables, and fruit trees, among others. Agriculture is the most important industry in the province.

Misamis Oriental is further subdivided into four (4) Economic Growth areas for faster development. These are the following:

a. Gingoog Bay Development Area (GBDA) covering the municipalities of Balingoan to Magsaysay including Ginoog City whose focus is more on fishery development;

b. MISORET covers the municipalities of Balingasag, Lagonglong, Salay, Binuangan,

c. Sugbongcogon, and Kinuguitan whose center of attention is on agri-fishery development and eco-tourism;

d. CLAJAVITA, comprises the municipalities of Claveria, Jasaan, Villanueva and Tagoloan whose focus is on agri-industrial development;

The following two growth areas concentrate on agri-industrial development.

– CIC 1 covers Opol to Gitagum; and

– CIC 2 from the municipality of Libertad to Lugait.

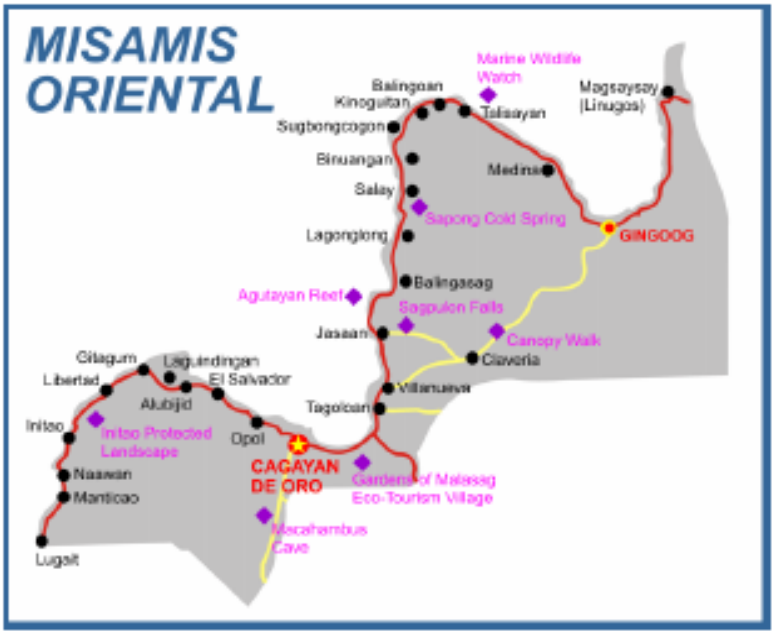


Figure 3.3 Map of Misamis Oriental

(a) Climate

The province has two types of climate based on rainfall distribution. Type II is characterized by "a very pronounced rainfall from October to January and no dry season. This type of climate occurs in

Gingoog City towards the boundary of Agusan del Norte and Camiguin. In this type, rainfall is more or less evenly distributed throughout the year. Type III has no very pronounced maximum rain period with a short dry season lasting for one to three months. This climatic type occurs in the western and central parts of the province including the district of Claveria. The dry months commences in February and end in April. The wet season occurs between May to January. Type II has more rainfall than Type III. The mean annual rainfall in Type II is 2461 mm with an average of 169 rainy days. In Type III, the mean rainfall is 1603 mm with 128 rainy days. Normal temperature is 26.8^{o}C while the min temp is 20^{o}C with max of 33.4^{o}C.

(b) Terrain

The municipalities located westward to Gingoog City along the coast are the most agricultural areas. In the areas, rice, vegetables, and sporadically fruit trees are planted from lowlands up to the lower slopes of the rolling to hilly farms, and coconuts are planned on hill sides and hilltops. The terrain in the uplands is rugged. That makes it difficult to cultivate annual crops like corn or sunflower in the areas. Misamis oriental is predominantly planted with rice and corn including coconut, banana, cassava and vegetables. The total area planted with rice in 2007 was 6,440 ha with an average yield of 4.02 t/ha. During the same year, the total area planted with corn was 54,409 ha with an average yield of 1.5t/ha. Backyard cultivation is practiced to a limited extent in small household farms but such may not be practicable for crops like sunflowers which require intensive cultivation.

To the south on the way to Claveria passing through a section of the municipality of Jasaan and the entire town of Villanueva, the terrain becomes more pronounced and predominantly flat. The land is being planted with corn (Figures 3.4 and 3.5), corn and banana (Figure 3.6) and cassava (Figure 3.7).

Figure 3.4 Newly cultivated area in Claveria

Figure 3.5 Existing corn area in Claveria

Figure 3.6 Slightly rolling area cultivated for corn and banana in Claveria

Figure 3.7 Cassava farm in Claveria

According to the Municipal Agricultural Officer, a total of 8,500 ha are devoted to corn and a total of 1000 ha to cassava.

The town of Claveria has an elevation of about 400-600 meters above sea level which is highly conducive to the requirements of sunflower. The mid elevation areas of the borders of Villanueva and the town of Claveria including its terrain, and proximity to and industrial economic zone and ports

make the area highly conducive to sunflower.

(c) Soil of Claveria

Based on climate, accessibility and terrain, there is no doubt that Claveria including a portion of Villanueva is best for sunflower. Its soil ranges from Jasaan clay to undifferentiated mountain soils as seen in Figure 3.8.

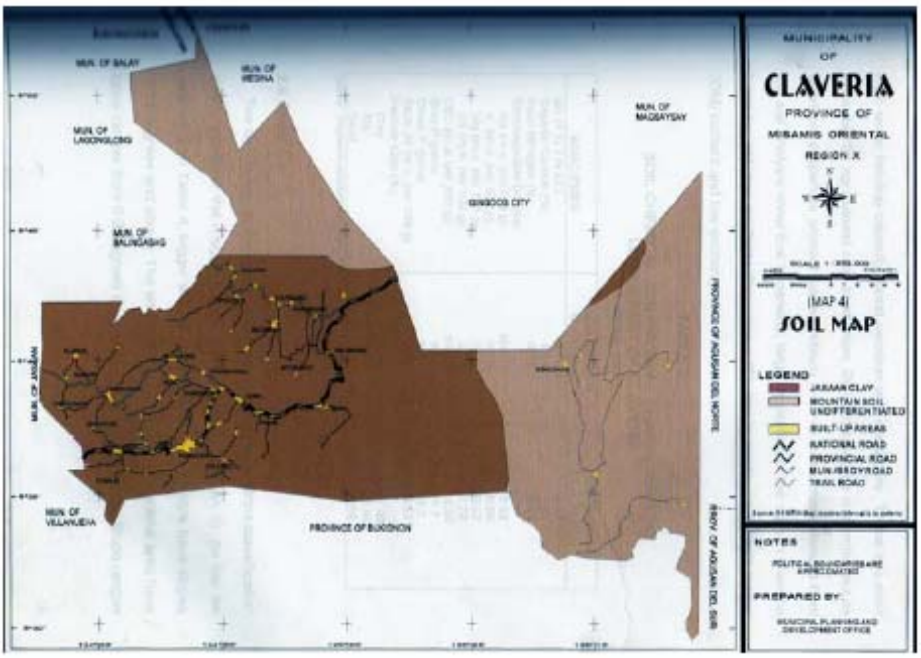


Figure3.8 Soil Map of Misamis Oriental

This soil type covers an area of 35,000 ha particularly from the municipalities of Jasaan, Villanueva and Claveria. Relief is flat upland. Its characteristics are presented in Table 3.2.

The soil can be easily tilled and farmed. In rolling areas however, it is better to practice conservation farming.

Table 3.2 Characteristics of Jasaan Clay

Depth (cm)	Characteristics
0-35	Surface soil, moderately compact clay loam to clay, brown to light brown, slightly friable and soft when moist, sticky, sticky and plastic when wet but hard when dry. Has a fair amount of organic matter and affords deep root penetration. It has a columnar structure. The boundary to the subsoil is clear and smooth.
35-50	Upper subsoil is clay, light brown to reddish brown, moderately compact and columnar structure. Roots penetrate down to this horizon. No gravel or stone in this horizon.
50-100	Lower sub-soil, same as above except for the presence of gravel or stones in this horizon. Boundary to the sub-stratum is diffused.
100-150	Sub-stratum, clay loam, light brown, loose and very friable. The horizon has a thickness of 1 meter or more.

Source: Lopez, 1954 Soil Classification and Erosion Survey of Misamis Oriental Province, Philippines

(2) Province of Bukidnon

(a) Location

The province is the largest in terms of area and population among the 5 provinces in Northern Mindanao. It is a landlocked plateau and is bounded on the north by Misamis Oriental and Cagayan de Oro City It is about 850 kilometers by air from Manila and 91 kilometers by road from Cagayan de Oro City. (Figure 3.9)

Figure 3.9 Map of Bukidnon

(b) Area

The province's total land area is 829,378 hectares, 38% is alienable and disposable and the rest is classified as timberland.

(c) Topography

Bukidnon is a vast plain land in the plateau of Northern Mindanao with mountainous areas in its southern and eastern boundaries. The province's average elevation is 915 meters above sea level with a peak at 2,938 meters in Mt. Kitanglad, an extinct volcano. In the southern portion is Mt. Kalatungan and Mt. Tangkulan, with an elevation of 2,287 meters and 1,678 meters, respectively. The Bukidnon plateau is mainly of volcanic zone. The volcanic terraces and volcanic foot slopes that are ≥500 meters above sea level are estimated to be about 221, 600 hectares.

(d) Climate

The province has two types of climate. The northern part has Type III, that is, there is no pronounced rain period but relatively dry during the months of November to May. In the southern portion of the province, the climate is classified as Type IV with no dry season. The driest area is Baungon, while

the wettest is the Calabugao plain. The climate is relatively cool and humid throughout the year. Average annual rainfall is 2,800 mm. Rainfall is more pronounced from June to October compared to other months of the year. February to April are the drier months. Temperature varies with elevation. In areas lower than 500 meters above sea level, temperature ranges between 20°C to 34°C while above 500m, temperatures would range from 18°C to 28°C. Relative humidity also varies with elevation. Those above 500 meters, relative humidity is about 80%; while in areas below 500 meters, the RH is 65-70%. The Malaybalay-Impasugong area and those around the volcanic cones approximate semi-temperate conditions.

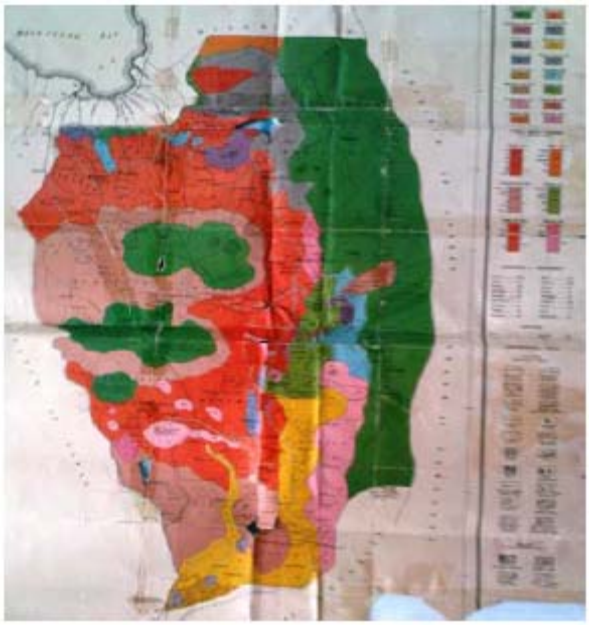
Based on climate, the province is divided into three agro-ecological zones. The first covers the mountainous eastern side (Central Cordillera) which is generally wet, with rainfall of about 2,340 mm to 4,000 mm per annum. The second covers the high altitude volcanic plains, the Malaybalay-Impasugong area and the foot slopes of Mt. Kitanglad and Mt. Kalatungan where annual rainfall is in the range of 2,490 mm to 3,680 mm. The third covers the south-central and the north-western parts of the province, with elevations of less than 500 meters, relatively dry with mean annual rainfall in the range of 1,700 mm to 2,600 mm.

(e) Accessibility

The northern part, particularly along the initial access to the Bugo-Malaybalay road to Manolo Fortich, is highly accessible. However, the town is predominantly planted with pineapple except on certain sections which were developed for corn and cassava. It is about one hour away from Cagayan de Oro City. Sunflower can be grown best in Type III although Type II of climate also meets the climatic requirements of the crop. Based on climate, the plains of Manolo Fortich, Impasugong, Sumilao and northern Malaybalay can be best grown to sunflower. These areas are planted with sugarcane, corn and cassava and have been intensively cultivated. They have good soil texture, terrain and drainage highly suitable for the exacting requirement of sunflower.

(f) Soils of Manolo Fortich, Sumilao and Impasugong Municipalities

The soil types in Bukidnon are generally of medium fertility. The soil is acidic. The more eroded areas have a combination of low pH and low organic matter. It has deficient levels of phosphorus. However, the Adtuyon clay which is the predominant soil type in the three municipalities is highly suitable for agriculture. This is indicated by the superior performance of pineapple, sugarcane, banana and cassava in these places (Figure 3.10). The red color in the map shows the areas having predominantly an Adtuyon clay soil.



Source: Agricultural System, College of Agriculture, UP Los Baños

Figure 3.10 Soil Map of Bukidnon

3.1.2 Recommended Site for Sunflower Production Area

Both northern Bukidnon (Manolo Fortich up to Sumilao), and Villanueva and Claveria in Misamis Oriental, are highly suitable to sunflower production based on soils and climate. These areas have vast plain lands, and fertile soils that can be intensively and extensively cultivated for annual crop like sunflower. The temperature and rainfall requirements of sunflower can be met in these places.

In terms of access to ports and industrial area, it is better to concentrate the core plantation in Claveria and Villanueva in Misamis Oriental. Both places can be reached in about 30 to 45 minutes by land and are closer to international ports of Cagayan de Oro and PHIVIDEC, a special industrial zone which is located nearby. The Manolo Fortich area up to Sumilao can supplement the requirements of the mill if and when sunflower project will be pursued.

3.1.3 Characterization of Potential Sunflower Production Sites in CLAJAVITA

Claveria-Jasaan-Villanueva-Tagoloan (CLAJAVITA) Corridor of Misamis Oriental is the most promising site for sunflower production and processing. These four (4) towns belong to District II of Misamis Oriental.

The town of Claveria was identified as the best choice among the various municipalities for large scale sunflower production area. The adjacent towns of Jasaan and Villanueva are expected to contribute to a small percentage of total production since they are small municipalities with little areas left for sunflower production. The town of Tagoloan is most suited for the location for the bio-diesel plant due to the presence of PHIVIDEC, an industrial estate with existing international port facility. Claveria is the largest municipality of Misamis Oriental in terms of land area, occupying about 25.07% of the

357,010 hectares land area of the province (Table 3.3).

Table 3.3 Total land area, Agricultural Area and SAFDZ Area by Municipality, 2001

Municipality / City	Total No. of Brgys.	Total Land Area (has.)	Total Agricultural Area (has.)	SAFDZ[1] Areas (has.)	Distance from CDO (km.)
District I					
Maqsaysay	25	10,800	7,989	2,890	151.90
Gingooq	79	40,461	33,670	30,697.10	121.00
Medina	19	12,610	5,911	4,861.50	105.70
Talisayan	18	13,780	10,143	4,660	87.24
Balingoan	9	5,780	4,360	3,328	82.94
Kinoguitan	15	2,200	3,018	1,125	75.34
Sugbongcogon	10	2,310	1,991	1,898	71.74
Binuangan	8	3,000	1,318	1,573.2	66.94
Salay	18	6,480	6,328	6,329.10	60.34
Lagonglong	10	5,600	5,527	5,102	56.04
Balingasag	30	12,370	12,158	12,168	49.44
District II					
Claveria	24	89,490	20,529	9,178	40.26
Jasaan	15	8,720	6,705	6,714.25	31.24
Villanueva	9	4,880	2,867	679	23.14
Tagoloan	10	8,720	6,051	1,500	17.14
Opol	14	15,800	13,628	1,394.05	10.11
El Salvador	15	13,670	5,099	1,210	18.31
Alubijid	16	6,300	6,191	1,667.50	25.11
Laguindingan	11	3,940	3,184	540	28.71
Gitagum	11	3,750	3,523	3,679.97	33.71
Libertad	9	3,750	2,153	2,361.35	41.01
Initao	16	11,650	7,398	9,330.37	51.11
Naawan	10	8,850	4,835	817	59.91
Manticao	13	11,260	5,800	1,669	64.01
Lugait	8	2,250	1,679	918	72.81
District 3					
CDO	80	41280	13,596	6,630	
Total	**502**	**357,010**	**195,651**	**122,920.39**	

Source: Provincial Agricultural Profile of Misamis Oriental, 2008.

The following are the criteria used in recommending Claveria as the production site for sunflower:

(1) Land Availability

As of 2008, Claveria has a total of 16,543 hectares of agricultural crop land. Corn is the major crop of Claveria with an area of about 8,460 has or 51% of the crop area. This is followed by tomato with an area of 1,837 has (or 11%), then cassava with an area of 954 (or 6%). Corn is being crop-rotated with cassava. This means an available total area of 9,414 hectares available for one season cropping for sunflower.

Approximately 6,000 hectares (located in mainland Claveria) have been declared by the municipality as new agribusiness area in compliance with Goal 1 of the Department of Agriculture in its Medium-Term Development Plan (MTDP). However, around 2,000 hectares of the new agribusiness areas have already been planted with pineapple. Hence, a total of 13,414 hectares would be available for sunflower production. Another potential area of 4,668 hectares is available at Tabok Claveria (across Kabulig River) consisting of six (6) municipalities, namely: Aposkahoy (1,794.82 has); Pambugas (27

has); Pelaez (227.8 has); Tipolohon (726.8 has); Malagana (1,118.02 has); and Bulahan (974 has). According to the Municipal Agriculturist, of the total crop land, around 80% (11,200-12,000 hectares) are being planted with corn during wet season and 20% (2,800-3,000 hectares) are being planted with vegetables and tomato during dry season. The Municipal Agriculturist also mentioned about another 3,000 hectares in the Barangay of Minalwang that can be opened for sunflower production.

(2) Potential Area for Sunflower

(a) Claveria

A potential area of around 11,125 hectares (Table 3.4) can be availed of by the project in Claveria every cropping season on crop rotation basis. This means that the project can also access the other 11,125 hectares previously planted with corn, tomato and cassava for the second cropping. This augurs well as a crop diversification strategy and good soil management practice.

Table 3.4 Potential Area Available for Sunflower Production in the Mun. of Claveria

Farming System	Total Area Available*	½ of Total Area for Crop Rotation
For Crop Rotation:		
Corn Area	= 8,460 hectares	4,320 hectares
Tomato Area	= 1,837 hectares	918 hectares
Cassava Area	= 954 hectares	477 hectares
	Sub-Total	**5,625 hectares**
Add:		
New Agribusiness Area	= 4,000 hectares**	2,000 hectares
Tabok Claveria	= 4,668 hectares	2,000 hectares
Minalwang	= 3,000 hectares	1,500 hectares
	Total	**11,125 hectares**

** Source: Comprehensive Land Use Plan of Claveria, 2001-2006*

*** of the total area of 6,000 hectares identified as new agribusiness area, about 2,000 hectares have recently been planted to pineapple, hence 4,000 hectares is currently available.*

(b) Misamis Oriental Province

The potential additional area for sunflower in the whole province of Misamis Oriental is estimated to be around 20,286 hectares (Table 3.5). This is if only one-half of the total area (43,241 hectares) for corn, rootcrops and vegetables will be crop-rotated with sunflower. In Claveria, corn is grown during the start of the rainy season commencing in May up to August and resumes in October up to January. Corn may be intercropped with banana in strip cropping system, relayed with cassava, raised under coconut, between young mango trees, after vegetables in sequential cropping or raised as monocrop.

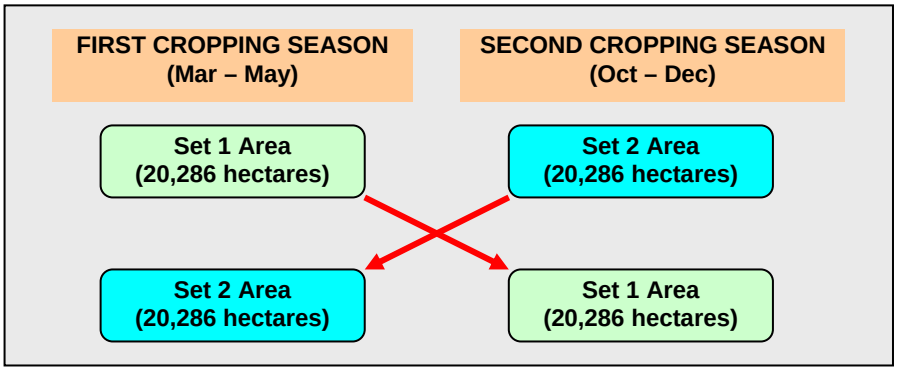


Figure 3.11 A Typical Cropping Calendar for Corn in Misamis Oriental

Since the production of sunflowers will be rotated with corn, rootcrops and vegetables, a total of 40,572 hectares can be harvested on a yearly basis in the whole province of Misamis Oriental, at 20,286 hectares per cropping season.

Table 3.5 Total Area Available for Sunflower Production in Misamis Oriental

Farming System	Total Area Available	½ of Total Area for Crop Rotation
Total Area from Claveria	24,919 hectares	11,125 hectares
Add: Area from Other Towns of Misamis Oriental:		
Corn	12,671 hectares	6,335 hectares
Rootcrops	4,494 hectares	2,247 hectares
Vegetables	1,157 hectares	579 hectares
Sub-Total)	**18,322 hectares**	**9,161 hectares**
Total Area Available	**43,241 hectares**	**20,286 hectares**

Source: Provincial Agricultural Profile of Misamis Oriental

(3) Agro-Climatic Suitability

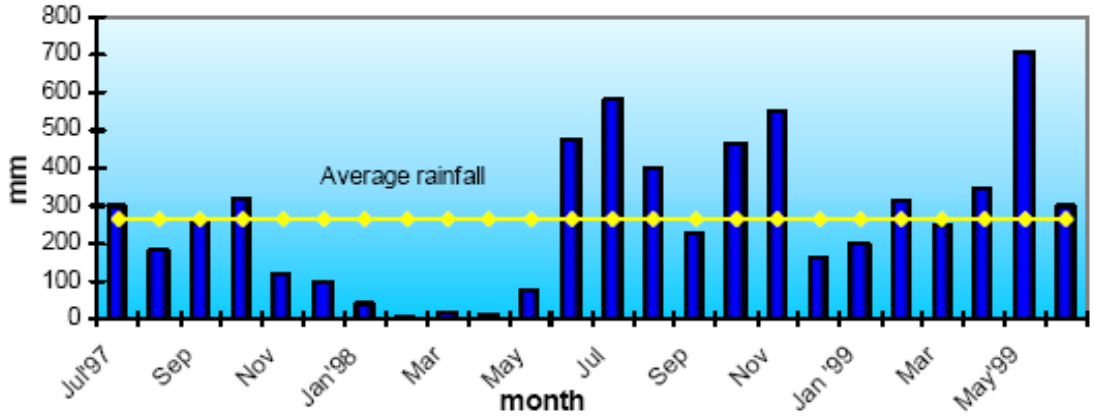
Being located in Mindanao, the CLAJAVITA is a typhoon-free area. The 16,543 hectares of crop land fall under the 18% and below slope. Discussed below are the agro-climatic characteristics of the site:

(a) Rainfall Pattern

Claveria's rainfall pattern has been consistent for the past years having adequate and seemingly equal distribution throughout the year, which in turn favors higher crop productivity (Figure 3.12). Irregularities in climatic condition will most likely happen during occurrences of the "El Niño" and

"La Niña" phenomena.

In late 1997 and early 1998 the "El Niño" phenomenon hit the municipality. This phenomenon started affecting the municipality on November 1997 and lasted in May 1998 and this is shown in Figure 8 below. The height of the phenomenon occurred from February to April 1998. The lowest recorded rainfall ranged from 8.25 to 20.15 mm and with 1 to 4 rainy days, which is far behind the computed average from July 1997 to June 1999. The average rainfall is 267.33 and the average rainy days are eighteen (18).

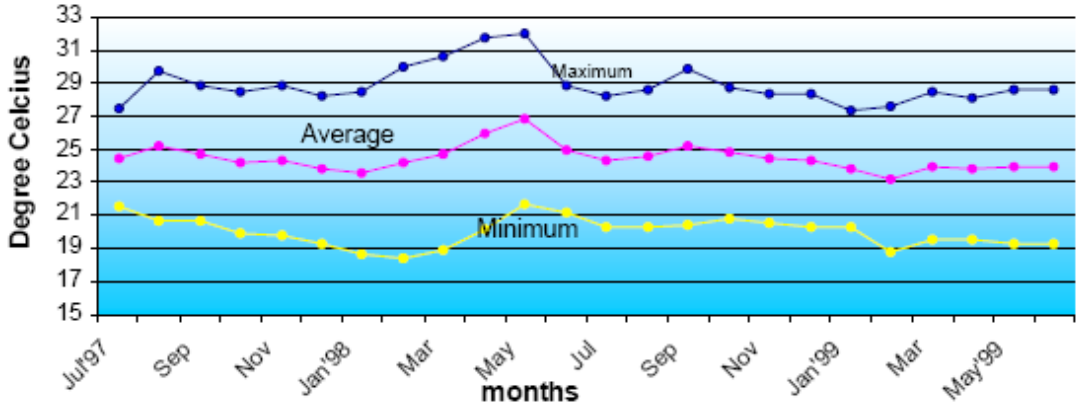


Source: Comprehensive Land Use Plan of Claveria, Misamis Oriental,. 2001-2006.

Figure 3.12 Rainfall Pattern in Claveria, Misamis Oriental

(b) Temperature Pattern

The prevailing average temperature from July 1997 to June 1999 is 24.27ºC (Figure 3.13). Usually cooler temperatures occur in the barangays situated at the eastern part of Claveria where elevation is much higher. This is more pronounced during the months of December to February, while relatively higher temperatures are experienced during the month of March to May.

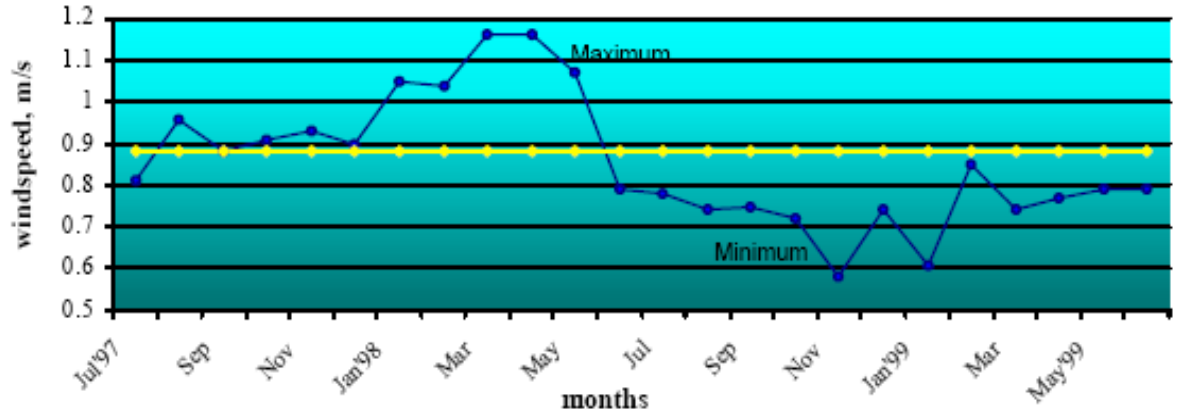


Source: Comprehensive Land Use Plan of Claveria, Misamis Oriental,. 2001-2006.

Figure 3.13 Temperature Pattern in Claveria

(c) Wind Speed

The average wind velocity that blows in Claveria from July 1997 to June 1999 is 0.88 meter per second (Figure 3.14). The Agromet recorded above-average wind velocity from August 1997 to May 1998.



Source: Comprehensive Land Use Plan of Claveria, Misamis Oriental,. 2001-2006.

Figure 3.14 Wind Speed in Claveria

(d) Soil Types and Fertility

The soil composition of barangays located in the lower elevations is generally classified as Jasaan clay (Figure 3.8), which is a generally acidic soil type with pH levels reaching 3.9 to 5.2. Soils in the higher elevation areas have similar soil pH levels, but are considered moderately fertile soils. Generally, the soils in Claveria are well drained with moderate depth and wide range of texture. These soils provide excellent anchorage for most types of vegetation. These contain fairly good amount of organic matter which supply ample natural vegetative nourishment for cropping.

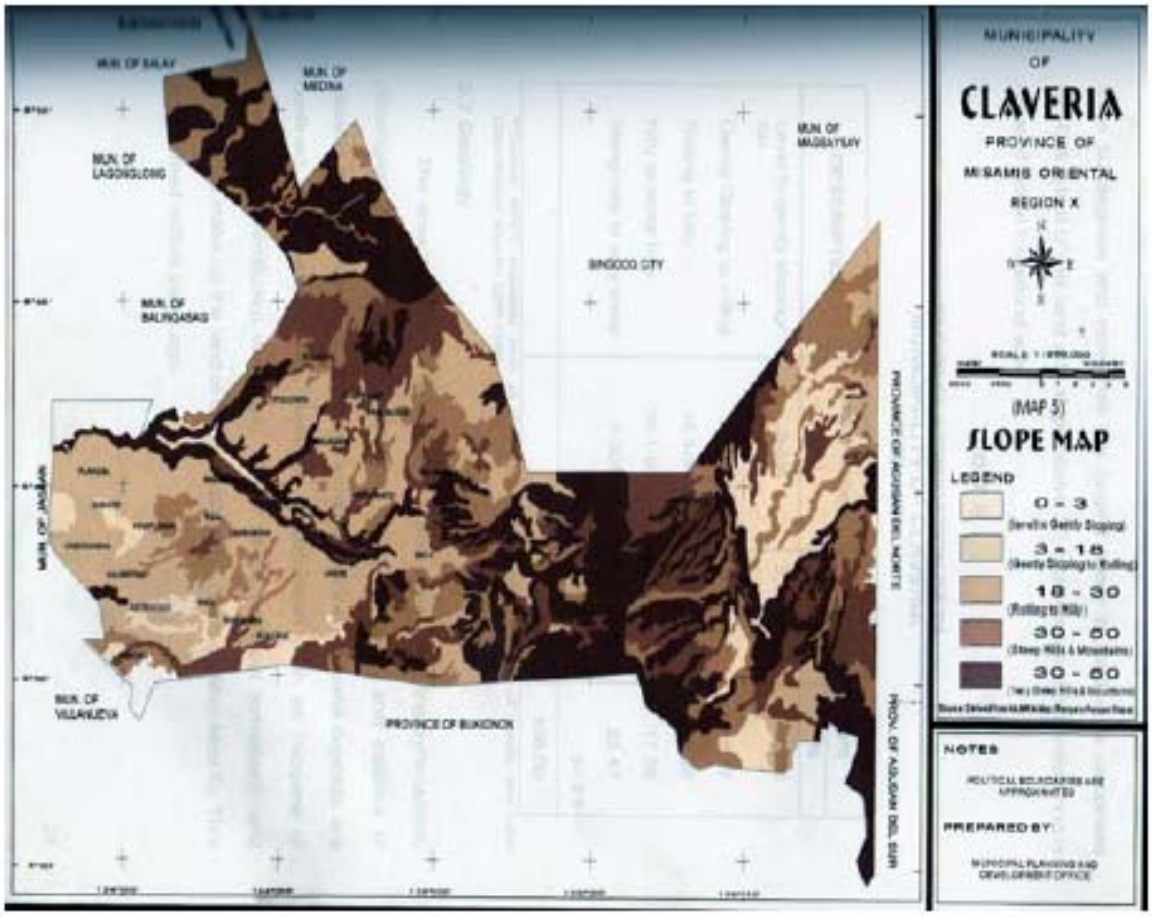
(e) Slope

The distribution of Claveria's land area according to its slope classification clearly indicates the rugged terrain of the municipality (Figure 3.15). As can be gleaned from Table 3.6, bigger shares of the total area or 67.95% have slopes of 18 degrees and above. The smallest share or 3.28% of the total area have slope ranges from 0-3 degrees or level to gently sloping lands. Areas with slope ranges from 18.1 to 50 degrees comprise 18.39% of the total land area. Slope that ranges from 50 degrees and more has the largest share of land area. Most of these lands with slope above 50 degrees are still forested and is located within forestland area.

Table 3.6 Slope Classification Data, Claveria, Misamis Oriental

Description	Slope Range (%)	Area in Hecatare	
		1998	Percentage
Level to gently sloping/ flat	0-3%	2,721.69	3.28
Gently Sloping to rolling	3.1-18%	23,879.67	28.77
Rolling to hilly	18.1-30%	15,266.18	18.39
Hilly to steep hilly	30.1-50%	14,177.51	17.08
Steep hilly to very steep	> 50%	26,952.93	32.47
	> 18 %	*56,396.62*	*67.95*
Total		**82,997.97**	**100.00**

Source: Comprehensive Land Use Plan of Claveria, Misamis Oriental,. 2001-2006.



Source: Comprehensive Land Use Plan of Claveria, Misamis Oriental,. 2001-2006.

Figure 3.15 Slope Map of Claveria

(4) Presence of Physical Infrastructures

Claveria town proper is connected to Cagayan de Oro City by excellent concrete/asphalted roads. Most barangays have supplies of electricity. Cellsites of major mobile phone providers reach most of the barangays. There are sand and gravel road in most barangays

(5) Access to Industrial Estate and International Port Facility

The Municipality of Claveria is just 23 kilometers to the coastal town of Tagoloan where the PHIVIDEC is located. It is an industrial estate with ample land area for would-be locators (e.g.

biodiesel processing) with excellent international port.

(6) LGU Support

New investments in agribusiness projects are most needed and very timely in Claveria. The municipal mayor had expressed his initial approval for the sunflower production project during the December 4 courtesy call and meeting with some of his town officials. The mayor also wished that the processing plant will also be located in Claveria.

(7) Socio-Economic

Farm Production and Marketing: Claveria is basically an agricultural economy with majority of its populace depending on agriculture for livelihood. The average landholding is 2 hectares per family. Farm productivity is relatively low. For example, corn (major crop) yield is only 2.22 tons/hectare (white corn) and 2.71 tons/hectares (yellow corn). Cassava, another major crop has an average yield of 16.78 tons/hectare. Rice has a dismal average yield of 693 kgs/ hectare (irrigated). Lack of capital to buy quality seeds, fertilizers and pesticides are just some of the problems in farming. However, tomato yield is high at 24 tons per hectare, higher than the national average of 10 tons/hectare. Labor cost is low at P120 per day. Land preparation is P250/day using man-animal combination while using tractors will cost P2,500/day. Disc plowing is relatively expensive at P5,000/ hectare. Cost of fertilizers bought from agricultural supply stores in Claveria have gone down significantly with the lowering of world oil prices. The cost of Triple 14 is P1,800/ bag (P1,000 to P1,200 in CDO) while a bag of urea costs P1,500 (P1,500 in CDO). The transport cost of one bag of fertilizer from Cagayan de Oro City to Claveria is P50. Farmers depend on local institutional buyers for their major crops. San Miguel Corporation buys the cassava and yellow corn of farmers. Tomatoes are being marketed to Manila. Pineapple production is being undertaken by Dole Philippines by leasing the land of farmers at P5,000/hectare per year with advance payment equivalent to 10 years of lease. Farmers find this arrangement very attractive that is why 2,000 hectares was already rented by Dole in so short a period.

Available and Trainable Manpower: The interview with the Municipal Agriculturist revealed that the farmers of Claveria are receptive to new crops and would like to learn the technology in growing them. They would even be more receptive if this new crop will give them more income that their existing crop.

Favorable Peace and Order Situation: The town of Claveria boasts for its favorable peace and order situation. For many years, there has been no incidence of insurgency-related problems in the municipality. The presence of big companies like San Miguel Corporation and Dole indicates a positive investment climate. Other local companies like Asian Livestock (swine) and Clavano Farms (poultry) also operate in the area.

(8) Ecology of Sunflower

The plant thrives best in areas with flat to slightly rolling topography similar to the requirements of corn. Having deep root system, sunflower is best grown in soils that are deep with 3.5% organic matter, well-drained, pH 6 to 7.5, and with high water holding capacity. Sunflower does not thrive in waterlogged soils nor in saline soils. It performs better in sandy to clay loam soil. Sunflower is a tropical plant. It is day neutral and will flower as soon as it reaches maturity. Its temperature requirement is in the range of 17 to 30^{o}C. Below 17^{o}C, pollination and fertilization are reduced and flowering and fruit maturity are affected. Best temperature for highest performance is 27-28^{o}C. At lowering, best temperature ranges from 18-20^{o}C. The crop is relatively drought tolerant requiring 600 to 1000 mm of rainfall per year. Highest yield can be obtained below 700 meters above sea level. An open area with plenty of sunshine is preferred.

3.1.4 Biodiesel Plant Site Selection

Based on the above discussions on the selection of suitable locations for sunflower production, Northern Mindanao, particularly Region 10 is the recommended potential area. Considering candidate potential areas in Region 10 with available petroleum depot for biodiesel blending as per required by law and international port for exportation of the oil and biodiesel, the municipality of Claveria and adjacent localities would be the most logical sunflower production site location. PHIVIDEC Industrial Estate (Figure 3.16), a potential plant site, is a 3,000 hectare industrial park located within the pre-selected area.

Figure 3.16 PHIVIDEC Industrial Estate

The site is outside the typhoon paths and earthquake faults with generally flat lands and strategic 1,000 hectares river network available for industries. PHIVIDEC Industrial Estate hosts an international port, the Mindanao Container Terminal. It is located in the towns of Togoloan and Villanueva in Misamis Oriental, about 23 kilometers northwest Claveria and 15 kilometers east of Cagayan de Oro City.

PHIVIDEC Industrial Estate (Figure 3.17) is managed by PHIVIDEC INDUSTRIAL AUTHORITY, a government-owned and controlled corporation. The area is also home to several depots of big petroleum companies.

Figure 3.17 Pre-selected Plant Site Location

PHIVIDEC Industrial Authority is mandated to be a catalyst to the economic and industrial developments of Mindanao through efficient and professional administration of the industrial park, international port and utilities. It is envisioned to be a progressive industrial community that is socially, economically and environmentally sound contributing to the growth and development of the country.

Mindanao Container Terminal (Figures 3.18 and 3.19) located within the estate is a major transshipment port in this part of the Philippines. It was established to improve access to international markets and enhance linkages between neighboring countries. The port will complement the Cagayan de Oro Base Port in handling increase in cargo volume at an annual rate of 8-10 percent. The Mindanao Container Port can accommodate container vessels up to 30,000 Dead Weight Tons in its 9.4 hectares interlocking block concrete container yard. The facility includes control tower with radar system, terminal operator's building, Office of the Bureau of Customs and Cost Guard, maintenance shop, power house 6-lane toll gate with 50 tons capacity weigh bridge and sewage treatment system.

Figure 3.18 Mindanao Container Port Terminal

Figure3.19 Mindanao Container Terminal Crane Facility

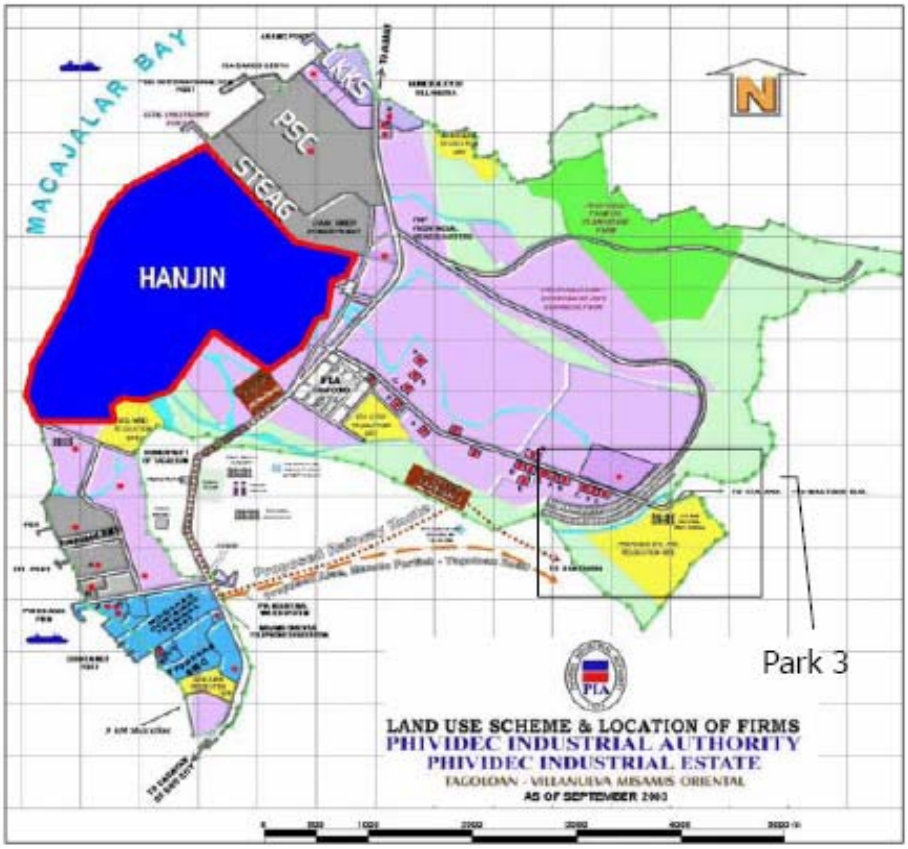


Figure 3.20 Locator Map of PHIVIDEC Industrial Estate

Availability of plant site in the estate has been confirmed to by Ms. Hyessa V. Suegay, Chief, Business Development Division of PHIVIDEC. She pointed to us specifically Park 3 (Figure 3.20) area as available area if ever the company will put up an oil extraction and biodiesel processing plant. The average rental fee ranges from PhP25.00 to PhP50.00 per square meter. A one month deposit and one month advance payment is only required. After three years, the company has an option to purchase the plant site from PHIVIDEC.

Locating within the estate, the processing plant would enjoy many benefits aside from having low land lease rates. These include reliable power and water supply which is vital to biodiesel processing. The estate hosts a 200-megawatt power plant that assures continuous and affordable electricity. Power rates are as low as PhP 6.027 per Kwh for 34.5KV bundled rate while industrial and domestic water is only PhP 12.08 per cubic meter.

If eligible for PEZA-registration (Philippine Economic Zone Authority), the company could avail of PEZA privileges such as exemption from customs duties and taxes if 70% of the production is exported. Similarly, if eligible for BOI- registration (Board of Investments), the company could avail of BOI privileges such as tax holidays of up to five years. Under the EO 226 - Omnibus Investments Code, there will be an Income Tax Holiday for a BOI-registered biofuels project. This entitles exemption of 35% income tax for 6 yrs if it is a “pioneer” firm and 4 yrs if it is a “non-pioneer firm. If the registered firm is expanding, Income Tax Holiday will be extended for 2 to 3 years. Other possible

incentives include tax-free machine and raw material importations.

The estate is home to other numerous companies and institutions such as the Jetti Supply Distribution Inc, Axent Wood Corporation, Philippine Sinter Corporation, Tagoloan Polymedic General Hospital and Mindanao Power Plant (see Figure 3.21).

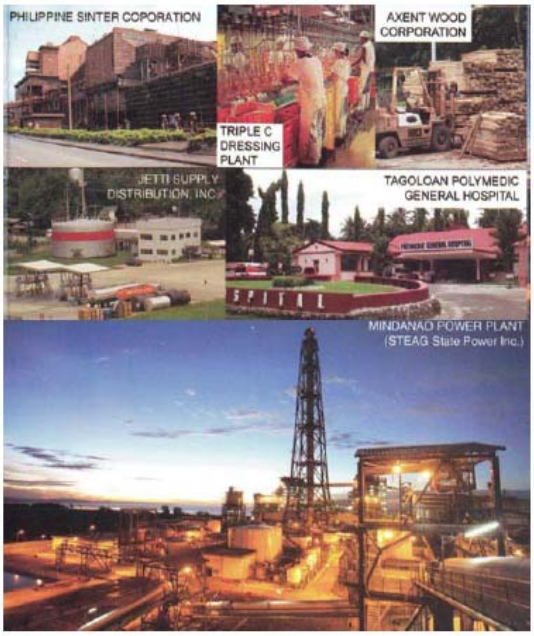


Figure 3.21 Different Industrial and Service Locators in the Estate

3.2 Business Model and Formation

3.2.1 The Core Business Enterprise

The project shall focus on the manufacture and marketing of biodiesel from sunflower seeds as its core business (Figure 3.22). Its scope of business operation also includes primary and secondary sunflower seed processing as well as production of certified seeds of sunflower. It shall establish business relations with cooperatives and individual farmers in Claveria and other nearby towns in Misamis Oriental through a contract growing/marketing arrangement to assure itself of supply of sunflower seeds for processing.

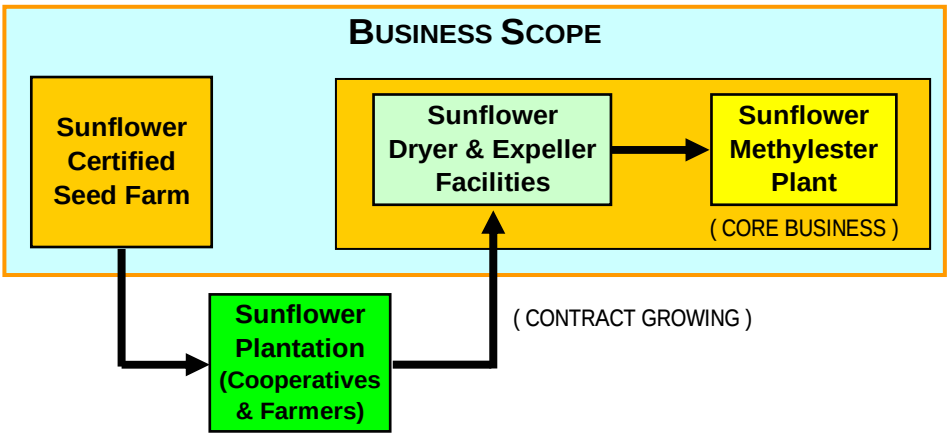


Figure 3.22 Business Model for the Project

3.2.2 Sunflower Production and Seed Supply

The source of sunflower seeds will come from the production of farmers with contract growing arrangement with the company. Majority of the supply of sunflower seeds will be grown in the Municipality of Claveria. Since the land available for sunflower production is not contiguous and expected to be widely dispersed across the different barangays and sitios of Claveria, the production areas shall be clustered with a configuration of 250 hectares per cluster. This is to match the capacity of one set of dryer and expeller facility per cluster.

The phased development of the project will require a gradual expansion in the production of feedstocks. An initial area of 1,200 hectares (approximately 4 production clusters at 250 hectares/cluster) will be used to produce the sunflower seeds and programmed to increase 3-folds each during the second and third year (Table 3.7).

Table 3.7 Sunflower Biodiesel Plant Capacity, Production Area & Yield, Seed Requirement and Seed Farm Area, By Phase of Project Development

Particulars	Capacity	Unit
Sunflower Methyl Ester Plant Capacity	30,000,000	liters/year
Operating Days Per Year	300	days
Operating Capacity Per Day	100,000	liters/day
Sunflower Crude Oil Requirement	33,333,333	liters/year
Sunflower Seed Input Requirement	88,200,000	kgs/year
Sunflower Area Requirement	38,348	hectares/year
One (1) Production Cluster of Sunflower	250	hectares
Number of Production Clusters	153	clusters
Seed Planting Requirement Per Hectare	4.23	kgs/hectare
Total Seed Requirement	162,211	kgs/year
Number of Hectares Seed Farm Requirement	71	hectares
Product Material Balances:		
Sunflower Seeds Harvest	88,200,000	kgs/year
Sunflower Crude Oil Output	33,333,333	liters/year
Wet Weight Sunflower Meal	58,212,000	kgs/year
Dry Weight Sunflower Meal	52,654,462	kgs/year
Sunflower Methylester	30,000,000	liters/year
Glycerine	3,000,000	kgs/year

Assumptions:

a. 16,000 pieces of seeds per acre
b. 5,000 pieces of seeds per lb
c. Seed germination percentage = 85%
d. Field mortality rate = 10%
d. Calculated seed requirement = 4.23 kg/ha
e. Sunflower Average Yield Per Hectare = 2.3 tons
f. No. of Hectares Per SF Production Cluster =250 has.
g. Number of cropping seasons/year (crop rotated) = 2
h. Sunflower Oil Content = 40%
i. Oil extraction Efficiency = 85%
j. Sunflower Methylester Plant Efficiency = 90%

A total of 71 hectares will be needed to serve as the seed farm to produce either certified or hybrid sunflower seeds to plant the 38,348 hectares of sunflower area. A contract growing and marketing agreement will be executed between the Project and various farmers' organizations. Based on the table survey, around 20,000 hectares of potential area is available for the project per cropping season. This means that if crop rotation will be strictly practiced, the project will be able to double its capacity to

40,000 hectares.

3.2.3 Primary and Secondary Processing

Postharvest activities consist of cleaning and drying of sunflower seeds. The secondary processing includes the extraction of sunflower oil. The equipment necessary to undertake the said primary and secondary processing activities will be provided by the Project to each production cluster. Sunflower crude oil shall be picked up from each cluster for delivery to the proposed sunflower methylester plant in PHIVIDEC.

3.2.4 Supply and Logistics Chain Framework of the Project

Figure 3.23 shows the supply and logistics chain of various inputs, intermediary products (dried seeds, crude oil), main product (SFME), and by-products (oil cake, shells). The efficiency, effectiveness and responsiveness of the supply chain will spell the success and failure of the project.

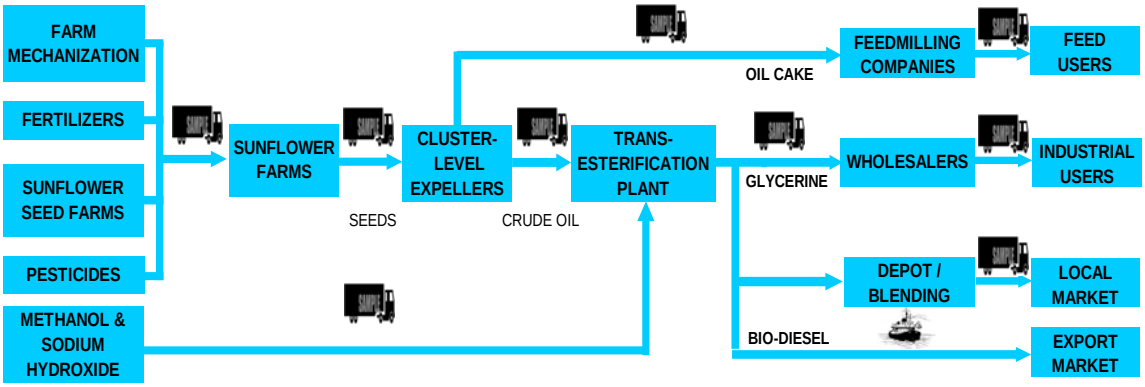


Figure 3.23 Supply chain system of the project

3.2.5 Organizational Set-up

Figure 3.24 shows the proposed organizational structure for the project. The project shall have three major departments, namely: Field Operations, Biodiesel Plant and Administration, Marketing & Finance. The Field Operations Department is task to operate two (2) divisions the sunflower certified or hybrid Sunflower Seed Farm and the Primary Processing Division. The sunflower seed farm shall also serve as the model demonstration farm showcase to the farmers the modern technologies in sunflower production. The Biodiesel Plant shall be responsible for raw materials receiving and storage, processing of biodiesel and bulk storage. The Administrative, Marketing and Finance Department shall be in charge of property and maintenance, personnel, accounting and finance, and domestic and export sales.

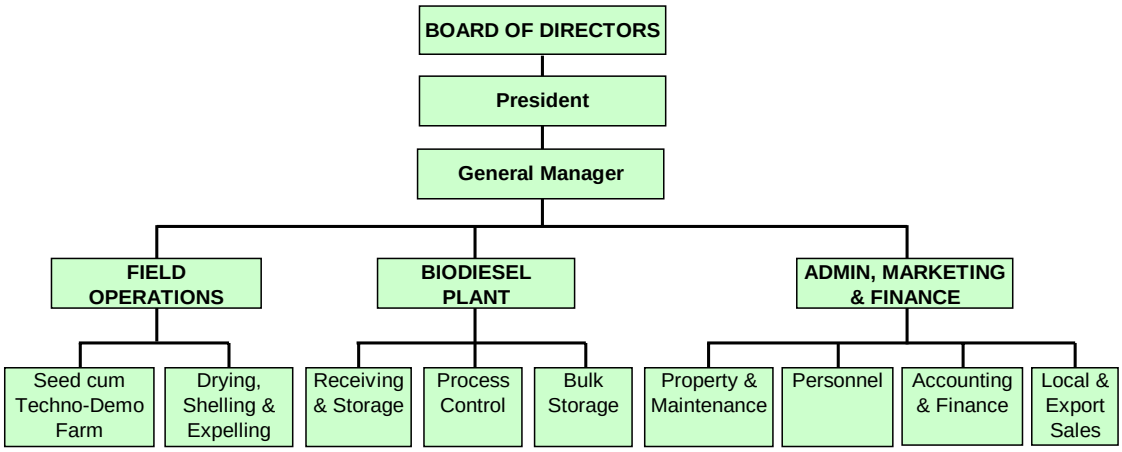


Figure 3.24 Project Organizational Structure

3.2.6 Equity Structure

The biodiesel plant which is the core business enterprise shall be 60% Japanese-owned and 40% Filipino-owned. For the primary processing, the project proponent can take in another set of local investors If possible, the Filipino equity shareholders shall come from within the province of Misamis Oriental.

3.3 Agricultural Plan

3.3.1 Goal

The goal of the proposed project is to be able to produce biodiesel using sunflower as feedstocks at the right place, at the right time, using the acceptable quality standards, and at the least possible cost.

3.3.2 Strategies

The feedstocks will be produced by contract growers around Claveria and sections of Villanueva. Initial processing such as drying, threshing and oil extraction will be conducted at the farming community. The processing plant will be established by the project firm with shareholders from local investors.

3.3.3 Key Players and Roles

The project will be implemented by Sun Care Fuels Philippines in partnership with local investors. Sun Care Fuels Philippines (SCFP) will establish the primary and secondary processing plants, the sunflower seed farm and procure feedstocks from the growers. They will be maintained by a group of technical personnel who will provide guidance to contract growers. The firm will also extend input support to contract growers and provide training programs.

The local government will be tapped to assist in training programs, and selection of farmer cooperators while local government agencies involved in agricultural development will be tapped to provide manpower training and seed production and distribution.

3.3.4 Organization

The project shall hire highly qualified and experienced project personnel. A General Manager shall be hired to assist the company's President in managing the day-to-day operational activities. Technicians will be hired to ensure the production of sunflower of desired size and yield levels. They will prepare workplans and conduct training programs for each sunflower farming communities and technicians of local government units. The LGU will be requested to provide manpower backstopping for training programs and delivering extension services to the farmers.

3.3.5 Operations

Seed production

Certified seeds of open pollinated varieties will be produced by SCFP to ensure the provision of quality sunflower seeds to the farmers. SCFP may accredit and sub-contract selected farmers as seed growers and supply the sunflower seed requirements of the project. The company in collaboration with UPLB or CLSU will conduct a training program for seed producers to ensure the production of quality seeds. In case hybrids will be used, the firm will be in charge of seed procurement and distribution in cooperation with local government units or farmer associations or cooperatives.

Field planting

It is recommended that the farm landholdings shall be clustered by multiples of 250 hectares per cluster to match the capacity of one (1) primary processing plant and ease in the provision of technical assistance. If possible, the number of farmers in each 250 hectares cluster shall be organized into a cooperative. The company will develop the farms through supervised contract ventures. An action plan will be prepared to ensure more regular production of sunflower seeds to meet the processing plant requirements. All field operations will be supervised by company technicians and in collaboration with technicians of the local government units. Harvesting will be scheduled to meet continuous operations of the plant facilities.

Research and Training and Extension

A regular training program for seed producers and for farmers will be conducted to include the production practices, post-production, processing, and propagation. This will be supplemented by a techno demo. Applied research on propagation, and production will be continuously conducted to improve the farming efficiency, productivity and product quality. A technical group from the firm will be assigned for this purpose and coordinated with existing pertinent institutions.

Harvesting and Postharvest Handling

A community of sunflower growers affiliated with their cooperative will provide the manpower needed for harvesting, drying and hauling of sunflower seeds for delivery to their assigned primary processing plant. The project may invest in drying facilities if only to ensure unhampered supply of harvested seeds especially during bad weather conditions. Farmers will be trained on proper

harvesting, drying and handling.

Linkages and partnership

Strategic alliances will be forged with partner institutions such as the DA, LGUs, DOS T, farmer organizations and academic institutions to empower the farmers to carry out various activities on production, manpower development and processing. These alliances are vital to ensure that technologies available are accessed and the project is put in the mainstream of biofuel development in the Philippines. This will also create awareness among farming communities and institutions involved in rural based technology development about the initiatives of the project.

3.4 Market Research

3.4.1 Market for Sunflower Product

Sunflower oil is the main product in the Project and can be sold both as food oil and as fuel. For fuel, there are two possible way. i.e., straight vegetable oil (SVO), and biodiesel fuel. The project will provide those products to the market according to market condition and project development stage.

At the first stage of the project, domestic bulk consumer of vegetable oil will be the main target market of sunflower oil. When the project scale is expanded, exporting sunflower oil will also be in view. After construction of Esterification plant, sunflower oil will be processed to biodiesel fuel and sold to petroleum companies with depot to blend diesel oil. Meanwhile, market for SVO would be limited at this moment since viscosity of SVO is high and it is difficult to supply conventional vehicle. At present, internal machine such as tractor would be the main consumer.

In addition to above main product, sunflower seed cake will be the major income source of the project as a material of compound feed. Glycerin, by-product of esterification process of biodiesel fuel, can also be a marketable product. Other agricultural by-product such as honey would be minor income source.

The initial step for the marketing of the Project is to make connection with possible domestic bulk consumer of sunflower oil such as tuna factory. Securing customer of feed mills as sunflower meal consumer is also necessary.

3.4.2 Food Oil

Characteristics and Uses of Sunflower Oil as Edible Oil

Oil seed varieties of sunflower to date are being used as edible oil due to its high price and limited supply. Sunflower oil is light/neutral in taste and appearance and supplies more Vitamin E than any other vegetable oil. It also has health benefits since high-oleic-acid sunflower oil favorably alters low-density lipoprotein cholesterol, triglycerides, and factor VII coagulant activity.

The global market for edible oils is increasing and changing. Some of the main reasons are: increasing global population and income; increasing trend and expenditures in Western-style food, the food

service sector due to eating out and prepared/convenience food; and rising concern and consciousness for food quality, health/wellness and food safety. Limited/shortage of international edible oil has led to historically higher prices. The recently experienced soaring of petroleum oil prices have also contributed to the increasing prices of edible oils and are likely expected to continue to go up.

World Trend in Sunflower Seeds Production

In crop year 2005-2006, the Russian Federation was the largest producer of sunflower seeds in the world, cornering 21% of the total production of 29.40 million metric tons. The followers are: Ukraine, 16%, Argentina 12%, India, China, and USA at 6% each. Argentina utilized around 2.2 million hectares for sunflower cultivation during the period while USA planted about 1.056 million hectares and China around 1.02 million hectares. The yield per hectare was: Argentina, 1.73 mt/ha; USA, 1.73mt/ha; and China, 1.89 mt/ha. The Food and Agriculture Organization (FAO) projects a 12 % growth in the global production of sunflower seeds, and 10% by USDA. Prices would however decrease by 11% from US$672/mt (2007/08) to US$596/mt (2008/09).

There is no known commercial production of sunflower in the Philippines. Production has been limited to the efforts of university research activities particularly those undertaken by the Central Luzon State University and the Mariano Marcos State University.

World Trends in Sunflower Oil Production, Imports & Exports

The annual global production of sunflower oil averaged almost 9.993 million metric tons from 2002-2007 and grows at an annual rate of 7% (Table 3.8). The apparent annual consumption averaged 9.971 million metric tons.

Table 3.8 Sunflower Oil World Supply & Disappearance

	Volume (in thousand metric tons)						Average Growth
	2002/03	2003/04	2004/05	2005/06	2006/07	Average	
Oil Opening Stocks	768	833	793	832	1,061	857	9.03%
Oil Production	8,708	9,579	9,417	10,993	11,268	9,993	6.89%
Oil Imports	2,519	2,793	2,847	4,290	4,344	3,359	16.19%
Disappearance	8,620	9,625	9,432	10,701	11,478	9,971	7.59%
Oil Exports	2,574	2,787	2,793	4,354	4,334	3,368	15.98%
Ending Stocks	800	793	832	1,061	860	869	3.16%

Source: World's Oilseeds and Products: FAPRI 2008 Agricultural Outlook.

Philippine Demand for Sunflower Seed and Oil

Philippines imported 468 tons of sunflower oil in 2002 and 160 tons of sunflower seeds (Table 3.9). Around 82% of the imported sunflower oil was destined for General Santos City while 17% went to Davao City. Tuna canners in General Santos City are known to use sunflower oil as premium oil for tuna canning, which would be a predominant bulk consumer of sunflower oil for the Project at the first stage.

Meanwhile, sunflower seeds were used in the snack food and bird seed markets.

Table 3.9 Philippine Imports of Sunflower Seeds and Oils, 2002

Port	Sunflower Oil			Sunflower Seeds		
	Volume (kgs)	Value (FOB US$)	Freight (US$)	Volume (kgs)	Value (FOB US$)	Freight (US$)
Cebu City	-	-	-	127,027	31,141	6,585
Davao City	77,910	50,809	4,675	14,010	4,903	490
General Santos City	382,154	284,239	9,286	-	-	-
Olongapo City, SBMA	8,442	17,522	876	18,630	8,281	726
Total	**468,506**	**352,570**	**14,837**	**159,667**	**44,325**	**7,801**

Source: National Statistics Office.

3.4.3 Biodiesel

Domestic Demand for Biodiesel

The total demand for diesel in the Philippines is 7,776 M Liters per year. Demand for biodiesel will increase with the signing of RA 9367, which mandates an immediate blending of a minimum of 1% biodiesel in all diesel fuels sold in the country. The 1% minimum blend will entail an estimated average demand of about 77,000.kL in 2007. The estimated biodiesel demand will be about 177,000 kL by 2009 for a 2% blend. This will increase to 482,300 kL for a 10% blend in 2011.

3.4.4 Straight Vegetable Oil (SVO)

Sun flower oil is possibly alternate fuel for diesel generator and vehicle without Esterification process, however, it needs to assess standard and regulation for the application. No data is available to indicate current use of SVO in Philippine. However, there are many independent diesel generations in islands of Philippines, which would be a large potential for consumption of SVO. For vehicle application, attachment would be needed to reduce viscosity of SVO and to prevent plugging of engine filter and leakage.

3.4.5 By-Products

Sunflower meal

Sunflower meal will be other major income source of the Project. From crop year 1997/1998 to 2007/2008, world production of sunflower meal grew at an average annual rate of 1.30%. (Table 3.10). However, prices would drop by 14% in 2009 from US$317/metric ton in 2008. Over the next five years, prices are projected to decrease by an average rate of 2.24% per year.

Table 3.10 World Production, Consumption, and Trade in Sunflower Meal

	Crop Year (in thousand metric tons)										
	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08
Production	9,836	10,571	10,609	9,351	8,326	9,043	10,217	10,018	11,430	11,751	10,743
Consumption	9,622	10,252	10,808	9,659	8,205	8,998	9,957	9,887	11,053	11,398	10,473
Ending Stocks	362	387	389	309	231	165	189	180	262	285	237
Trade*	2,095	2,491	2,317	1,990	1,813	2,007	2,475	2,261	2,817	2,930	2,653

* Excludes intraregional trade.

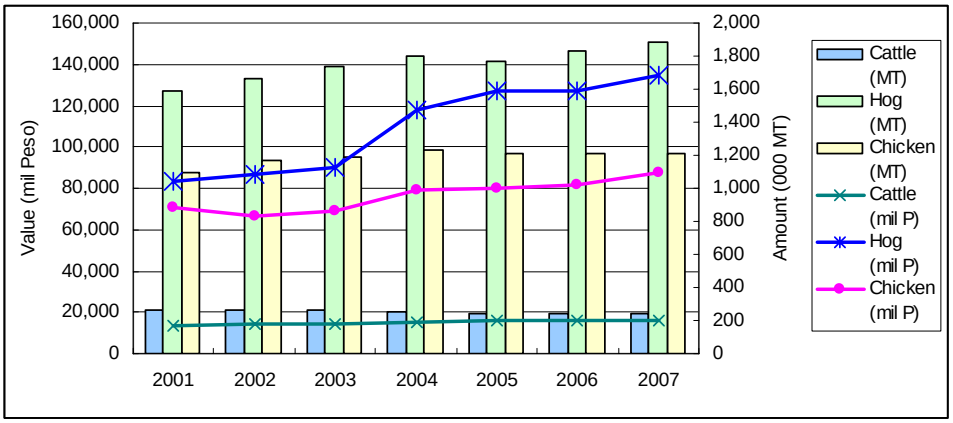
Source: World's Oilseeds and Products: FAPRI 2008 Agricultural Outlook.

Most regions in Mindanao including Region X are major producers of livestock, poultry and aquaculture products of the country. Sunflower meal can be a material of compound feed and it can substitute soya bean cake. Table below shows the import amount of soya beans cake and compound feed in Philippine, which indicates domestic market scale for sunflower meal. The total amount and value of hog and chicken production in Philippine is increasing and the market of feed for livestock and poultry is expanding.

Table 3.11 Imported Amount and Its Price of Feed in Philippine

Year	Soya Beans Cake			Compound Feed		
	MT	000 US$	US$/MT	MT	000 US$	US$/MT
2001	1,060,797	200,532	189	73,588	51,638	702
2002	1,290,514	231,911	180	80,030	59,960	749
2003	1,251,050	263,293	210	NA	NA	NA
2004	1,170,175	358,080	306	71,806	58,910	820

Source: FAO Key Statistics of Food and Agriculture External Trade: Import



Source: Bereau of Aricultural Statistics

Figure 3.25 Amount and Value of Livestock and Poultry Production in Philippine

Glycerin

Demand for glycerin as an ingredient in pharmaceuticals, personal care and other products is expected to show brisk growth out 2015, when demand around the world is expected to reach 3.39 billion pounds, according to market research firm Global Industry Analysts. However, flood of glycerine products created as a by-product of biodiesel has caused dramatic prices down as a result of market oversupply. Crude glycerin produced in biodiesel plant has high alkalinity and need refinery process.

Since the attachment of glycerin refinery to biodiesel plant is costly, it needs to assess the feasibility of glycerin product with its market price and cost for plant. If the refinery is not feasible, glycerin can be used as a fuel for boiler or fermentation material of compost for domestic use.

3.5 Collaboration with ODA Projects

In consideration of the Philippines land ownership regulation, the adoption of contract growing scheme will be crucial for the stable and sustainable sunflower seeds supply. To implement the contract-growing scheme of the Project, the following success contract growing arrangement in the oil palm industry in Mindanao is recommended as model for adoption:

1) AGUMILL (a private corporation) forged a production and marketing tie-up for 25 years with NARCICO (an Agrarian Reform Beneficiaries' cooperative) for the cultivation of oil palm.
2) Under the tie-up, AGUMILL provides direct technical assistance to NARCICO and its members.
3) A total of 89 farmers are currently benefited involving 200 hectares.
4) Under this scheme, assured better quality of oil palm is stably and increasingly supplied to AGUMILL that resulted to increase monthly farmers' income due to high yield, high quality, better pricing and assured market.

On the other hand, the success of the would have been difficult to attain without the help of the following Japanese Official Development Assistance (ODA) Projects:

1) The agrarian reform community (ARC) where NARCICO is situated, was supported by the Agrarian Infrastructure Supported Project (ARISP) Phase I under Department of Agrarian Reform (DAR), with construction of irrigation, farm-to-market road, post-harvest facility and institutional strengthening of NARCICO and irrigators' association.
2) NARCICO was also supported by the Rural Farmers and Agrarian Reform Support Credit Program (ARSCP), with provision of crop production loan by LANDBANK and organizational strengthening of NARCICO and provision of agricultural development by DAR.

In light of such circumstances, the collaboration with Japanese ODA projects is one of the most effective strategies for the attainment of stable and sustainable sunflower seeds supply under the contract-growing scheme in the Philippines. Specifically, the collaboration with ARISP Phase III (ARISP-III) of DAR and Support Program for Agri-Enterprise Development (SPAED) of LBP is recommended. The following scheme may be explored to have collaboration with the project proponent and ODA projects:

1) Adoption of the successful contract-growing model mentioned above by the project proponent and DAR ARISP-III assisted ARB cooperative federation. The project

proponent and ARB cooperative federation will enter into contract-growing and marketing arrangements.

2) DAR ARISP-III will handle the capability-building activities of the ARB cooperative federation. Being a province-based federation, at least 15 primary cooperatives will be involved. ARBs and small farmers who are members of these primary cooperatives will be the benefited in this tie-up.

3) LBP SPAED will be tapped for credit support for both the project proponent and DAR ARISP-III assisted ARB cooperative federation.

4) The tie-up will be equally beneficial for the private proponent, federation/ARBs and small farmers, DAR and LBP.

The scheme of collaboration with ODA projects is illustrated in Figure 3.26.

One of the most important objectives of DAR ARISP-III and LANDBANK SPAED is improvement of quality life of ARBs and small farmers through provision of support services for them to increase their income. This collaboration will be expected to contribute not only in increasing the income of ARBs and small farmers but also in the enhancement of Project's effectiveness of both ARISP-III and SPAED.

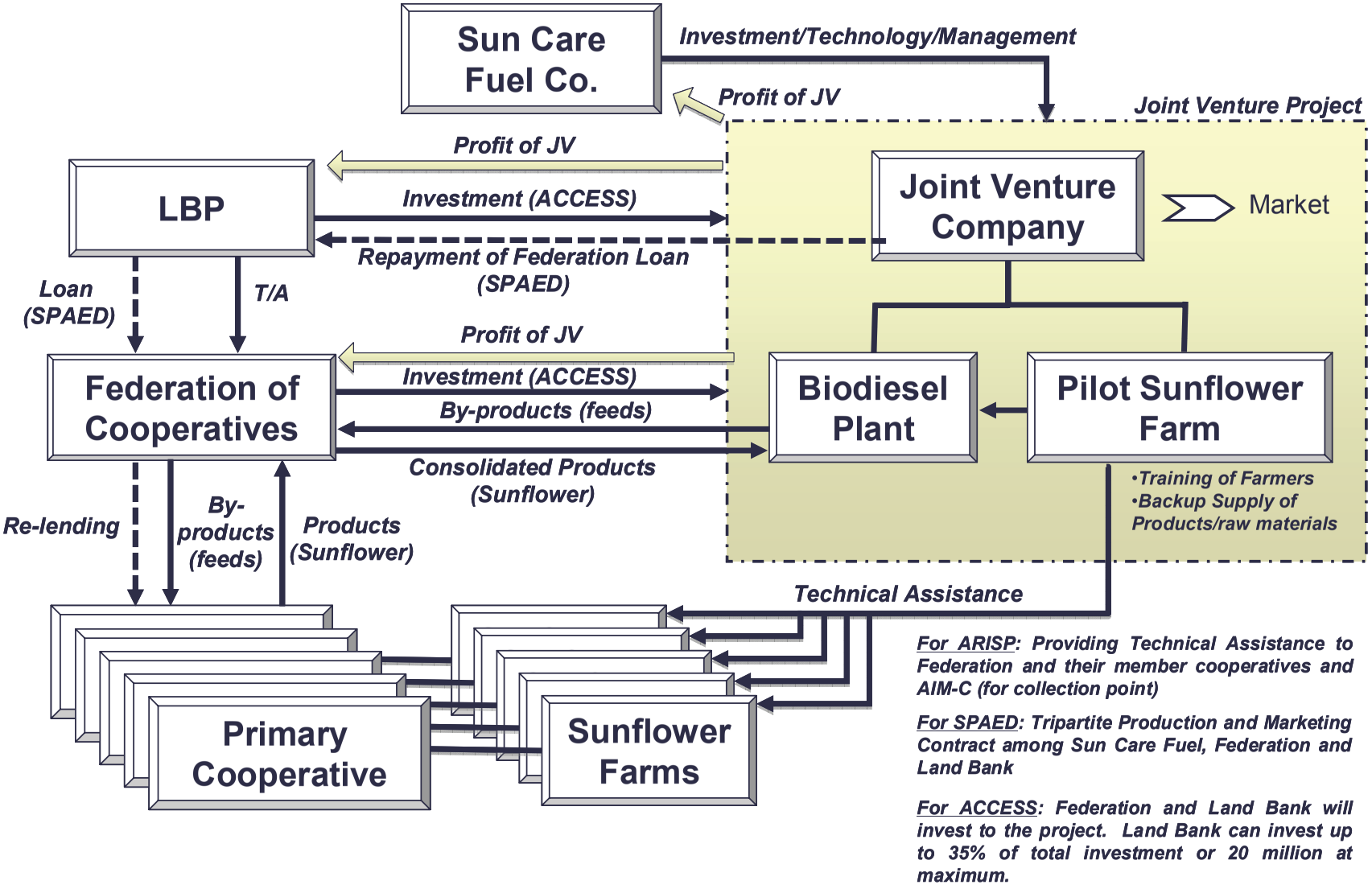


Figure 3.26 Scheme of Collaboration with ODA Projects

3.6 Potential Risks and Mitigation Plan

The study team identified several potential risks of the project. These are presented in Table 3.12 including ways to mitigate them

Table 3.12 Identified Risks and Mitigation Plan

Potential Risks	Mitigation Plan
1. Recurrence of the El Niño and La Niña Phenomenon will bring about decrease in farm production and supply of sunflower seeds and underutilization of the capacity of primary and secondary plants.	Must monitor advisories on global climate change and not to plant if it will likely to occur. Provide crop insurance to sunflower production; premium payments to crop insurance should be included in the farm budget. Collaboration with ODA projects and other farmers in nearby provinces for outsourcing of sunflower seeds.
2. Sunflower production in mono cropping system negatively impacting soil fertility and build up of pests and diseases	Sunflower should be crop-rotated with other crops such as corn, cassava, tomato and other annual crops; Provincial and municipal governments should promulgate local ordinances prohibiting sunflower mono-cropping and instead prescribe crop rotation as a soil fertility and crop protection management strategy.
3. Recurrence of high petroleum oil prices pushing the prices of farm inputs (fertilizers, pesticides, transportation, seeds, etc) upwards and squeezing net income which could result into the shift by farmers in planting other more profitable crops.	The project must also provide price increases to sunflower seeds corresponding to upward increases in the prices of sunflower biodiesel and sunflower meal. The project can provide price subsidy which will be taken from the gross margin of sunflower meal to cushion the impact of decreasing net income of farmers.
4. Traders and/or coconut oil mills offering higher prices to sunflower farmers to fill their under-utilized crushing capacities. Coconut oil mills can also be used to expel oil from sunflower seeds. If this happens, polevaulting by sunflower farmers may become a problem.	Sign a contract growing and marketing agreement with would-be sunflower farmers with the LGU as a third party to the agreement.
5. Pest incidence. Sunflower has no major pests at the moment but intensified farming systems and change in climate can result to resurgence of a dominant pest.	Conduct regular pest surveillance in existing farms and institute appropriate preventive measures.
6. Collision of sunflower grown as biofuel with food crops. Land use defines existing land uses. For Claveria where corn, cassava, vegetables and other fast growing fruit crops are grown in its vast plains, growing sunflower may cause a stir in existing land use policy.	Grow sunflower as part of existing farming system.
7. Competition from coconut oil as source of biodiesel.	Stable and competitive price for sunflower seeds and sunflower biodiesel.

Source: The Study for Strategic Food and Fuel Production, 2009

CHAPTER 4 FINANCIAL ANALYSIS

4.1 Project Cost Estimation

The project would require a total investment of P856 million (Table 4.1). About 60% will be spent to purchase capital items, 36% for working capital and 4% as pre-operating costs. Around 75% or P643.70 million will be invested in establishing and operating the manufacturing plant for sunflower biodiesel, while 25% will be invested in 149 clusters of primary processing plants (at 250 hectares per cluster).

Table 4.1 Total Project Cost, in PhP

Particulars	Sunflower Methyl Ester	Sunflower Crude Oil		Total (PhP)
		(per cluster)	(33 clusters)	
Fixed Assets	405,000,000	3,333,333	110,000,000	**515,000,000**
Working Capital	203,000,000	2,636,364	87,000,000	**290,000,000**
Pre-Operating costs	35,700,000	463,636	15,300,000	**51,000,000**
Total	**643,700,000**	**6,433,333**	**212,300,000**	**856,000,000**

Source: The Study for Strategic Food and Fuel Production, 2009

4.2 Project Sales Estimation

At higher recovery rates scenario, the total monthly sales volume for sunflower biodiesel is 2,500 kiloliters, 4,390 ton for sunflower meal and 250 ton for glycerine (Table 4.2). Total monthly sales is PhP194.41 million while yearly sales is PhP2.33 billion.

At lower recoveries scenario, the outputs of sunflower methyl ester (biodiesel) and glycerine have been maintained but the sunflower meal output has increased by 10.55% due to higher residual oil content. The implication is that, the project needs an additional 1,038 hectares or 3% increase in production area to produce 30,000 kiloliters of biodiesel annually. Using this scenario, the total sales increased by 2.95% due to higher contribution margin from sunflower meal.

Table 4.2 Projected Sales Volume & Value for Various Products

Particulars	Base Case			
	High Recovery Rate Scenario		Low Recovery Rate Scenario	
	Monthly	Yearly	Monthly	Yearly
Volume (ton)				
SF Biodiesel	2,500	30,000	2,500	30,000
SF Meal	4,388	52,654	4,851	58,212
Glycerine	250	3,000	250	3,000
Prices (PhP/Unit)				
SF Biodiesel (per liter)	55	55	55	55
SF Meal (per ton)	13,650	13,650	13,650	13,650
Glycerine (per kg)	10	10	10	10
Sales (PhP)				
SF Biodiesel	137,500,00	1,650,000,000	137,500,000	1,650,000,000
SF Meal	54,409,611	652,915,332	60,152,400	721,828,800
Glycerine	2,500,000	30,000,000	2,500,000	30,000,000
Total Sales Revenue	**194,409,611**	**2,332,915332**	**200,152,400**	**2,401,828,800**

Source: The Study for Strategic Food and Fuel Production, 2009

[a] *at 92% oil extraction recovery and 95% biodiesel recovery*

[b] *at 85% oil extraction recovery and 90% biodiesel recovery*

4.3 Result of Financial Analysis

4.3.1 Cost and Price Analysis

The profitability of biofuel depends to a large extent on the cost of feedstocks which constitute the most significant cost in biofuel production. The cost of manufacturing one liter of sunflower methylester is estimated to be P53/liter which already includes the cost of feedstocks, primary processing and secondary processing.

(1) Higher Recovery Rates Scenario

In the financial projections, the sunflower biodiesel's price was set at a relatively competitive level of PhP55/liter (ex-factory)~~,~~ leaving a gross margin of only PhP2/liter (Table 4.3**)**. The projected selling prices of sunflower meal (PhP 12.40/kg) and glycerine (PhP 10.00/kg), being the project's by-products, were assumed to be net prices. The contribution therefore of each product to total gross margin is: 8.06% for sunflower biodiesel, 87.89% for sunflower meal and only 4.04% for glycerine. It can be concluded therefore that the money-maker for the project is sunflower meal, a by-product and not sunflower biodiesel which is the main product. In terms of absolute value, the sunflower meal contributed PhP 275 million in net income, out of the total net income of PhP 312 million during the first year of operation.

Table 4.3 Sunflower Biodiesel, Meal and Glycerine Contribution to Net Income (at higher recoveries scenario)

Items	SF Biodiesel	SF Meal	Glycerine	Total/Average
Gross Margin Per Unit	PhP2.00 per liter	PhP 12.40 per kg	PhP 10.00 per kg	-
Volume Per Year (Material Balance)	30,000,000 li	52,654,462 kg	3,000,000 kg	85,654,462.24 kg
Total Gross Margin per Product/Year	PhP60,000,000.00 (8.08%)	PhP652,915,332.00 (87.89%)	PhP30,000,000.00 (4.04%)	PhP742,915,332.00 (100%)
Allocation of Other Costs (Year 1)	PhP34,731,061.00	PhP377,940,708.00	PhP17,365,531.00	PhP430,037,300.00
Net Income per Product/Year	PhP25,268,939.00	PhP274,974,624.00	PhP12,634,469.00	PhP312,878,032.00

Source: The Study for Strategic Food and Fuel Production, 2009

(2) Lower Recovery Rates Scenario

The contribution of each product to total gross margin at lower recoveries scenario is: 7.39% for sunflower biodiesel, 88.91% for sunflower meal and only 3.70% for glycerine (Table 4.4). In terms of absolute value, the sunflower meal contributed P330 million in net income out of the total net income of P371 million during the first year of operation.

Table 4.4 Sunflower Biodiesel, Meal and Glycerine Contribution to Net Income (at lower recoveries scenario)

Items	SF Biodiesel	SF Meal	Glycerine	Total/Average
Gross Margin Per Unit	PhP2.00 per liter	PhP 12.40 per kg	PhP 10.00 per kg	-
Volume Per Year (Material Balance)	30,000,000 li	58,212,000 kg	3,000,000 kg	91,212,000.00 kg
Total Gross Margin per Product/Year	PhP60,000,000.00 (7.39%)	PhP721,828,800.00 (88.91%)	PhP30,000,000.00 (3.7%)	PhP811,828,800.00 (100%)
Allocation of Other Costs (Year 1)	PhP32,546,836.00	PhP391,554,065.00	PhP16,273,418.00	PhP440,374,320.00
Net Income per Product/Year	PhP27,453,164.00	PhP330,274,735.00	PhP13,726,582.00	PhP371,454,480.00

Source: The Study for Strategic Food and Fuel Production, 2009

Soybean meal is a close competitor of sunflower meal in the protein meal market. The project can still sell sunflower meal at a competitive price than soybean meal while maintaining the viability of the project. The Philippine Association of Feedmillers, Inc. (PAFMI) projects that with lower feed prices, lower raw material prices and the expected rebound of the livestock sector, they see more importation of soybean meal in 2009. They expect that soybean meal importation to bounce 1.6 million metric tons in 2009 from 1.3 million metric tons in 2008.

Last December 2008, the price of soybean meal was P21-23/kg down from P28-30/kg in August 2008 according to PAFMI. This year 2009, USDA projected that the price would be US$399/ton (CIF Rotterdam), or P19.95/kg. However, USDA sees a decline in prices to US$356/ton in 2010 and will

continue to decline yearly and would register a price of US$227/ton in 2018. The average yearly price for soybean meal in the 9-year price decline is US$325/ton or P16.255/kg.

USDA projects an average price for sunflower meal of US$248/ton (CIF Rotterdam) for the same 9-year period (2009/2010 crop-year to 2017/2018 crop-year) or approximately P12.40/kg. The price disparity maybe attributed to soybean meal's higher protein content (48%) than sunflower meal (38%).

4.3.2 Financial Projections and Indicators of the Project's Financial Viability

A ten-year financial projection was prepared to set the ground for financial analysis. Using the undiscounted method of analysis, the project is deemed viable (under a higher oil and biodiesel recoveries) with a Return on Investment (ROI) of 39.4% and a payback period of 2.72 years (Table 4.5). On the other hand, using the discounted method, the project also demonstrated financial viability with an Internal Rate of return (IRR) of 31.7%, a Net Present Value (NPV) of P836 million, and a cash payback period of 3.02 years.

Under a lower crude oil recovery and lower biodiesel recovery situation, the project's key financial indicators have exhibited significantly higher values. The reason behind is that there is a higher volume of meal/cake that is produced plus higher residual oil content resulting into higher sales and contribution margin of sunflower meal. A separate ten-year financial projection was prepared to determine the impact of lower recovery rates to financial indicators. Using the undiscounted method of analysis, the project is deemed even more viable with a Return on Investment (ROI) of 46.2%, and a payback period of 2.29 years (Table 4.5). On the other hand, using the discounted method, the project also demonstrated high financial viability with an Internal Rate of return (IRR) of 39.0%, a Net Present Value (NPV) of P1.167 billion, and a cash payback period of 2.50 years.

Table 4.5 Summary of Financial Indicators

Financial Indicators	Base Case	
	High Recovery Rates Scenario[a]	**Low Recovery Rates Scenario[b]**
Undiscounted Method:		
Return on Investment	39.38%	46.22%
Payback Period (yrs)	2.72	2.29
Discounted Method:		
Internal Rate of Return	31.73%	39.01%
Net Present Value (PhP)	836,514,264	1,167,484,259
Payback Period (yrs)	3.02	2.50

Source: The Study for Strategic Food and Fuel Production, 2009

The Projected Income Statement and the Projected Annual Cash Flow Statement prepared for the study is shown in Appendix 5 and Appendix 6, respectively.

4.3.3 Profitability Analysis of Sunflower as a New and Alternative Livelihood

The success of the project should not only be viewed from the viability of the core enterprise (sunflower methyl ester plant) but also on the viability of sunflower production as a livelihood of

participating farmers. No farmer will be motivated to plant sunflower if it has no significant economic advantages over their existing crops. If this happens, the project will not have access to farmlands in the target site. The profitability of sunflower production as a new and alternative livelihood in the farming communities of Misamis Oriental and Bukidnon is best described in Table 4.6.

If the minimum wage rate in the region will be followed, the net income from sunflower production is equivalent to P8,190 per hectare per cropping season. On the other hand, if the prevailing wage rate in the area will be used, the net income will increase to P10,740 per hectare per cropping season. The return to costs or working capital is 31.13% (per cropping season) and 62.26% (per year) using the minimum wage rate and 45.20% (per cropping season) and 90.40% (per year) using the prevailing wage rate. Net income as a percentage of sales is obviously lower (23.74%) with the minimum wage rate and higher (31.13%) with the prevailing wage rate. Wage rate, yield per hectare and price of sunflower will play a significant role in determining the profitability of sunflower production.

Table 4.6 Profitability of Sunflower Production Using Minimum and Below-Minimum Wage Rates

Particulars	At Minimum Wage				At Below Minimum Wage			
	Unit	Qty	Unit Cost	Total Per Ha	Unit	Qty	Unit Cost	Total Per Ha
A. LABOR COSTS								
1. Land Preparation		1	3,000	3,000		1	3,000	3,000
2. Planting	md	4	170	680	md	4	120	480
3. Fertilization/Cultivation	md	6	170	1,020	md	6	120	720
4. Herbicide Application	md		170	-	md			
5. Pesticide Application	md	8	170	1,360	md	8	120	960
6. Hilling-up			1,500	1,500			1,500	1,500
7. Harvesting	md	20	170	3,400	md	20	120	2,400
8. Hauling	md	2	170	340	md	2	120	240
9. Threshing	md	4	170	680	md	4	120	480
10. Cleaning	md	3	170	510	md	3	120	360
11. Drying	md	4	170	680	md	4	120	480
Sub-Total				**13,170**				**10,620**
B. MATERIAL INPUTS								
1. Seeds	kgs	6	15	90	kgs	6	15	90
2. Fertilizer								
a. Complete (14-14-14)	bags	6	1,200	7,200	bags	6	1,200	7,200
b. Urea (45-0-0)	bags	1	1,100	1,100	bags	1	1,100	1,100
3. Pesticides								
a. Baythroid or Lorsban or Parathion or Permethrin	P/ha		2,500	2,500	P/ha		2,500	2,500
b. Fungicide	P/ha		1,500	1,500	P/ha		1,500	1,500
4. Other Materials:								
a. Sacks	pcs	50	5	250	pcs	50	5	250
b. Plastic Twine	P/ha		100	100	P/ha		100	100
c. Scythe/bolo	P/ha		400	400	P/ha		400	400
Sub-Total				**13,140**				**13,140**
C. TOTAL COST				**26,310**				**23,760**
Yield	kgs	2,300			kgs	2,300		
Minimum Price	P/kg		15		P/kg		15	
Total Sales	Pesos			**34,500**	Pesos			**34,500**
Net Income	Pesos			**8,190**	Pesos			**10,740**
% Return to Costs (1 season)	%			**31.13%**	%			**45.20%**
Net Income as % of Sales	%			**23.74%**	%			**31.13%**
Net Income at Various Yield Levels		**Yield Levels/ha (kgs)**				**Yield Levels/ha (kgs)**		
		2,300	**2,000**	**1,700**		**2,300**	**2,000**	**1,700**
Cost of Production Per kg	P/kg	11.44	13.16	15.48	P/kg	10.33	11.88	13.98
Net Income/ha	Pesos	8,190	3,690	(810)	Pesos	10,740	6,240	1,740

Source: The Study for Strategic Food and Fuel Production, 2009

4.3.4 Comparative Profitability Analysis of Sunflower Versus Competitor Crops

Corn, cassava and pineapple are the main competitor crops of sunflower for available farmlands in Claveria and other towns in Misamis Oriental and Bukidnon. In order to convince existing corn and cassava farmers to shift to sunflower as a substitute crop or as second crop, the main decision driver should be profitability. Table 4.7 below shows the comparison among yellow corn, cassava and sunflower in terms of yield, price and expenses. Cassava is evidently the highest in terms of yield, sales and expenses. However, cassava fetches the lowest price than cassava and sunflower. Sunflower will generate a higher income than corn but has only a slight income advantage over cassava. The competition from pineapple will not come from the profitability performance of the crop but on the

financial arrangement offered by Dole to landowners. The company provides the landowners a 10-year advance rental to their land to a tune of P5,000/hectare/year in order to have a management control over those areas. The attractiveness of this arrangement is that the farmers receive an immediately big cash bonanza. As a livelihood undertaking, pineapple will not be attractive to farmers because they will have to wait for one and a half years to harvest the crop. If the prevailing wage rate in Misamis Oriental will be followed, the income from sunflower production would be the highest at P10,740 per hectare.

Table 4.7 Profitability Comparison Among Yellow Corn, Cassava and Sunflower

Particulars	Yellow Corn	Cassava	Sunflower	
			Min. Wage	< Min. Wage
Ave. Yield / ha (kg)	3,500	16,780	2,300	2,300
Price /kg	10	3	15	15
Total Sales	35,000	41,950	34,500	34,500
Expenses				
Seeds	2,600	2,500	90	90
Fertilizers	9,400	13,200	8,300	8,300
Pesticides	4,000	100	4,000	4,000
Other Materials	840	4,550	750	750
Labor	13,070	13,775	13,170	10,620
Total	29,910	34,125	26,310	23,760
Net Income	**5,090**	**7,825**	**8,190**	**10,740**

Source: The Study for Strategic Food and Fuel Production, 2009

The profitability of sunflower production as a new and alternative livelihood of farmers will generate support from the local government officials who would like to see their constituents benefiting from it. It makes good political sense for local government officials supporting and endorsing this project on account of its profitability.

CHAPTER 5 PROJECT IMPLEMENTATION

5.1 Executing Organization

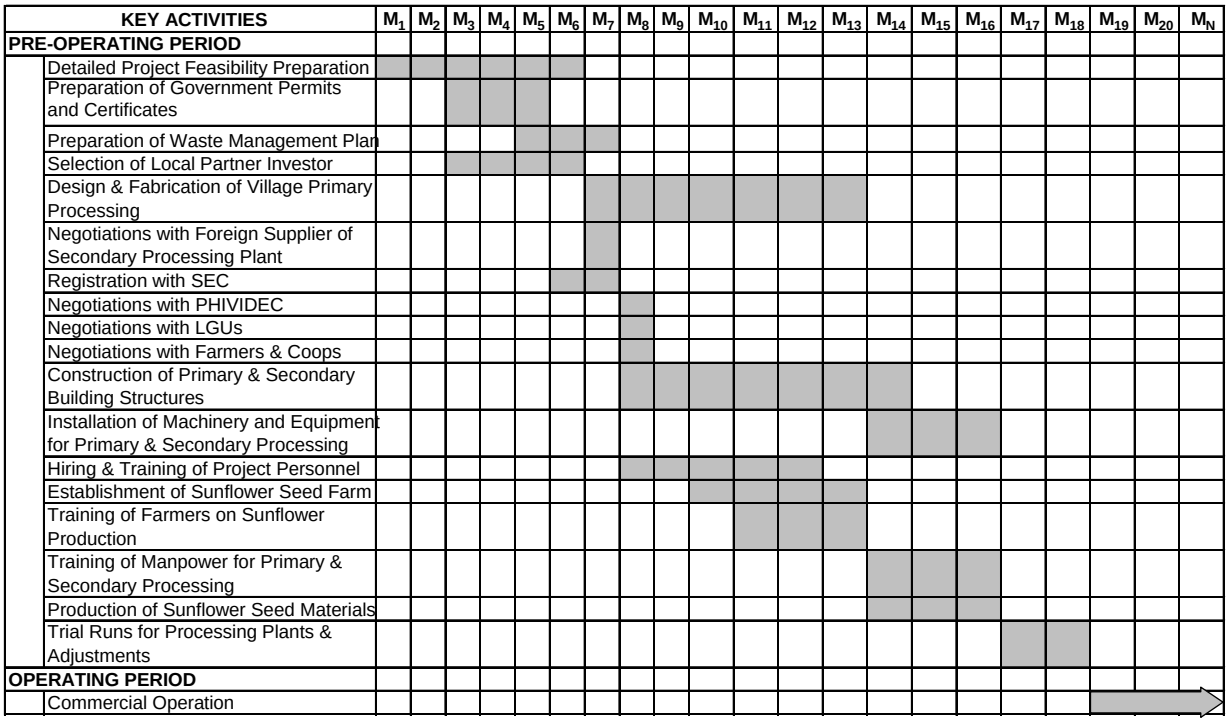
For the execution of the Project, a business organization will be established in the Philippines. There are two options for the establishment of business organization, i.e. new domestic corporation or partnership, or foreign corporation as stated in Sub-chapter 2.3.2. From the nature of Project, the business organization to be established should be a new domestic corporation or partnership. Thus, suitable local partners should be selected to establish a new domestic corporation. The major local partners will be private corporations and/or partnerships. Besides, Local Government Units (LGUs) of the host provinces or municipalities, rural banks, cooperatives, etc. are also potential partners for the Project.

Upon selection of suitable local partner(s), a new corporation should register with the Securities and Exchange Commission (SEC) to have the juridical personality to transact business in the Philippines. This new company will therefore serve as the executing organization for the Project.

The company will then be tasked to deal with local government units (LGUs), financial institutions like Land Bank of the Philippines, PHIVIDEC, farmers and cooperatives, including other product and service providers such as the manufacturer of the processing plants, and providers of utilities and other materials for the operation of the project.

5.2 Implementation Schedule

Figure 5.1 shows the indicative schedule for project implementation. The pre-operating period will cover approximately 18 months. Commercial operation is estimated to commence on the 19th month and to continue onwards.



Source: The Study for Strategic Food and Fuel Production, 2009

Figure 5.1 Project Implementation Schedule

5.3 Financing Plan

The project is hereby intended to be financed through a 100% equity ownership with Japanese and Filipino investors. The ratio of investment by Japanese and Filipino investors is proposed to be 60% by Japanese investors and 40% by Filipino investors (Table 5.1).

Table 5.1 Financing Plan

Japanese Investor (60%)	Filipino Investor (40%)	Total (100%)
Php 510,000,000	Php 346,000,000	Php 856,000,000

Source: The Study for Strategic Food and Fuel Production, 2009

Financing the sunflower production by the farmers can be obtained from Land Bank of the Philippines, and other rural financial institutions. The LBP can also take part as one of the Filipino investors in the project.

The project needs a total area of 37,310 hectares (Table 5.2) to be planted with sunflower to supply the yearly sunflower seeds requirements of both the primary and secondary processing plants. This translates to approximately 18,655 hectares per cropping season.

Table 5.2 Financing Plan for Farmers

Particulars	First Cropping	Second Cropping	Total
Sunflower Area Requirement (ha)	18,655	18,655	37,310
Production Cost Per Hectare (Php)	26,310	26,310	26,310
Total Financing Requirement for Sunflower Production by Farmers	Php 490,813,050	Php 490,813,050	Php 981,626,100

Source: The Study for Strategic Food and Fuel Production, 2009

On a per-hectare basis, the financing requirement for sunflower production by farmers would appear very small but when aggregated would require a total of P981,626,100 per year.

Since the project needs a different area every cropping season to be planted to sunflower requiring another set of farmer-cooperators, a total financing of P490,813,050 will be need per cropping season.

CHAPTER 6 CONCLUSIONS AND NEXT STEP

From the findings and results of this study, the consultant team has arrived at the following conclusions:

1. Misamis Oriental has proven to be a highly suitable site for the project particularly in the Municipality of Claveria in the CLAJAVITA Corridor in terms of: availability of land for sunflower production; agro-climatic conditions suited for sunflower production; logistical advantages due to proximity to an industrial center, presence of infrastructure facilities such as ports, power and road networks, presence of oil depots of major oil companies; support from local government units and farming communities that are receptive to the introduction of new livelihood opportunities;
2. There are other regional sites in Mindanao that may have a combination of the above endowments but may not be agro-climatically feasible due to high rainfall which is disadvantageous to sunflower production.
3. On the overall the project is highly financially viable. The viability of the project hinges on the demand outlook for sunflower meal which is expected to contribute 86% to the total gross margin. Sunflower meal has therefore proven to be the cash cow of the project rather than sunflower biodiesel;
4. Sunflower production looks like an attractive new and alternative livelihood for farmers in the area in terms of higher income opportunities vis-à-vis other crops such as corn, cassava and pineapple. The likelihood therefore of sunflower production to be accepted by the farmers is very high.

The actions to be done in the next step to realize the project are to:

i) decide the local partners and finalize the business formation;

ii) refine the business model; and

iii) conduct the feasibility study based on the business model and formation.

The draft terms of reference for the feasibility study to be conducted in the next step are shown in Appendix-7.

APPENDICIES

Appendix-1: PHOTOGRAPHIC RECORD

Presentation of Candidate Site by FEDARCO

Display of Butuan Agricultural Product of FEDACO

Road to Candidate Site in Guamod Barangay

Candidate Site in Gumaod Barangay

Meeting with Mayor of Claveria

Corn Farm in Claveria (possible crop rotation site)

FEDARCO: Federation of Agrarian Cooperatives

Peasants of Corn Harvesting in Claveria

Candidate Site for BDF Plant in PHIVIDEC Area

Drawing of Candidate Site in PHIVIDIC Area

Test Farm of Sum Flower in CLSU

Sun Flower in Testing Farm in CLSU

Seed of Sun Flower in Testing Farm in CLSU

PHIVIDIC: Philippine Veterans Investment Development Corp.
CLSU: Central Luzon State University

APPENDIX 2 FARMING PRACTICES OF SUNFLOWER

Land Preparation: It is best to plow and harrow the land twice to attain the desired soil tilt and control weeds. Timely land preparation operation is required for effective weed control. Furrow the land to the desired distance.

Planting: The plants can be raised at a distance of 75 x 25 cm apart. This would give a total population of around 53,000 plants/ha. The seeds are dibbled at 2-3 cm deep, using one seed per hill. The seeds should come from recognized seed distributors to ensure higher percent germination. In case, viability of seeds is not known, it is recommended to sow 2-3 seeds/hill. Seeds sown during the dry season should be irrigated. Since the seed weight of commercial hybrids used for oil purposes weighs about 0.15 g, about 6 kg/ha can be used.

Cultivation: At 30 to 40 days after emergence, Off-bar or cultivate the soil to loosen it and help in aeration and weed control.

Fertilizer Application: In general, sunflower requires 60-40-40 kg/ha NPK fertilizer. The nitrogen is split, at planting and about 30-40 days after emergence. About 6 bags (50 kg/bag) of complete fertilizer (14-14-14)/ha and 1 bag of urea (46-0-0)/ha is applied. The fertilizer should be side-dressed at about 5 cm from the base of the plant. The soil can be hill up after application. While CLSU recommended only one application, it is still recommended to split the nitrogen, apply 40 kg at planting and 20 kg/ha, 30-40 days after planting.

Irrigation: Plants should be irrigated more regularly during the dry season. It can be done after planting and at 15, 30, 50 and 70 days after planting. In case the farm does not drain naturally, it is best to install drainage systems to ensure healthy plant growth. Both furrow and sprinkler irrigation system can be adopted.

Pest Control: Insect pest and disease. Common insect pest attacking the plant is cutworm while diseases include stem, root rot and head rot, both caused by fungus. Cutworm may be controlled using Karate or Lannate while Captan can be used to control diseases. Judicious application of pesticides should be done. Roguing can also be practiced.

Weeding: The more common weed species are Cyperus rotundus, Eleusine indica, Digitaria violansens, Ipomea triloba among others. They may be controlled by hand pulling, land preparation

and cultivation.

Harvesting: Fruits mature in 90-95 days after planting during the dry season and 105-110 days during the rainy season. Maturity index used is the browning of the sepals at the back side of the floral disc. The head is cut off from it stalk using harvesting scythe. Fruits are placed in container and brought to frying area where they are piled in single layer on drying floor. When seeds shatter or at 10% moisture content, the seeds are considere3d dry.

Threshing: Seeds are threshed in a rice thresher. It can also be done by scrubbing the heads against a board with a mesh size of about 1 cm mesh.

Cleaning: Good seeds are separated from the poor seeds by winnowing. Seeds that tare weak, light in weight are blown away during winnowing. After cleaning, the good seeds are dried up to 8-10% moisture content.

Storage: Dried seeds are treated with fungicides, placed in clean sacks ands stored at room temperature in a ventilated area.

APPENDIX 3 FOREIGN INVESTMENTS NEGATIVE LIST (FINL)

Excerpts from Foreign Investments Act of 1991. RA 7042, Section 8.

"List of Investment Areas Reserved to Philippine Nationals (*Foreign Investment Negative List*). - The Foreign Investment Negative List shall have three (3) component lists: A, B, and C:

a) List A shall enumerate the areas of activities reserved to Philippine nationals by mandate of the Constitution and specific laws.

b) List B shall contain the areas of activities and enterprises pursuant to law:

1) Which are defense-related activities, requiring prior clearance and authorization from Department of National Defense (DND) to engage in such activity, such as the manufacture, repair, storage and/or distribution of firearms, ammunition, lethal weapons, military ordnance, explosives, pyrotechnics and similar materials; unless such manufacturing or repair activity is specifically authorized, with a substantial export component, to a non-Philippine national by the Secretary of National Defense; or

2) Which have implications on public health and morals, such as the manufacture and distribution of dangerous drugs; all forms of gambling; nightclubs, bars, beerhouses, dance halls; sauna and steambath houses and massage clinics.

Small and medium-sized domestic market enterprises with paid-in equity capital less than the equivalent of five hundred thousand US dollars (US$500,000) are reserved to Philippine nationals, unless they involve advanced technology as determined by the Department of Science and Technology. Export enterprises which utilize raw materials from depleting natural resources, with paid-in equity capital of less than the equivalent of five hundred thousand US dollars (US$500,000) are likewise reserved to Philippine nationals.

Amendments to List B may be made upon recommendation of the Secretary of National Defense, or the Secretary of Health, or the Secretary of Education, Culture and Sports, indorsed by the NEDA, or upon recommendation motu propio of NEDA, approved by the President, and promulgated by Presidential Proclamation.

c) List C shall contain the areas of investment in which existing enterprises already serve adequately the needs of the economy and the consumer and do not require further foreign investments, as determined by NEDA applying the criteria provided in Section 9 of this Act, approved by the President and promulgated in a Presidential Proclamation.

The Transitory Foreign Investment Negative List established in Sec. 15 hereof shall be replaced at the end of the transitory period by the first Regular Negative List to the formulated and recommended by

the NEDA, following the process and criteria provided in Section 8 and 9 of this Act. The first Regular Negative List shall be published not later than sixty (60) days before the end of the transitory period provided in said section, and shall become immediately effective at the end of the transitory period. Subsequent Foreign Investment Negative Lists shall become effective fifteen (15) days after publication in two (2) newspapers of general circulation in the Philippines: Provided, however, That each Foreign Investment Negative List shall be prospective in operation and shall in no way affect foreign investments existing on the date of its publication.

Amendments to List B and C after promulgation and publication of the first Regular Foreign Investment Negative List at the end of the transitory period shall not be made more often than once every two (2) years."

APPENDIX 4 PERMITS AND CERTIFICATIONS

The following excerpts are from the **"**GUIDELINES GOVERNING THE BIOFUEL FEEDSTOCKS PRODUCTION, AND BIOFUELS AND BIOFUEL BLENDS PRODUCTION, DISTRIBUTION AND SALE UNDER REPUBLIC ACT NO. 9367"

Chapter I- Section 3. Biofuel Production Site as One of the Priority Development Areas for Land Conversion.

In accordance with the purpose of the Act, Section 6 of DAR Administrative Order No. 01, Series of 2002, is hereby amended to include a proposed biofuel production site as a Priority Development Area for Land Conversion and shall therefore read as follows: x

Agricultural Areas/Lands proposed to be developed as biofuel production site as certified by DA; *Provided*, that each production facility site shall not be more than twenty five (25) hectares; *Provided*, *further,* that a project that has a production capacity in excess of one hundred thousand (100,000) liters per day or where more than twenty five (25) hectares is required as a production facility site, the applicant can apply for exemption for the additional hectarage as production facility site subject to the approval of DAR.

Chapter II- Section 1. Requirements for Biofuel Feedstock Producer.

An Applicant who shall engage in the production of biofuel feedstock shall secure the following, prior to the production thereof:

a. Environmental Compliance Certificate ("ECC") issued by the DENR, as applicable;
b. Certification Precondition issued by the NCIP, as applicable; and
c. Certification issued by the DA, as applicable.

The requirements above shall not be required for existing coconut and sugarcane areas, subject to the regulations by PCA and SRA, respectively, as approved by the DA.

Chapter II- Section 2. Environmental Compliance Certificate.

An Applicant who shall engage in the production of biofuel feedstocks shall secure an ECC from the DENR. The issuance thereof shall be subject to the following guidelines:

a. For new biofuel feedstock production project with a total contiguous land area of one hundred (100) hectares up to one thousand (1,000) hectares and which involves land preparation, an Initial Environmental Examination (IEE) or IEE Checklist is required prior to the issuance of ECC;

b. For new biofuel feedstock production project with a total contiguous land area of more than one thousand (1,000) hectares and which involves land preparation, an Environmental Impact Statement (EIS) is required prior to the issuance of ECC; and

c. For existing biofuel feedstock production areas regardless of the total land area, an ECC is no longer required.

For the above purpose, DENR Administrative Order No. 30, Series of 2003 and DENR Memorandum Circular No. 2007 - 08, whenever applicable is hereby adopted as an integral part of this Guidelines (Annex "A" and "B", respectively).

Chapter II- Section 3. Certification Precondition.

An Applicant shall secure a Certificate of Non-Overlap or Certificate of Compliance from the NCIP, subject to the following guidelines:

Section 3.1.

If the proposed site for the project is outside the ancestral domain/land of the ICCs/IPPs, a Certificate of Non-Overlap shall be secured by the Applicant, which shall be issued by the concerned NCIP Regional Director after a field based investigation.

Section 3.2. If the proposed site is within or overlaps the ancestral domain/land:

a. An Applicant shall secure the written Free, Prior and Informed Consent (FPIC) if the area to be covered by the project is located within or overlaps the ancestral domain/land of the ICCs/IPPs.

b. After securing the FPIC, an Applicant shall secure a Certificate of Compliance from the NCIP Head Office.

Section 3.3. Documentary Requirements.

For purposes of securing the Certification Precondition under Sections 3.1 and 3.2 hereof, the following documents are required to be submitted by the Applicant:

a. Endorsement from the DENR;

b. Project Profile of the Applicant; and

c. Operational Plan.

For the above purpose, NCIP Administrative Order No. 1, Series of 2006, is hereby adopted as an integral part of this Guidelines (Annex "C").

Chapter II- Section 4. DA Certification.

An Applicant shall secure a DA certification that the feedstock or the proposed biofuel feedstock area may be utilized for the production of biofuel feedstock. The DA Certification shall not be required if the feedstock to be used, (e. g. molasses), does not involve land utilization.

Section 4.1. Criteria for DA Certification. The following are the criteria for the issuance of DA certification:

a. Cereals that can be used both for food and for biofuel production such as, but not limited to, corn and wheat shall not be used for biofuel production;

b. The land to be used shall be consistent with the natural expansion of the municipality or locality, as contained in the approved physical framework and land use plan by the concerned municipality or locality;

c. The area that will be used is not the only remaining food production area of the community,

d. All agricultural areas classified hereunder shall not be utilized for biofuel feedstock production:

- All areas covered by government-funded irrigation facilities, either national agency or LGU, designed to support rice and other crop production, and all irrigated lands where water is not available for rice and other crop production but are within areas programmed for irrigation facility rehabilitation by DA and NIA;
- All irrigable lands already covered by irrigation projects with firm funding commitments as certified by NIA at the time of the application for land use conversion;
- All privately irrigated alluvial plain lands utilized for rice and corn production; and
- All agricultural lands that are ecologically fragile, the utilization of which will result in serious environmental degradation.

Section 4.2. Issuance of Certification.

The Certification may be issued, except for areas identified above, under the following conditions:

a. Compliance with the SRA and PCA policy guidelines, as approved by DA, for the utilization of sugarcane and coconut areas;

b. The areas are evaluated by DA to be underutilized and marginal; and

c. The proposed project is supportive to agro-industrial development, and will generate additional and alternative livelihood opportunities for the affected community. Cereals that can be used both for food and for biofuel production such as, but not limited to, corn and wheat shall not be used for biofuel production;

b. The land to be used shall be consistent with the natural expansion of the municipality or locality, as contained in the approved physical framework and land use plan by the concerned municipality or locality;

c. The area that will be used is not the only remaining food production area of the community,

d. All agricultural areas classified hereunder shall not be utilized for biofuel feedstock production:

- All areas covered by government-funded irrigation facilities, either national agency or LGU, designed to support rice and other crop production, and all irrigated lands where water is not available for rice and other crop production but are within areas programmed for irrigation facility rehabilitation by DA and NIA;
- All irrigable lands already covered by irrigation projects with firm funding commitments as certified by NIA at the time of the application for land use conversion;
- All privately irrigated alluvial plain lands utilized for rice and corn production; and
- All agricultural lands that are ecologically fragile, the utilization of which will result in serious environmental degradation.

Section 4.3. Scope and Coverage.

As used in this section, an Independent Biofuel Feedstock Producer shall refer to a Biofuel Feedstock Producer who has no marketing or supply agreement with a Biofuel Producer.

a. Only an Independent Biofuel Feedstock Producer with an effective area exceeding twenty five (25) hectares, either contiguous or fragmented, shall be required to obtain a DA Certification.

b. An Independent Biofuel Feedstock Producer whose effective area is twenty five (25) hectares or less is exempted from securing the DA Certification.

c. A Biofuel Feedstock Producer who has a marketing or supply agreement with a

Biofuel Producer shall not be required to secure a DA Certification; Provided, that the Biofuel Producer shall secure the DA Certification as provided in Chapter III, Section 2.4 of this Guidelines.

Section 4.4. Documentary Requirements.

The following documents and information are required to be submitted by the Applicant:

a. Feasibility Study;

b. List of Biofuel Feedstock supplier(s); and

c. One (1) copy each of geo-referenced map, vicinity map and lot plan showing the feedstock production areas duly certified by the LGU.

Chapter III- Section 1. Certificate of Registration and Accreditation.

An Applicant shall secure a Certificate of Registration and Accreditation from the DOE prior to production, distribution and sale of biofuel. This shall apply to the following:

a. Biofuel Producer that:

- Sells biofuels to Oil Companies; and
- Sells directly to the end users (for bio-diesel);

b Biofuel Distributor.

Community-based Biofuel Producers and/or individuals who produce biofuels for their own direct uses are exempt from securing a Certificate of Accreditation; Provided, however, that Community-based Biofuel Producers and/or individuals who sell their products commercially are required to secure a Certificate of Accreditation from DOE.

Chapter III- Section 2. Requirements for Registration of Biofuel Producers with the DOE.

The DOE shall issue a Certificate of Registration with Notice to Proceed with the construction of the facilities upon complete and satisfactory submission of the following:

a. Duly accomplished DOE application form;

b. Proof of payment of filing fees;

c. Registration with the Securities and Exchange Commission (SEC), Philippine Economic Zone Authority (PEZA), Cooperative Development Authority (CDA) and/or the DTI, as applicable;

d. Certification Precondition from NCIP for ancestral domains/lands, as applicable;

e. Feasibility Study demonstrating the technical, economic and ecological viability of biofuel

production and Construction/Work Plan;

f. Developer's Profile;

g. Letter of Intent to supply a volume of biofuel;

h. DA Certification as specified in Chapter II of this Guidelines;

i. SRA or PCA Registration, as applicable;

j. Special Forest Land-use Agreement from DENR if the site is within untenured forest lands, as per existing rules and regulations;

k. CARP Exemption based on HLURB certification that the land was classified prior to June 15, 1988 or DAR Land Use Conversion, as applicable;

l. ECC from DENR; and

m. LGU Clearance and Locational Clearance.

The Certificate of Registration with Notice to Proceed shall automatically be revoked upon failure to commence construction of the facilities within two (2) years from the issuance thereof.

Section 2.2. Issuance of ECC by DENR for Biofuel Production.

An Applicant who shall engage in the production of biofuels shall secure an ECC from the DENR-EMB Regional Office. The issuance thereof shall be subject to the following guidelines:

a. For Biofuel Processing Plants with annual production capacity of equal to or less than one hundred fifty (150) million liters (< 150 million liters per year), an Initial Environmental Examination (IEE) or IEE Checklist is required prior to the issuance of ECC; and

b. For Biofuel Processing Plant with annual production capacity of more than one hundred fifty (150) million liters (>150 million liters per year), an Environmental Impact Statement (EIS) is required prior to the issuance of ECC.

For the above purpose, DENR Administrative Order No. 30, Series of 2003 and DENR Memorandum Circular No. 2007 - 08, whenever applicable is hereby adopted as an integral part of this Guidelines (Annex "A" and "B", respectively).

Section 2.3. DAR Conversion of Agricultural Lands to Biofuel Production Site.

The following documents and information are required to be submitted by an Applicant to DAR for purposes of converting land from agricultural to biofuel production site:

a. Proof of payment of filing fees and inspection costs;

b. Posting of performance bond;

c. Sworn application for conversion;

d. Proof of land ownership or proof of right over the land (e.g. Transfer Certificate of Title, tax declaration, lease agreement, if applicant is Farmer Beneficiary under Comprehensive Agrarian Reform Law (CARP), a certification from LBP/PARO)

e. DA certification as provided in Chapter II, Section 2.4 of this Guidelines;

f. Feasibility Study containing among others, the Applicant's financial and organizational capability, and development plan;

g. Joint venture agreements and other similar arrangements;

h. Photographs of the property;

i. Affidavit of Undertaking, as provided under DAR Administrative Order No.1, Series of 2002, as amended;

j. MARO Certification as provided under DAR Administrative Order No.1, Series of 2002, as amended;

k. Notice of LUC Application as provided under DAR Administrative Order No.1, Series of 2002, as amended;

l. HLURB Certification or Sangguniang Panlalawigan Resolution, as the case may be;

m. Lot Plan; and

n. Maps:

- Vicinity Map;
- Directional Sketch Map; and
- Topographic Map, as applicable.

For the above purpose of converting the use of an agricultural land from agricultural to biofuel production site, DAR Administrative Order No.1, Series of 2002, as amended, in all aspect not inconsistent herewith, is hereby adopted as an integral part of this Guidelines (Annex "D").

Section 2.4. DA Certification.

All Biofuel Producers shall declare their proposed source of feedstock for evaluation of DA if the proposed biofuel feedstock production area is compliant with the prescribed criteria as specified in Chapter II, Section 4.1 of these Guidelines. The DA shall subsequently issue a certification to that effect.

A Biofuel Producer who shall have new biofuel feedstocks producer-supplier or new feedstock production areas, is required to submit to DA the list of its new feedstock producer-supplier or new feedstock production areas for evaluation based on the criteria as specified in Chapter II, Section 4.1 of this Guidelines. Moreover, every Biofuel Producer shall declare his/her biofuel

feedstocks producer-supplier and the location of the feedstock production area.

Chapter III- Section 3. Certificate of Accreditation from DOE.

The DOE shall issue a Certificate of Accreditation prior to commercial operations upon the submission and compliance with the following:

a. Rated production capacity in million liters per year;
b. Certificate of Fuel Additive Registration from the DOE for biofuels, as applicable;
c. Completion of DOE's inspection of the facilities and on-site sample-taking of the biofuels produced;
d. Product compliance with the PNS;
e. Distribution networks and authorized distributors, if any; and
f. Program of quality management system.

The Certificate of Accreditation shall be valid for a period of five (5) years, unless earlier revoked or suspended as provided in this Guidelines.

Section 3.1. Renewal of Certificate of Accreditation.

The Certificate of Accreditation may be renewed every five (5) years subject to compliance with the minimum requirements as provided by this Guidelines, pertinent laws, rules and regulations and other DOE issuances. The following documents shall be submitted for the renewal of the Accreditation:

a. Proof of payment of renewal fee;
b. Completion of DOE's inspection of the facilities and on-site sample-taking of the biofuels produced;
c. Proof of compliance with PNS;
d. BIR tax clearance for the immediately preceding year;
e. Updated distribution networks and authorized distributors; and
f. Updated local government licenses and permits.

Section 3.2. Amendment of Certificate of Accreditation.

The Biofuel Producer shall send a Letter-request to DOE for the amendment of the Certificate of Accreditation, thirty (30) days prior to the intended amendment, if the any of the following is attendant:

1. Increase or decrease of production capacity;

2. Change in the process flow, technology or feedstock to be used for the biofuel production; and
3. Change in the ownership of the biofuel production project.

Chapter III- Section 7. Permit to Export Biofuels.

Prior to each exportation of the biofuels, the Biofuel Producer and/or Biofuel Distributor shall submit to the DOE a written application to export; Provided, that DOE shall only allow exportation in the event that there is excess of supply of biofuels for domestic consumption.

The following documents and information are required to be submitted by the Biofuel Producer:

a. Product type and volume to be exported and cost of product shipment;
b. Country of destination;
c. Percentage of volume to be exported to plant's current production capacity; and
d. Payment of appropriate application or processing fees per shipment; and
e. Export Clearance from PCA, for coconut-based biofuels."

APPENDIX 5 PROJECTED ANNUAL INCOME STATEMENT

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
TOTAL REVENUES										
Sale of SFME	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000
Sale of SF Meal	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332
Sale of Glycerine	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000
Total Revenues	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332	2,332,915,332
Less: EXPENSES:										
Mfg Cost of Goods Sold - SFME	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000
Depreciation	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000	20,600,000
Administrative/Mgt Cost	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767
Repairs & Maintenance	-	-	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000
Selling Costs	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533
Land Lease	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Amortization of Pre-Op Expenses	7,140,000	7,140,000	7,140,000	7,140,000	7,140,000	-	-	-	-	-
Intrerest Payment	51,360,000	45,946,374	39,991,384	33,440,896	26,235,360	18,309,269	9,590,570	-	-	-
Total Expenses	2,020,037,300	2,014,623,673	2,018,968,684	2,012,418,196	2,005,212,659	1,990,146,569	1,981,427,869	1,971,837,300	1,971,837,300	1,971,837,300
NET INCOME BEFORE TAXES	312,878,032	318,291,659	313,946,648	320,497,136	327,702,672	342,768,763	351,487,463	361,078,032	361,078,032	361,078,032

Return on Investment	39.38%
Undiscounted Payback Period (years)	2.72

APPENDIX 6 PROJECTED ANNUAL CASH FLOW STATEMENT

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
CASH INFLOWS											
Equity	342,400,000	-	-	-	-	-	-	-	-	-	-
Loan Proceeds	513,600,000	-	-	-	-	-	-	-	-	-	-
Sale of SFME	-	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000	1,650,000,000
Sale of SF Meal	-	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332	652,915,332
Sale of Glycerine	-	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000
Total Cash Inflows	**856,000,000**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**	**2,332,915,332**
CASH OUTFLOWS											
Fixed Capital Investments	515,000,000										
Pre-Operating Costs	51,000,000										
Advance Land Rentals	2,000,000										
Mfg Cost of Goods Sold	-	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000	1,590,000,000
Administrative/Mgt Cost	-	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767	116,645,767
Repairs & Maintenance	-	-	-	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000
Selling Costs	-	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533	233,291,533
Annual Land Lease	-	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Principal Payment	-	54,136,265	59,549,891	65,504,880	72,055,368	79,260,905	87,186,996	95,905,695	-	-	-
Intrerest Payment	-	51,360,000	45,946,374	39,991,384	33,440,896	26,235,360	18,309,269	9,590,570	-	-	-
Total Cash Outflows	**568,000,000**	**2,046,433,564**	**2,046,433,564**	**2,056,733,564**	**2,056,733,564**	**2,056,733,564**	**2,056,733,564**	**2,056,733,564**	**1,951,237,300**	**1,951,237,300**	**1,951,237,300**
NET CASH FLOW	**288,000,000**	**286,481,767**	**286,481,767**	**276,181,767**	**276,181,767**	**276,181,767**	**276,181,767**	**276,181,767**	**381,678,032**	**381,678,032**	**381,678,032**
CASH BALANCE, BEGINNING	-	288,000,000	574,481,767	860,963,535	1,137,145,302	1,413,327,070	1,689,508,837	1,965,690,604	2,241,872,372	2,623,550,404	3,005,228,436
CASH BALANCE, ENDING	**288,000,000**	**574,481,767**	**860,963,535**	**1,137,145,302**	**1,413,327,070**	**1,689,508,837**	**1,965,690,604**	**2,241,872,372**	**2,623,550,404**	**3,005,228,436**	**3,386,906,468**

Internal Rate of Return (IRR)	31.73%
Net Present Value (NPV)	836,514,264
Discounted Payback Period (years)	3.02

APPENDIX 7 DRAFT TERMS OF REFERENCE FOR PROPOSED FEASIBILITY STUDY

1. Purpose of the Study

The purpose of the study is to confirm the feasibility of the Strategic Food and Fuel Production Project based on the planned business model and executing organization.

2. Study Period

The required period of the feasibility study is estimated at around 7 months.

3. Input

The required input to conduct the feasibility study is estimated to be around 14 man-months by the international experts and 10 man-months by local experts.

The required experts are shown below.

International Experts for:

(i) Team leader
(ii) Biofuel and byproduct
(iii) Energy market
(iv) Demonstration farm with fuel plant
(v) Agricultural organization
(vi) Financing plan and financial evaluation

Local Experts for:

(i) Biofuel and alternative energy
(ii) Agribusiness and marketing
(iii) Accounting and business law
(iv) Agriculture Planning
(v) Plant and cost estimation

4. Scope of Work

The scope of the work is to:

(i) to finalize the business model;
(ii) to finalize the business formation;
(iii) to design the demonstration farm with fuel plant;

(iv) to analyze financial feasibility;

(v) to prepare financing plan; and

(vi) to prepare the implementation program.

5. Output

The output of the study is the feasibility study report including implementation program.