BUSINESS PLANNING AND MANAGEMENT FOR SUSTAINABLE SMALL-SCALE RURAL AQUACULTURE VENTURE

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Note to Readers

This material is for use in training courses in business planning and management for small-scale aquaculture ventures. It contains a format or content outline of a ***Business Plan for Sustainable Small-Scale Rural Aquaculture Venture*** that serves as guide for the preparation of a business plan. This deviates from the standard business plans and feasibility studies in that it deals not only with the usual concerns on technical, market and financial viabilities of a business enterprise but also with factors and issues relating to the sustainability of natural resources and social equity. True, profit and growth are still the primordial concerns of any business, but there has been a paradigm shift that goes beyond profit. The emerging business models now take into account in their planning and management strategies external concerns that, in the long run, will affect the bottom-line figures of their operations and the stability of the society in which they operate. These external concerns include: 1) participation in campaigns for the conservation and protection of natural resources, such as water, land, forest and coral reefs, for the equitable use of all stakeholders in this generation and the next; 2) extension of socioeconomic benefits to neighboring communities in order to foster smooth relationship; 3) participation in policy dialogues and development, especially those that affect their businesses; and, 4) extension of support to institutions and legitimate people's organizations that serve as catalyzers for positive change in society and as watchdogs against forces or elements that seek to destroy the fabric of society.

In order to enrich the learning experience of the aquaculturists and make them more aware of their responsibility and accountability in the exploitation of natural resources, this training material includes discussion of factual resource-sustainability and social issues. The author combined theoretical and empirical examples in the presentation and discussion of the various subject matters. The examples are simple and factual, based on selected publications and readings in aquaculture.

Note to Trainers/Facilitators

Trainers and facilitators must be well-grounded in all aspects of the aquaculture business, i.e. technical, market and marketing, and financial. It would be an advantage for trainers to keep abreast of global issues on sustainability of aquaculture as a business venture.

The Business Plan advocated by this paper is composed of 10 chapters. It is stated above that this Plan is different from the standard business plan or feasibility study; Chapters 1 and 2 show that difference. They lay out the industry systems and natural, socioeconomic and policy environments that the trainee-aquaculturists should consider in the preparation of their own business plans to ensure the sustainability of the business they are engaged in or intend to pursue. Chapters 3 to 10 are the standard content of the traditional business plan.

As shown in the examples provided by this Plan, the business plan that should be prepared by the trainee-aquaculturist should start with statement of objectives and an overview of topics in the succeeding paragraphs. Samples of how the trainees may write their own topic discussions in their business plans are given (in boxes or tables) for better comprehension and clarity. As learning enrichment, the author included under each chapter discussions of issues that are relevant to the chapter.

Chapter 1 is an introduction to the roles of the various sectors (production, support, and marketing) that comprise the aquaculture industry, and their interconnectedness that drives the flow and exchanges of goods and services, information and technology. The discussion provides a framework for the planning of a sustainable aquaculture venture. The schematic diagram should be reproduced either in a flip chart or a power-point format, if a computer will be used, to facilitate the discussion.

Together with Chapter 1, Chapter 2 gives an overall perspective of the complex natural, socioeconomic and policy environment in which aquaculture operates. The author discusses the issues that beset most, if not all, countries engaged in aquaculture.

Chapters 3 to 8 discuss the business operation and management. Chapter 3 (The Business) is a short and straight-forward discussion of the background and legal personality of the company that a trainee proposes to establish/rehabilitate/expand. For the benefit of the neophytes, it would be useful if the trainer/facilitator can give other examples of the type of business organizations that are used in local aquaculture ventures.

Chapter 4 (Market Study and Marketing System) describes the markets for fish, both domestic and export. The domestic market is usually the main market of small-scale aquaculturists. It may not be as lucrative as export, but it is constantly there. It is therefore important for the trainee-aquaculturists to know their domestic market. The small-scale aquaculturists, however, will eventually break into the export market, given the information and support on how to go global. It is important for them to know the intricacies of fish export so that they may be able factor these in their business strategies. For purposes of estimating demand for fish, a simple example is discussed to give the trainee an idea on how to project future demand for fish.

The trainer/facilitator may reproduce the diagram of the marketing system in a flip chart or power-point format to help the trainees understand the different aspects of marketing (usually referred to as the four "Ps" of Marketing) - product, place, price, and promotion. The arrows will lead the lecturer in discussing the topic.

The operation of a small-scale culture of tilapia in freshwater ponds in the Philippines is given as case study for Chapter 5 (Technical Study-Aquaculture Operations). Intended for readers who have no experience in aquaculture, e.g. financiers or investors, the case study presents in layman terms and simplified form the different aspects of fish farm operation. Pictures of fish farms (ponds or cages) will be useful in the discussion.

Chapter 6 (Enterprise Management Principles) presents general principles and management models that may be universally adopted, regardless of nature and scale of operations. The trainee-aquaculturists may choose which ones to adopt for their operation, bearing in mind the cultural milieu in which they operate.

Chapter 7 (Human Resources and Organization) discusses the various types of business organizations (single-family business, partnership, corporation, and cooperatives) that the trainee-aquaculturists may adopt for his business plan. An organogram of a fishery cooperative is shown so the trainees will easily comprehend the organizational structure.

Chapter 8 (Financial and Economic Analysis) is a combination of theoretical and empirical discussions of the accounting tools that businesses use to determine the profitability of their operations. The formulas have corresponding examples to facilitate learning. The examples (in Tables) –financial data of a crab farming operation - are simple and easy to understand. At the end of the chapter, the trainee can see the final outcomes of the exercises in terms of short-term profitability indicators. The tables should be reproduced in flip charts or power-point format.

Chapter 9 (Environmental Impact and Social Acceptability) discusses the impacts of the proposed aquaculture venture. Given as an example is a tilapia farming project for out-of-school youth in the Philippines. This chapter reiterates the sustainability issues discussed earlier in this training material.

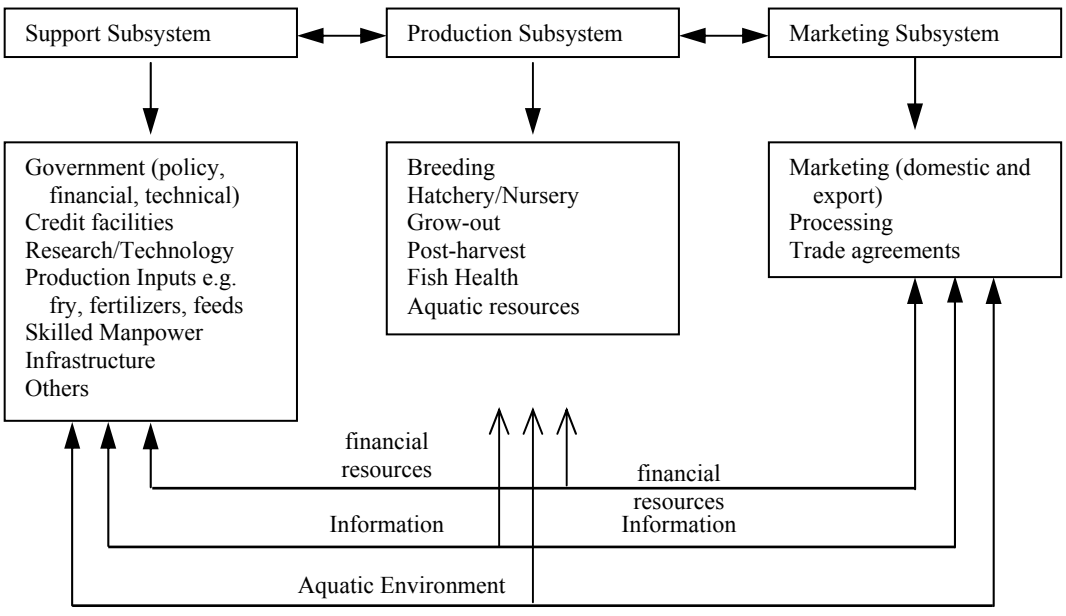
Chapter 10 (Conclusion and Recommendation) gives samples of statements of decisions and actions to be taken as a result of a business plan.

The Executive Summary, although it precedes all chapters, should be prepared last. This part of the Business Plan should be a concise and straight-to-the-point write-up of the contents of the business plan. The Executive Summary provides a "snap-shot" of the aquaculture venture; it should be written in such a way that it arouses the interest of the intended readers, mainly investors, to read the entire document.

AQUACULTURE INDUSTRY SYSTEMS: PLANNING FRAMEWORK

During the past four decades, aquaculture has become the fastest-growing industry of the food production sector of the world economy. The phenomenal growth of aquaculture can be attributed to a number of factors: the development of culture techniques in practically all the life stages of commercially important species of fish, mollusks, crustaceans and seaweeds; the formulation of affordable commercial feeds; the development of chemicals and drugs for health intervention; the support of governments and international fund donors for research and development, human resource development, and policy dialogue and development; the infusion of huge capital into high-risk profit aquaculture ventures; the development of communication technologies that facilitated the sharing of information; the development of transportation infrastructure that sped up the movement of goods; and the trade treaties of fish-producing countries and fish-importing countries that reduced or totally eliminated trading barriers.

Fig. 1 below illustrates the interconnection of the production systems, the marketing systems, the support systems, and the externalities of the aquaculture industry, in both the national and global scale.



Aquaculture Industry Systems

Production system

The core of the aquaculture industry is the production system. It is composed of: 1) breeding; 2) hatchery/nursery; 3) grow-out culture; 4) fish health; and 5) aquatic environment management. Technological breakthroughs in captive breeding, hatchery/nursery and grow-out culture of various species have opened opportunities for expansion and intensification of production in the various grow-out systems (pond and cage) in various water bodies, both fresh and marine waters. Intensive or high-density stocking systems have been developed in response to ever-increasing demand for fish, and to land-and-water use conflicts (use rights of competing stakeholders, environmental degradation).

Small-scale fish farmers, in southeast Asia, are still very much dependent on fry sourced from the wild. Worldwide, this seed source has been observed to be dwindling due to a number of factors such as overfishing, habitat degradation and increasing competition. The small-scale farmers, therefore, must have an alternative source of seed so that they can take advantage of grow-out technologies that allow high-density stocking and maximize the use of their ponds/pens during the seasons that are favorable for grow-out culture. They need to learn appropriate technologies in fish breeding, hatchery/nursery, farming and disease prevention and control that are technically and economically viable and environment-friendly. Given their remote location and low financial position, the small-scale fish farmers need the support of government and donor agencies in order to avail themselves of this alternative. They need assistance in sourcing capital and in accessing training programs and information channels.

The production system technologies require support from both the government and the private sector for them to be continually developed, improved and disseminated Support is needed all the way from the education of researchers who conceive the technologies, to the experiments in laboratories and ponds, to the verification of the technical and financial viability of the technologies, and to their dissemination to target clientele.

At the R&D stage, support from the government and private fund donors is primarily in the form of funds for research, human resource development and institution building. Big business also extends help by providing funds for research and making their laboratories and facilities available for experiments and verification.

At the dispersal stage of mature technologies, big business usually gets benefited first because they have ready and easy access to current information, land and water resources, and funds for manpower development.

Because of their remote location and financial constraints, small-scale fish farmers do not have easy access to technologies and information generated by R&D. Thus, they need help from the government and concerned non-government organizations (NGO) to avail themselves of information and training in the application of such technologies. Assistance may be in the form of sponsored training, information dissemination campaigns, and soft loans to start or rehabilitate an aquaculture business. Private sector assistance may be in the form of soft loans from the banks, and credit facility for inputs from traders.

A vital help from the government is the formulation and efficient implementation of pro-poor policies, e.g. use rights of small-scale fish farmers to common property resources like rivers and municipal waters for them to manage and use for their livelihood operations; low-interest and non-collateralized loans from government banks to build facilities and buy equipment; low tariff for imported inputs, etc.

Market & marketing system

The marketing systems and facilities (supply and market chains) are vital to the timely and safe delivery of inputs to the farm and of farm products to the intended markets. The supply and market chains significantly reduce or increase the profit of farmers, depending on their efficiency.

On the supply or input side, large-scale operators have a big advantage over the small-scale operators because they can buy their inputs at volume-discounted prices direct from manufacturers or distributors. They have storage facilities for inputs that they buy at big volumes when these are available at low prices (e.g. artemia for shrimp hatcheries). The small-scale operators, on the other hand, get their supplies from retailers at much higher prices, even predatory prices when bought on credit or during lean season.

In the marketing of produce, the big-scale operators get higher prices from export processors who pay premium for large volumes of say, shrimp, to optimize utilization of their facilities as well as to ensure meeting of their export orders. The big-scale operators also have direct access to big-volume buyers such as food processors and chains of supermarkets, fastfood outlets, hotels and restaurants. They have access to current information on prices and markets, and to communication media that facilitate communication with their customers. They also have transportation and storage facilities for timely and efficient delivery of their products to end-buyers.

The small-scale fish farmers, on the other hand, do not have the same marketing advantages. For market information, they rely mainly on middlemen who usually prey on their disadvantaged position and buy their products at low prices.

On the financing side, big operators have cash so they are not burdened with interest payments. Or if they need to take out a loan, they have access to low-interest loans from formal lenders like banks and government credit facilities. The small-scale fish farmers, on the other hand, do not have collaterals for loans so they rely on informal lenders who charge them usurious interest rates.

The pond/pen sites of small-scale fish farmers are often located in remote areas with bad roads and bridges. Cold storage and other post-harvest facilities are hard to come by in these remote areas. Oftentimes, the fish farmers' produce do not reach the market in fresh condition and so they are sold at low prices.

The government should, therefore, have a program to help the small-scale fish farmers in marketing their products. The government can initiate the forming of small-scale fish farmers' cooperatives that would, among other functions, facilitate the pooling of harvests to come up with big volumes that are normally desired by export processors, restaurant and hotel chains, fast food outlets and food manufacturers. The government can also help them by finding markets for their produce, training them in fish processing and value-adding techniques, building cold storage and post-harvest facilities in the remote areas.

Government investments in helping the small-scale operators would eventually redound to the national coffers in terms of taxes, and to a robust economy in the countryside.

NATURAL, SOCIOECONOMIC, AND POLICY ENVIRONMENT

Aquaculture is the "sunshine" industry of the food production sector of most Asian countries, particularly China, Thailand, Vietnam, Indonesia, Malaysia, Taiwan and the Philippines. Cultured shrimp, finfishes and seaweeds are major exports of these countries to the US and Japan, the two biggest markets of fish and fish products. These exports bring in foreign exchange that helps keep afloat the economies of the fish-producing countries.

But the irresponsible aquaculture practices of the 1980s-90s also wrought damage to land and water resources – some irreversible – and spawned social problems in certain areas.

Impact on land and water resources

In the 1980s-90s, vast areas of agricultural lands and mangroves were converted into aquaculture farms, mainly for intensive culture of shrimp and high-value finishes like seabass and grouper. These aquaculture farms were abandoned after only a few years of operation due to huge losses that resulted from shrimp and fish diseases and degraded environment. Most of these lands are now lying in waste, rendered unproductive by the salinity and silt left behind by aquaculture operations.

The clearing of mangrove forests to give way to aquaculture ponds/pens deprived shallow-water dwelling fishes, mollusks and crustaceans of their habitat, caused coastal erosion and siltation that adversely affected coral growth.

The excessive pumping of freshwater for aquaculture operation caused the subsidence of soil and, worse, the intrusion of saltwater into freshwater tables – an irreversible damage to a vital resource.

The chemical-laden effluents of aquaculture farms caused mass mortality of fish and other aquatic life in municipal waters and in the natural streams and rivers and man-made canals through which they were funneled out to sea.

Socioeconomic benefits; social problems

Social and economic benefits

Aquaculture has brought huge profits to large-scale fish farmers, export processors, traders of inputs, and middlemen; employment to many in the rural areas; taxes to the government; and foreign exchange to the economy. The enterprising small-scale fish farmers, especially those who formed cooperatives, have also benefited from the aquaculture boom. Some of them have even graduated into big-time operation. But many others have barely survived; quite a few went under.

Aquaculture has made fish available to all sectors of society: for the masses – tilapia, milkfish, mussels, grass carp, etc.; for the upscale market – shrimp, seabass, grouper, crabs, abalone, snakehead, etc. In countries afflicted with the "mad cow" disease and the avian flu, shrimp and fish fillet have taken the place of the blighted beef and poultry on the dining table of both the rich and poor. Aquaculture also supplies most of the protein needs of health-conscious societies - particularly in the USA, Japan and some Western European countries – whose culinary preferences have shifted from meat to fish for health reasons.

Social problems

The poor coastal dwellers – particularly the small-scale fish farmers and fishers - have borne the brunt of the damage wrought by irresponsible aquaculture practices on nature. Their agricultural farm lots were rendered unproductive when these got flooded over by saline water and effluents of fish farms during rainy seasons. Their sources of water for drinking and household-use vanished when seawater intruded into freshwater tables as a result of excessive pumping of underground water. A rich source of their food and livelihood was destroyed and their homes were exposed to harsh winds and waves when mangrove forests were cleared for aquaculture. Their access to fishing grounds and transportation routes was impeded by ponds and pens that were built along the shores of rivers and municipal waters. Agricultural farmhands lost their livelihood when agricultural lands were converted into fish farms. Some farmhands who were able to re-invent themselves to become pond helpers were hired by aquaculture companies but there were more who ended up jobless because aquaculture operations need much less workforce than agriculture operations.

Programs, policies and laws for environmental damage control and social equity

Governments in the Southeast Asian region responded to the natural and social problems spawned by aquaculture with pro-poor programs, policies and laws. With efficient prodding and guidance from research and academic institutions and "green" NGOs, the ASEAN governments came up with guidelines for granting environmental clearance for businesses to be able to obtain permit to operate, formed local and national councils that are tasked to conduct grassroots consultations on the co-management and equitable utilization of common property resources; declared as fish sanctuary areas that have been petitioned to become such after careful study; gave the villagers use-rights to municipal waters; sponsored training programs on skills development for the villagers' alternative livelihood, and management training for community leaders. Some governments initiated the formation of cooperatives – of fisher folk or small-scale fish farmers – through which the governments channeled technical and financial assistance for livelihood projects such as seaweed farming, mollusk and finfish culture, and fish processing. The governments also built farm-to-market roads, and formed agencies that scoured the world for markets of their produce.

FAO Code of Conduct for Responsible Fisheries

The FAO Code of Conduct for Responsible Fisheries sets out the principles and international standards of behavior for responsible practices to ensure the effective conservation, management and development of living aquatic resources. The Code recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and the interests of those involved in the fishery sector.

International organizations and treaties that promote global fish trade

The aquaculturists must adhere to a number of laws and regulations that deal with land tenure, water use, environmental protection, pollution prevention, public health and fisheries in general. A single model of aquaculture law cannot be formulated for the use of all countries because each country's law should be framed within the context of their respective needs, resources, tradition and culture. These needs, resources, tradition and culture change over time; laws and policies are amended to address these changes.

Nevertheless, there is general agreement among countries that certain rules and regulations should be formulated and applied universally to ensure fair trade practices between and among the trading countries. They thus established regional and global organizations that would formulate such rules, oversee their implementation, and resolve disputes. Vietnam is a member of some such bodies: the World Trade Organization (WTO) and the Asia-Pacific Economic Cooperation (APEC).

The WTO administers trade agreements, holds forums for trade negotiations, rules on trade disputes, monitors national trade policies, provides technical assistance and training for developing countries, and fosters cooperation with other international organizations. WTO agreements cover goods, services and intellectual property. Member-countries are committed to lower, and eventually remove, tariffs and other trade barriers, and to open, and keep open, their markets and services to each other. WTO agreements also include preferential tariff and trade concessions for products from developing countries, and special arrangements with regional organizations such as the Association of Southeast Asian Nations (ASEAN).

APEC's functions are similar to the WTO but its jurisdiction is over the countries in the Asia-Pacific region only.

Note to trainee-aquaculturists

In preparing your own Business Plan, discuss the natural, socioeconomic and policy environments prevailing in your area of operation, as well as the national environment that you will have to contend with in doing your business.

THE BUSINESS

Box 1. Example of a history of an aquaculture enterprise

The Fishermen's Association of Malalison Island was organized in 1992 by small-scale fishers and farmers who were engaged or who planned to go into coastal resrouce management and small-scale aquaculture venture. The original membership was 200 fishers but this has decreased to just over a hundred because of poor production in their fish farms. The members were not able to acquire the required information and know-how in latest aquaculture techniques that would have improved their productivity.

The SEAFDEC Aquaculture Department provided technical assistance to FAMI through training and institution-building activities with focus on coastal resource management and small–scale aquaculture such as seaweeds farming. Annual workshops were conducted to evaluate the progress and impacts of the interventions of SEAFDEC and partner-organizations in improving the socioeconomic conditions of the fishers and the rehabilitation of critical fish habitats such as coral reefs and seagrass beds.

The bio-physical and socioeconomic impacts assessment showed positive indicators in terms of increase in biomass of fish and improved income of the fishers. Since then, FAMI pursued its community-based and cooperative efforts in managing the fishery resources and implement appropriate livelihood ventures including aquaculture.

Box 2. Example of a description of a cooperative as an aquaculture enterprise

The Fishermen's Association of Malalison Island (FAMI) was organized by fishers and small-scale aquaculturists in the island of Malalison, Culasi, Antique as an instrument for attaining their common economic, social and cultural needs and aspirations.

The objectives of the cooperative are:

1. To engage in fishery resources management and small-scale aquaculture ventures either by family or as clusters of families;
2. To assist the members in dealing and transacting with the government and development organizations in acquiring technical, financial and marketing information; and
3. To strengthen their bargaining power in negotiating good prices for their products from traders and middlemen and lower prices of inputs from traders.

FAMI is managed by a Board of Directors (BOD) that formulates overall business policies. The Board is composed of five members: four who are elected by the cooperative members, plus the President as ex-officio member. The board members elect from among themselves the chairman and board secretary. The board members have a two-year term and they meet once a month.

The Cooperative's day-to-day operation is managed by an executive group composed of the: 1) President; 2) Vice-President; 3) Business Manager; 4) Operations Manager; 5) Finance Manager; and 6) Marketing Manager. The officers are elected by the members of the cooperative and they have a two-year office tenure.

MARKET STUDY AND MARKETING SYSTEMS

Note to trainee-aquaculturists
In preparing your business plan, describe the markets you cater to – domestic or export. Discuss the competition from other growers, the marketing systems (product development, channels of distribution, pricing and promotional efforts) needed to market your products effectively.

General Market Description

Box 3 is an example of a simple market description.

Box 3. Example of a general market description

The market for fish is large and continuously growing. As global population grows, as people become more health conscious, as culinary preparations of fish become more sophisticated and appealing to universal taste, and as animal and fowl diseases continue to threaten people's health, the markets for fish will continue to expand and grow.

In 2003, the Philippines was the 8th largest producer of fish, crustaceans, molluscs, and aquatic plants (seaweeds) with a total volume of 989,569 metric tons (FAO 2003). In 2005 the total aquaculture production of the Philippines was 1,895,847 metric tons with seaweeds comprising 70% and the rest were other species such as milkfish (15.25%), tilapia (8.6%), shrimps/prawns (2.11%) and others (3.44%). The domestic consumption of fish has been increasing with preference towards aquaculture products such as milkfish and tilapia because of stable prices.

Also in 2005, the breakdown of exports of fish and fishery products was: a: fish, crustaceans, mollusks and preparation (139,358 mt, US&347,866,000), shells and by-products (7,854 mt, UA$36,849,000), and miscellaneous and other fishery products (33,562 mt, US$72,664,000). The total volume during that year was 180,774 mt valued at $457,379,000. The major export market of fish and fishery products are Japan. USA. Taiwan, Korea, Germany, and Hongkong.

Demand estimates

The size and the projected growth of the fish markets are important in determining the potential development of fisheries and aquaculture. The major factors that affect the demand of aquaculture products are population size and income.

The domestic market is important to the fishing industry, especially to the aquaculture sector. Institutional buyers such as restaurants, hotels, supermarkets and similar establishments are fast developing and have become major outlets for fish. High-value capture products, such as lobster, mackerel and squid, and aquaculture products, like shrimps and snappers, are in strong demand among institutional consumers. Household consumption of fish is increasing, especially fresh products.

In determining market trends or projecting demand for fish in a particular area or market segment, consumption data of the species are studied over time. However, it is very difficult to have these types of data unless the company is big and can spend some resources in gathering the data. As a general rule, estimating future demand is based on the average percentage increases during the past years. If the average increase is 3%, then demand projections will increase by 3% annually.

An example is shown in Box 4.

Box 4. Estimate of demand for catfish

Estimate of demand for catfish in Aklan Province based on past consumption:

Year	Quantity (kg)
2000	120000
2001	121230
2002	124700
2003	125690
2004	127790
2005	129900
2006	131900

Based on the above figures, the estimated yearly increase in the demand of catfish is 2% per year. Therefore, the projected demand for the next three years will be:

2007	135857
2008	139933
2009	144131

Future-demand projections are, at best, benchmark figures that will guide the fish farmer in his/her business plans. The fish farmer should always be aware of the changes in market trends and of the factors that affect the demand for fish products such as price, taste, nutritional value, and value-added features of the products.

Marketing Plan

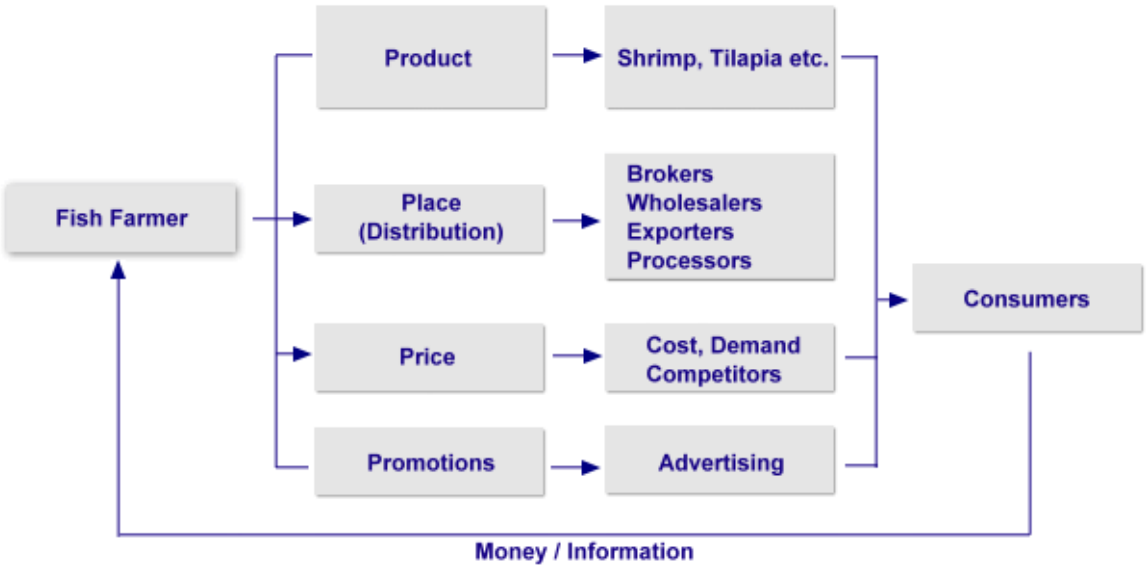
A marketing plan presents the strategies of a business entity in satisfying the needs of its customers in order that its operations will profit and grow.

The marketing plan starts with objectives. Examples of marketing objectives are:

1. To sell 60% of farm products in Manila, 20% in Iloilo, and 20 in other parts of the country.
2. To penetrate the export market next year by selling quality fish to exporters and processors; and

3) To increase sales by 10% annually.

The marketing plan describes the four "Ps" in marketing goods and services, namely *product, place, price, and promotion*.



Marketing Systems

1. Products

Aquaculture products are mostly high-value species (shrimps, groupers, snappers, crabs, etc) with good export potential. However, species for domestic consumption, such as tilapia and snakehead, are popular products and fish growers have invested substantially to culture these species.

An aquaculture venture can specialize in one or two products, or engage in the polyculture of multiple species, depending on the company's resources, technological capabilities, business management skills, and market coverage. An aquaculture venture may also engage in product development, such as fish processing and packaging in cans or bottles in order to prolong the shelf life of and add value to their fish products.

2. Place (Distribution channels)

In choosing a distribution outlet - whether a broker, wholesaler or exporter - profit optimization is a major consideration. The small-scale fish farmers do not always have this luxury of choice because of some constraints like lack of facilities to sell their products direct to consumers or fish processors. The small-scale fish farmers have limited influence over the distributors, unlike big aquaculture companies that can consistently supply good quality fish in large volume thus reducing the buying costs of processors or distributors. The small-scale fish farmers are at the mercy of big-time brokers and middlemen and they could not get good prices for their products.

Wholesalers play an important role in fish marketing and information dissemination. Majority of the fish products are sold to wholesalers who are classified into four categories: first, intermediate, last-stage, and multifunctional wholesalers. The fish, depending on the distance of the source to the market or processing plants, must pass several intermediaries before it reaches the end-consumers. Small farmers, because of their limited production, normally sell their products in nearby wet markets and local restaurants.

Processors play critical roles in distributing aquaculture products, especially in tapping distant markets such as export markets. The presence of fish processors in a certain area encourages more fish production because of the assurance of a reliable market for the producers. Value-adding of fish products, through processing and other product development activities, results to expansion of the demand for fish.

3. Pricing

There are three criteria in setting price schemes: cost of production, demand, and competition.

The cost criteria of the product include production and marketing costs, a reasonable allocation for fixed costs (depreciation and loan interest), and management and administrative overhead expenses. The aquaculture company will then put a reasonable mark-up as profit for his business.

An example is cost and pricing for shrimps per kilogram in Vietnam:

Cost of production	-	VND 12,000
Marketing cost	-	800
Total cost	-	13,000
Mark-up (30%)	-	3,900
Selling Price/kg	-	16,900

However, the market forces (supply and demand) that dictate the prices in the market are competition from the produce of other farmers and from other fish products that give the consumers the same level of satisfaction.

If the market price for shrimp is VND 15,000/kg, which is lower than the computed selling price based on 30% mark-up, the fish farmers will have to decrease their price and make do with less profit. If competition becomes very tight and forces the market price to go as low as VND 13,000/kg, then the shrimp farmer is forced to sell at cost or break-even. This means no-profit, no-loss. There are times when the fish farmers are forced to sell at loss, when the market prices go lower than the fish farmer's production cost.

4. Promotion

The standard promotion and advertising strategies, using the popular media (TV, radio, print) are not employed by small-scale aquaculture companies. They rely on word-of-mouth to promote their products.

Big aquaculture companies that export their products do engage in advertising. Attractive product packaging is a form of advertising. Shrimp exported to rich western countries are contained in attractive packages in order to catch the attention of buyers in supermarkets and groceries.

TECHNICAL STUDY (AQUACULTURE OPERATIONS)

Project Site Facilities

This section gives the technical description of the proposed farm facilities. Farm facilities include ponds or cages, water systems, buildings, laboratories and instruments, and equipment like pumps, generators, blowers, etc. This section is important because it will be the basis for computing the cost of constructing the facilities and acquisition of instruments and equipment.

Box 5 is an example of a write-up on Project Site Facilities for a business plan.

Box5. Project Site Facilities for Tilapia Culture

Tilapia Facility. The pond facilities shall be constructed in a one-hectare pond located near the river. The ponds are for tilapia broodstock, nursery and grow-out culture. The specifications are:

Broodstock Pond: 2 units, 10 x 20 x 1.5m
Nursery Pond: 1 unit, x10 x 20 x 1.5m
18 units of hapa nets, 3 x 3 x 1.5m, inside the pond.
Grow-out Pond: 7 units, 10 x 20 x 1.5m

A deep well, made of concrete culverts, is the source of freshwater for breeders' conditioning and treatment, egg hatching, and larval rearing. Two units of 1/2hp water pumps are needed: one to pump water from the well direct to the ponds, and the other to pump water from the well into a 6-box re-circulating system.

The re-circulating reservoir measures 0.46 m wide, 2.5 m long, 0.77 m high; it is made of 2 cm-thick marine plywood.

An aeration system, consisting of a Roots blower and aeration pipeline (2 cm dia. PVC pipe) aerates the hatching troughs and multipurpose tanks. The four units of 1m x 1m x 1m multipurpose tanks - primarily used for broodstock conditioning or treatment - are made of 2 cm-thick marine plywood.

A concrete or wooden working table, measuring 0.61m x 2.5m x 0.76m, is located near the hatchery stockroom and sleeping quarters of the catfish hatchery technician and aide.

The sleeping quarters (3m x 5m) for the technician and aide, and stockroom (3m x 4m) are built near the four multi-purpose tanks.

Dikes. Soil excavated from the pond shall be used to construct the dikes. The specifications are:

Main Perimeter Dike: 2.0m base; 1.0m crown; 2.0m height
Secondary Dike: 1.5m base; 1.0m crown; 1.5m height

Drain Gates. Located at the northern rear of the tilapia facility, the specifications for the two concrete drain gates are:

Main Drain Gate: 0.7 m wide; 2.0m long; 2.0m high
Secondary Drain Gate: 0.5m wide; 1.5m long; 1.56m high

Flume. A flume, 46 cm wide and 61 cm high, is an open channel that is laid/buried on the crown of the central secondary dike from the reservoir pond to the grow-out ponds. The distribution gate from the flume to every pond is 15 cm wide with double grooves for slabs and screens. The inner side of the dike, where the water flows when the distribution gate is opened, should be rip-rapped to about 1 m wide.

Production Process (Aquaculture Operations)

The production process in aquaculture generally includes pond preparation, stocking, feeding, and monitoring, maintenance, and harvesting of fish stocks.

Box 6 shows the different activities in the grow-out culture of tilapia in ponds.

Box 6. Grow-out culture of tilapia

Pond Preparation. The protocol for the preparation of the grow-out pond is similar to those indicated in the preparation of broodstock and nursery ponds. Pond water is drained and replenished; unwanted species eradicated; pond soil is limed and fertilized; and, finally, flooded. The ponds are conditioned and prepared for the culture of natural food needed by the fish.

Acclimation and Stocking. Fry or fingerlings are acclimatized to a new environment by gradually equalizing the temperature of the transport water and the pond water to prevent the death of fish due to thermal shock after their release into the ponds. This is usually done by making the transport bags float on the pond water for at least 30 minutes before the fry are released from the transport bags into the pond water. The fish are stocked at 5/sq m or 50,000/ha.

Feeds and Feeding. Fish are given supplemental diets (25-30% protein) at 3-5% of their biomass. The daily feed ration is given equally during the 8:00AM and 4:00PM feeding schedules. The daily feed ration is adjusted every 15 days based on the stock sampling.

Water Management. The availability and maintenance of good water quality is the most important consideration in the culture of tilapia. Water depth is maintained at 80-150 cm. During the first 2 months of culture, water is drained and replenished to about 40-60% every two weeks. From the 3rd month until harvest, a flow-through water system is recommended due to higher biomass and feed inputs.

Harvest and Post-Harvest Handling. Harvest is done when a desired marketable size (100-200 g) is attained. Harvest can be partial or selective; only bigger ones are collected by cast net or seine net. This will allow further growth of smaller fish. Total harvesting can be done by totally draining the pond and removing all fish. Fish are placed in chilled water and packed in styrofoam boxes with 1:4 ice-to-fish ratio.

ENTERPRISE MANAGEMENT

Enterprise management principles are learned from experience, and they have universal validity for almost all business situations. It is up to the managers to apply them intelligently to your project. Your aquaculture enterprise would be in a strong position if it is in the hands of a project manager who deeply believes in these principles and acts on them. These principles are:

- **Rule #1- Know your business.** Know as much as you can about your business, and more. Since you have decided to go into aquaculture business, make sure your business is financially and technically viable. Select the aquaculture systems that are good and appropriate for your site, resources, technical know-how, and market. Understand the value systems in your business and watch for changes. Be diligent, resilient, and resourceful. Learn and apply the best aquaculture practices. Define what is inside and outside your area of responsibility.
- **Rule #2 - Understand the customers' requirements and preferences.** Understand thoroughly and document the customers' needs and requirements. Requirements management is the leading success factor for good enterprise management, whether aquaculture, manufacturing or trading.
- **Rule #3 - Prepare a realistic and doable plan.** Prepare a plan that defines the scope, schedule, cost, and approach for a realistic and doable project. Make a schedule of activities within a time frame to ensure coherence and thoroughness, and to reduce waste of resources.
- **Rule #4 - Build a good team with clear definition of roles and turf.** Get good people and trust them. Give the members clear and well-defined tasks; ensure they have the tools and training needed to perform their tasks; and provide them with timely feedback. Emphasize open communication. Create an environment in which team dynamics can jell. Lead the team.

- **Rule #5 - Monitor project status and let others know.** Monitor the progress of operations. In aquaculture, good water management and feeding protocols and vigilance against diseases will spell the difference between good and bad production runs.
- **Rule #6 - Use Baseline Controls.** Budget and cost controls are examples of baseline controls. Establish baselines for the different fish species that are being cultured to determine if costs and budgets are within the projected figures. If changes are needed in the budget or in the cost of production, manage changes judiciously.
- **Rule #7 - Write down important matters, share it, and save it.** Document requirements, plans, procedures, and designs. Write down ideas and concepts and allow them to evolve and improve. Without documentation it is impossible to have baseline controls and reliable communications, or to repeat a process. Record all important agreements and decisions, along with supporting rationale and documents. They may be of vital use later.
- **Rule #8 - Ensure customer satisfaction.** Keep the customers' real needs and requirements continuously in view. Undetected changes in customer preferences, or not focusing the business on the customer's needs, are sure paths to project failure. Remember, a satisfied customer will always be a customer.

HUMAN RESOURCES AND ORGANIZATION

For single-family proprietorship types, the owner is also the manager. S/He oversees all tasks: from pond preparation, stocking of fry, feeding, changing of water in the ponds, monitoring stock health and growth, to harvesting. If disease occurs, s/he will have to rely on his/her personal knowledge without benefit of technical advice from experts. S/He also takes care of selling the fish and collecting payments from buyers. Financial resources are limited to the family's financial assets. Family members compose the work force in the farm.

For business partnership, at least five investors agree to pool their resources to put up a business. They may manage the business themselves or hire professional managers, technicians and workers. Since there are more people involved, there are more sources of financing for the business operation. The partnership is disbanded once a partner decides to quit from the partnership.

A business corporation is created and governed by law. The business organizers, minimum of five, decide to put up a corporation. The company is registered with the appropriate government agencies following the corporation laws of the country. The corporation is financed through subscription of stocks or shares by investors. The value of the shares is based on the financial assets of the company. A corporation has a Board of Directors (BOD), with a minimum of five members who are chosen or elected by the stockholders. The Chairman of the Board is elected by the members. The President or Chief Executive Officer is usually a member of the BOD.

The organizational structure of a corporation is more complex than the other business organizations. Big aquaculture companies are normally organized as corporations. Corporations are attractive to long-term investors who, in turn, are preferred by big business set-ups. The liability of a corporation is limited to its assets.

Fishery cooperatives are institutions that are established by people involved in the fishery sector with common business aspirations. The members of a cooperative may be in fish capture, aquaculture, processing, or marketing. The main objectives of fishery cooperatives are focused on the development of the industry and well-being of the communities. They aim to increase income, improve standard of living and increase fish supply for their communities. Cooperatives started as grassroots organization. The members, usually from the poor sector of the workforce, e.g. workers, fishers and farmers, pool their limited resources and work together so they could get better selling prices for their products, lower buying prices for their production inputs, and have a united front in negotiating for credit or loans from lending institutions, both private and government.

In Japan, the fisheries cooperatives dominate 70% of the fish market. In Turkey, fisheries cooperatives are described as "insistent ideal" organization for fishers because they were born not out of the people's desire for cooperation but out of the insistent and conscious organizational effort of the state bureaucracy.

A typical organization structure of a fisheries cooperative is shown below. There is a Board of Directors that is composed of five members. The board members are elected by the cooperative members. The chairman of the board is elected by the members of the board. The members invest in the cooperative by buying shares. These investments are part of the financial assets of the cooperative. If the cooperative earned profit, dividends are paid to members *pro rata*. Most governments are supportive of cooperatives. Government provides support to the cooperatives by sponsoring training and extension activities, extending low-interest financing, providing market information, and opening access to technology.

Below is a typical organizational structure of cooperatives:

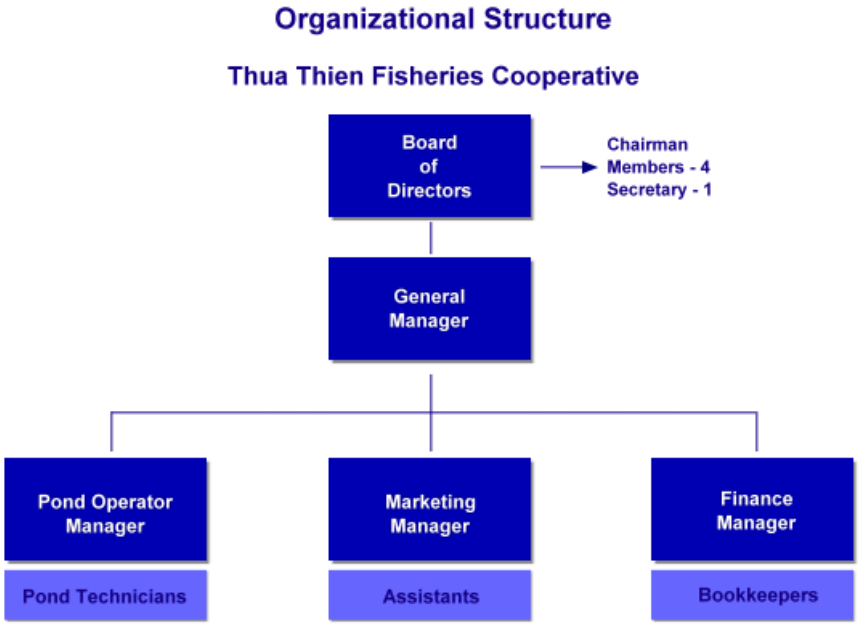


Figure 3. Organizational structure of a cooperative

FINANCIAL AND ECONOMIC ANALYSIS

This portion of the business plan is important to show to the creditors (banks and trade creditors) the financial viability of the aquaculture venture

Simple cost and returns analysis

The cost and return analysis uses the undiscounted method of evaluating the economic feasibility of a business enterprise (aquaculture venture in our case) in the short term. Figures used in cost and returns computations are based on production and market information.

Tables 1-5 are examples of the computation of simple cost and returns analysis of tilapia culture in freshwater ponds.

Production and market data (Table 1) provides the basis for computing revenues of the tilapia farm.

Table 1. Technical Parameters of a Tilapia Grow-out Operations

1. Total area (m2)	1400
2. Stocking requirement (/m2)	30
3. Total stocking	42000
4. Duration of culture (mo)	4
5. Croppings/year	3
6. Survival rate	0.9
7. ABW (g)	150
8. FCR	1.2
9. Feed requirement/cropping	6804
10. Cost of feed/kg (PhP)	16
11. Production/crop	5670
12. Price of fish/kg (PhP)	50

Investment requirements

First step is to compute the investment requirements. There are two parts considered in estimating the amount of investment *(*Table 2). 1) capital outlay (cost of structures and equipment); and 2) working capital or operating capital (budget for cost of inputs e.g. fry, fingerlings, fertilizers, direct labor, fuel, electricity, supplies and materials, etc). The sum of the capital outlay and the working (operating) capital is the total investment requirement. The business organizers put up the required capitalization from their own individual resources. If their fund is insufficient, the company may borrow from either formal (banks) or informal lenders. The loan bears interest and is payable at an agreed duration.

Table 2. Investment Requirements for Tilapia Grow-out Operations

							Amount
A. Capital outlay							
1. Pond excavation and diking (1400 m2 x 0.5 m) =					700	80	56000
2. Reservoir							
a. Excavation & diking P18000/2							9000
b. Cement plarform P600/2							300
c. Hollow block division P5600/2							2800
d. PVC pipe 6" dia. 46 pcs @1154 = P49622/2							26542
e. PVC coupling 6" dia 42 pcs @P450=P18000/2							9000
f. PVC ball valve 6" @P650/2							325
3. Gates							
a. Concrete drain gate P10000 + reservoir drain							18900
gate P5000 + slabs & screens P3500							
b. Concrete sec. Drain gate 7 units @P6000 and							42000
P5000 slabs and screens							
4. Flume							
50 m X 200/2 + slabs & labor P1500							5000
5. Harvesting shade/stock room P13,000/2							6500
6. Caretakers hut P13000/2							6500
	Subtotal						182867
B. Working capital (one run)							160,053
C. Total Investment							342920
Sources of Funds					Interest		
Equity		10.00%		34292			
Loan	18.00%	70.00%		240044	43208		
Grant		20.00%		68584			

Production cost

Computing the production cost is important in order to monitor the cost effectiveness of the aquaculture venture. The total cost is composed of two parts: 1) variable or operating cost; and 2) fixed cost. Variable costs are the cost of inputs (fry, fingerling, feeds, chemicals, direct labor, etc.). Variable costs change, depending on the level of operation. Fixed costs are the depreciation of capital assets, interest expenses and salaries of fixed term employees (management and administrative) that do not change over a long time.

Variable cost

Variable costs are the cost of direct inputs, e.g. fry, fingerlings, fertilizers, direct labor, etc. The variable cost of each item is computed by multiplying the quantity (pieces, kilograms, etc) by the unit cost of the item. Refer to Table 3, item *B. Variable Costs.*

Table 3. Cost and returns - Tilapia Grow-out Operations (Philippine Peso)

					Per run	Per year
				Unit		
Revenues			Quantity	Price	Total	Total
Sale of tilapia			5,670	50	283,500	850,500
Less:						
Variable cost						
Cost of fingerlings			42,000	0.24	10,076	30,227
Feeding			6804	16	108,864	326,592
Electricity					0	0
Lime			196	1.3	255	764
Manure			196	1.2	235	706
16-20-0			7	8.5	60	179
45-0-0			3.5	8.5	30	89
Labor						
Technician (P5000/mo)			0.25	30000	7,500	22,500
Aide (P3500/mo)			0.5	21000	10,500	31,500
Casual (5 person-days)			4	115	460	1,380
Food allowancce for technicians			3	25	2,250	6,750
Honorarium for Manager			0.25	5000	1,250	3,750
Marketing expenses (2% of sales)					5,670	17,010
Repairs and Maintenance (5% of capital assets)					10,904	32,713
Miscellaneous expenses					2,000	6,000
	Subtotal				160,053	480,160
Fixed cost						
Interest expense					14,682	44,045
Depreciation					7,512	22,535
Management and Administrative overhead (P5000/4/mo)					5,000	15,000
Land lease - P15,000/yr for 1st 2 years					1,250	3,750
	Subtotal				28,443	85,330
Total Cost					188,497	565,490
Income before tax per run					95,003	
Annual income (3 runs)						285,010
Return on Investment (ROI)						83.11%
Payback period						1.12
Cost of tilapia/kg						33.24

Fixed cost

Fixed costs do not change regardless of the level of production. It means that even if the aquaculture farm is not operating, the business incurs fixed costs nonetheless. Examples of fixed cost are depreciation of capital assets and interest of borrowed money.

a. Depreciation cost. Depreciation is the allocation of the cost of a capital asset (building, equipment) over its economic life of more than a year. The straight-line method is the most common method of computing depreciation cost. The formula is:

$$\text{Annual depreciation} = \frac{\text{Original cost - salvage value}}{\text{Economic life}}$$

The salvage value is the estimated "left over' or residual value of a capital asset at the end of its economic life.

Table 4. Depreciation cost (Philippine Peso)

		Amount	Econ. life	Salvage value	Depr
A. Capital outlay					
1. Pond excavation and diking (1400 m2 x 0.5 m) =		56000	10	0	5600
2. Reservoir					
a. Excavation & diking P18000/2		9000	10	0	900
b. Cement plarform P600/2		300	10	0	30
c. Hollow block division P5600/2		2800	10	0	280
d. PVC pipe 6" dia. 46 pcs @1154 = P49622/2		26542	5	1327.1	5043
e. PVC coupling 6" dia 42 pcs @P450=P18000/2		9000	5	450	1710
f. PVC ball valve 6" @P650/2		325	5	16.25	62
3. Gates					
a. Concrete drain gate P10000 + reservoir drain		18900	10	0	1890
gate P5000 + slabs & screens P3500					
b. Concrete sec. Drain gate 7 units @P6000 and		42000	10	0	4200
P5000 slabs and screens					
4. Flume					
50 m X 200/2 + slabs & labor P1500		5000	5	0	1000
5. Harvesting shade/stock room P13,000/2		6500	10	0	650
6. Caretakers hut P13000/2		6500	5	650	1170
	Subtotal	182867			22535

b. Interest expense. Interest paid for borrowed money is a fixed cost. It is simply computed by multiplying the interest rate by the amount of the loan. In Table 2, the amount of loan of the tilapia farm is PhP 240,044 , bearing 18% annual interest. Thus, the interest expense of our example is PhP 43,208.

Total cost

The total cost is the sum of the variable cost and the fixed cost. The cost per unit (kg) is computed by dividing the total cost over the quantity of fish produced.

In our example, the cost of producing one kilogram of tilapia is:

$$\text{PhP}\frac{188497}{5{,}670 \text{ kgs}} = \text{PhP } 33.24$$

Profitability indicators

In determining short-term profitability, the following indicators are used:

1. Net profit (Income) = total revenue – total cost of production
   = PhP 850,500 – 565,490
   = PhP 285,010

2. Return on investment (ROI) = Net income/total investment
   = PhP 285,010/342920
   = 83.11%

3. Payback period (PP) = total investment/(net income + depreciation)
   = 342,920/ (285,010+22,535)
   = 1.12 years

The profitability indicators show that the tilapia farming is financially viable. For every PhP 1000 invested in the business, PhP 831.10 is earned in one year. The payback period is 1.12 years. This means that the original investment is recovered in a little over a year of operation.

There is no hard-and-fast rule regarding minimum figures to indicate acceptable profitability levels. So much will depend on the prevailing investment opportunities in a certain place and time. There might be competing investment opportunities but with different risk levels.
The simple cost and returns analysis will provide the investors a picture of the relationships between the cost, revenues, and the profitability of their investment.

Simple accounting and bookkeeping records

In addition to the previous examples on cost and returns, simple accounting records and bookkeeping practices are useful in aquaculture operations and management (Tables 6-10). Fish farming activities include pond preparations, fertilization, purchase of fry and juveniles, feeding, farm maintenance, harvesting, and marketing. For small enterprises, simple accounting records will help the farmer monitor the flow of expenses and the status of the cost of production and revenue of the business.

A daily record of operating expenses will help the fish farmer monitor the cost of production (Table 6).

Table 6. Sample of a daily record of operating expenses

Date	Pond/cage No.	Item	Kind	Quantity	Unit cost	Total cost
1-May	1	Fry	Shrimp	10000	2	20000
3-May	2	Feeds	Pellets	10	10	100
5-May	3	Gasoline	Diesel	10	3	30
30-May	2	Chemicals		3	20	60
Total						20190

Labor costs are incurred in all the activities, whether the laborers are members of the family or hired labor (Table 7).

Table 7. Daily Record on labor cost

Date	Pond /cage	Activity	Kind of labor	Number of laborers	Number of days	Daily rate	Total Labor Cost
1-Jul	1	Pond preparation	Daily	5	5	80	2000
15-Jul	2	Repairs of cage/pond	Daily	2	6	100	1200
30-Jul	3	Harvest	Daily	6	1	80	480
Total							3680

Recording of sales (Table 8) will make it easy for the fish farmer to prepare a cost and returns computation at the end of a business period, whether per crop or per year. The record can also show the source of fish, whether in pond 1 or cage 3, so that inventory of the fish stocks in the different compartments (ponds or cages) is regularly monitored and controlled.

Table 8. Sales Record

Date	Pond/cage	Species	Quantity (kg)	Unit Price	Revenue
June 1	1	Tilapia	1200	50	60000
June 15	2	Shrimp	500	200	100000
June 30	3	Snapper	800	50	40000
Total					200000

Efficient management of assets is important because of the high cost of acquisition. The inventory of assets will serve as guide in the maintenance of these assets in order to prolong their usefulness.

Table 9. Inventory of assets and estimated economic life

Type	Acquisition/Construction Cost	Date of Purchase	Economic life
Building	30,000	Feb-04	10
Transport	20,000	Mar-05	5
Nets	15,000	Apr-06	3
Equipment			
- Water pump	10,000	Apr-06	5
- Generator	20,000	May-06	5
- Blower	10,000	Jun-06	5
- Feed mixer	5,000	Jul-06	5
- Refrigerator	5,000	Aug-06	10
- Others	1,000	Sep-06	5
Total	216,000		

Good financial management requires prompt payment of loan (principal and interest). Keeping records of loan (Table 10) is, therefore, imperative in the overall management of the business.

Table 10. Record of loans

Date borrowed		July 6, 2006
Amount borrowed		VND 30,000,000
Source of loan		Vietnam Farmer's Bank
Purpose of loan		Purchase of equipment, pond repairs
Terms of loan		
	Length (years)	5
	Annual Interest	6%

Payment of the loan

Date		Outstanding	Interest paid	Repayment of principal	Total payment
July 6		VND30,000,000			
Oct. 6			450,000	1,500,000	1,950,000
Oct. 18		28,050,000			

ENVIRONMENTAL IMPACT AND SOCIAL ACCEPTABILITY

Below is an example of the discussion on the environmental and social acceptability of an aquaculture venture. This is the case of the tilapia culture project for out-of-school youth in Aklan, Central Philippines.

Box 7. Environmental impact and social acceptability of a tilapia culture project

A. Environmental impact

*Preservation and protection of trees in the project site***.** The trees growing on the project site - mangrove, gemelina, mahogany and eucalyptus - will not be cut.

*Revival of native catfish in freshwater bodies***.** The native catfish is an endangered species that nearly disappeared from the country's freshwater bodies because it was preyed upon by the imported African and Thai catfish. The Jawili project will open the way to the revival of the native catfish in the freshwaters of Tangalan and neighboring areas.

*Productive use of Jawili Falls water***.** The proposed project will make good use of the free-flowing water of the Jawili Falls instead of just being wasted away.

*Clean-up of waterfalls pollutants***.** The Jawili project will need clean water. The project will thus spur the municipal and barangay governments, which are both supportive of the project, to come up with measures to eliminate such pollutants as shampoo and soap suds of bathers in the waterfall basin, and to regulate the disposal of picnicker's trash.

*Disciplinary measures for waterfalls polluters***.** The representatives of the different sectoral organizations in Jawili concurred with the village Council's move to draw up measures, including punitive sanctions, for the elimination of pollutants in the Jawili Falls water and of trash in surrounding areas.

B. Social Acceptability

The social concerns of the project were:

No social displacement. The proposed project is an idle site and unoccupied land. Nobody loses abode or job when the project is established on the lot.

Out-of-school youth will be trained in best practices of pond aquaculture. The skills will enable them to be employed in the project and make them productive members of the community.

Women's role in the Project. There is no position in the project that discriminates against women. All the positions – from manager to aide – may be occupied by healthy women who have the requisite academic preparation, skills, aptitude, and attitude.

There are certain work in the operation that require physical strength, such as carrying of water-filled pails, scraping pond bottoms, starting generator, and repairing of dikes, but women who are healthy and are willing to take on the jobs will have equal crack at the jobs as men.

*Hiring of residents***.** The residents were assured that they will be given first priority in the hiring of workers, provided they are qualified, during the development phase of the project.

*Environmental safeguards***.** The residents were assured that the production processes are environment-friendly. Environmental management measures to neutralize or pre-empt the adverse impact of some production activities were explained to them.

CONCLUSIONS AND RECOMMENDATIONS

The proponents of the aquaculture project should be able to make sensible conclusion and powerful recommendations to convince investors and banks of the worthiness of the proposed business.

Box 8. Examples of statements of conclusions and recommendations

1. The proposed crab culture project is economically and technically feasible.
2. The project will provide the small-scale fish farmers additional income and source of food.
3. The proposed project is socially acceptable because it will generate employment and livelihood opportunities for the community and provide them access to market and technological information.

In view of the above conclusions, the following are the recommendations:

1. To organize a fishery cooperative among the small-scale fishers of Thua Tien Hue province.
2. To train the members of the cooperative in best aquaculture practices and enterprise management.
3. To negotiate with a government financing institution to provide the cooperative low-cost financing packages.