

**CREDIT MARKETS IN THE FISHERIES SECTOR  
UNDER THE CARP: A REVIEW OF LITERATURE  
AND CONCEPTUAL FRAMEWORK**

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## TABLE OF CONTENTS

I.	Introduction.....	1
II.	The Philippine Fisheries Industry: An Overview.....	2
	A. The Fisheries Sector.....	2
	B. The Aquaculture Sector.....	5
	1. Profile of the Aquaculture Industry.....	8
	2. Industry Organization.....	8
	3. Cost and Return Analysis.....	18
	4. Productivity, Farm Income, Ownership and Farm Size.....	23
III.	Structure of Credit Markets in the Fisheries Sector and the CARP.....	23
	A. Economics of Aquaculture.....	27
	B. Risk Element in Aquaculture.....	29
	C. Credit Constraints in Aquaculture.....	31
IV.	Credit Policy and Interventions in the Fisheries Sector:	
	The Philippine Experience.....	32
	A. Loans to the Fisheries Sector.....	32
	B. Past Credit Policies and Programs for Aquaculture.....	33
	C. Current Credit Policies and Programs.....	39
V.	Conclusion: Research Gaps and Priorities.....	45
	References.....	47

## LIST OF TABLES AND FIGURE

1.	Fisheries Production by Sector, 1981-90.....	3
2.	Employment in the Fisheries Industry by Sector, 1990.....	3
3.	Philippine Aquatic Resources.....	4
4.	Philippine Exports of Fish and Fishery Products and the Major Countries of Destination in Terms of Value, 1990.....	6
5.	Status of Aquaculture Industry, 1990.....	9
6.	Features of the Aquaculture Industry in the Philippines Summary of Findings from Various Studies.....	10
7.	Investment and other Inputs, Aquaculture Industry in the Philippines, Various Surveys.....	19
8.	Cost and Return Analysis, Aquaculture Industry in the Philippines.....	24
9.	Agricultural Production Loans Granted, by Commodity: 1980-1990.....	34
10.	Loans Granted to Fisheries by Institution, 1986-1990.....	36
11.	Financing Programs for Aquaculture, by Institution and by Maturity.....	40
12.	Status of CALF Guarantee Coverage, by Type of Commodity.....	44
Figure 1.	Factors Affecting the Aquaculture Sector.....	28

# **CREDIT MARKETS IN THE FISHERIES SECTOR UNDER THE COMPREHENSIVE AGRARIAN REFORM PROGRAM (CARP): A REVIEW OF LITERATURE AND CONCEPTUAL FRAMEWORK\***

*Gilberto M. Llanto and Marife T. Magno\*\**

## **I. INTRODUCTION**

The Comprehensive Agrarian Reform Program (CARP) of the Aquino administration which was enacted into law under Republic Act 6657 is expected to bring about a great impact on Philippine subsistence agriculture. This is not surprising considering that the CARP encompasses the whole agricultural sector including fisheries, in contrast to the previous agrarian reform program, Presidential Decree (PD) No. 27, which covers only the rice and corn sectors.

It is interesting to see the effect of employing a land reform program originally designed for the crop sector in the fisheries sector. While it may produce beneficial results, it may also bring about disruptive effects that could worsen existing problems in the industry.

One aspect of the fisheries industry that will likely be affected is the availability and accessibility of credit. For example, because the fishing industry, specifically the small-scale fishery subsector, is faced with the problem of undercapitalization, an important issue to consider is whether the implementation of the CARP will improve credit access and availability. It is when banks generally prefer to finance big fishpond operators who can offer sufficient collaterals that the problem for the small fishpond operators becomes aggravated (TBAC 1976).

This implies that the opportunity to invest in the industry will be limited to those who can satisfy the collateral and other requirements of banks in view of the limitations of self-finance and/or informal credit. The inability to invest and, for some, to expand investments and productivity in the industry will have spillover effects like increased pressure against stagnating municipal and coastal fisheries resources for more output and employment.

The paper has the following objectives: (a) to review existing literature on fisheries credit markets in the Philippines, with a specific focus on the aquaculture subsector; (b) to identify critical issues and research gaps; and (c) to develop a framework of analysis for examining policy issues on

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fisheries (aquaculture) credit markets. The paper is structured as follows: Section II gives an overview of the fisheries industry in the Philippines. It focuses primarily on aquaculture since it is this subsector that will be directly affected by CARP. In Section III the different features of the aquaculture sector such as tenancy arrangements, productivity by farm size, and other basic microeconomic characteristics, as well as the structure of credit markets in the sector will be discussed. Section IV deals with credit policies and government intervention in the fisheries sector in the country. The last section concludes with an identification of research priorities and gaps for further study.

## **II. THE PHILIPPINE FISHERIES INDUSTRY: AN OVERVIEW**

### **A. *The Fisheries Sector***

The fisheries industry in the Philippines consists of three sectors, namely: (a) small-scale or municipal fisheries, (b) commercial fisheries, and (c) aquaculture.

Both municipal and commercial fisheries are categorized as marine fisheries differentiated in terms of boat tonnage, fishing gear and species captured. Municipal fisheries utilize fishing boats weighing less than three gross tons and use simple fishing gear such as ring net, bag net or seine. Using gear alone without the use of boats is also possible. This sector is regarded as the most important among the fisheries sectors because it contributes, on the average, 50 percent of the total fisheries production and employs 68 percent of the one million workers in fisheries excluding those workers in ancillary industries (e.g., net making, repair of boats) (Tables 1 and 2).

In contrast to the municipal fisheries, the commercial fisheries sector uses boats weighing more than three gross tons and operates in waters more than seven fathoms deep using sophisticated equipment such as purse seine and trawlers. On the average, this sector accounts for 26 percent of fisheries production and employs about six percent of the labor force in the fisheries industry.

Unlike the marine fisheries sector, aquaculture or fishfarming is more manageable since the breeding and culture of aquatic organisms can be controlled. This sector does not face problems of "open-access" and resource degradation but is constrained by the unavailability of, and monopsonistic market for, inputs, particularly fry. Although, on the average, aquaculture contributes only 24 percent of total fisheries production and employs only about 26 percent of the labor force in the fisheries industry, the sector is considered one potential growth area in view of the declining productivity of marine resources. In particular, the fishpond industry (both brackishwater and freshwater) which supplies the bulk (45%) of aquaculture production is expected to grow from a production of one ton per hectare to its maximum production capacity of two tons per hectare (Guerrero 1991).

The three sectors combined occupy a total area of about 221 million hectares including the 220-mile Exclusive Economic Zone (EEZ). Coastal and oceanic water resources account for 99.5 percent of the total while inland water resources (Table 3) comprise the remaining balance (0.5%).

The importance of the fisheries industry in the economy is shown in its significant contribution to income, employment and export earnings. On the average, for the ten-year period covering 1980-90

**Table 1**  
**FISHERIES PRODUCTION BY SECTOR, 1981-90**  
(In thousand metric tons)

Year	Total quantity	% to total	Aquaculture		Municipal		Commercial	
			Quantity	% to total	Quantity	% to total	Quantity	% to total
1981	1,773	100	340	19.2	939	53.0	495	27.9
1982	1,897	100	392	20.7	978	51.6	526	27.7
1983	2,110	100	445	21.1	1,146	54.3	519	24.6
1984	2,080	100	478	23.0	1,089	52.4	513	24.7
1985	2,052	100	495	24.1	1,045	50.9	512	25.0
1986	2,089	100	471	22.5	1,072	51.3	546	26.1
1987	2,213	100	561	25.4	1,061	47.9	591	26.7
1988	2,270	100	600	26.4	1,070	47.1	600	26.4
1989	2,371	100	629	26.5	1,105	46.6	637	26.9
1990 <sup>a</sup>	2,503	100	671	26.8	1,132	45.2	700	28.0
<b>Total</b>	<b>21,358</b>	<b>100.</b>	<b>5,082</b>	<b>23.8</b>	<b>10,637</b>	<b>49.8</b>	<b>5,639</b>	<b>26.4</b>

<sup>a</sup> Preliminary data from the Bureau of Statistics.

Source: 1990 Philippine Fisheries Profile, Bureau of Fisheries and Aquatic Resources (BFAR).

**Table 2**  
**EMPLOYMENT IN THE FISHERIES INDUSTRY BY SECTOR, 1990**

Sector	No. of persons employed	% to total
Aquaculture	258,480 <sup>a</sup>	26.1
Municipal fisheries	675,677 <sup>b</sup>	68.2
Commercial fisheries	56,715 <sup>a</sup>	5.7
<b>Total</b>	<b>990,872</b>	<b>100.0</b>

<sup>a</sup> Source of data: Fisheries Statistics Sections, Bureau of Fisheries.

<sup>b</sup> Source of data: 1980 Census of Fisheries.

Table 3  
PHILIPPINE AQUATIC RESOURCES

Resources	Area (in thousand ha)	Percent share
Total Aquatic Resources	220,826	100.0
Marine Resources	220,000	99.5
Coastal	26,600	12.0
Oceanic	193,400	87.5
Inland Water Resources	826,000	0.5
Swamplands	338	0.2
Freshwater	106	--
Brackishwater	232	--
Fishpond	224	0.1
Freshwater	14	--
Brackishwater	210	--
Lakes	200	0.1
Rivers	31	--
Reservoir	19	--

Source: 1990 Philippine Fisheries Profile, Bureau of Fisheries and Aquatic Resources (BFAR).

the sector accounts for five percent of Gross National Product (GNP) at constant prices. Its contribution to the agricultural sector alone amounts to about 19 percent, the second highest contribution in that sector.

In terms of employment, the fisheries sector employs about a million individuals who comprise about five percent of the country's labor force. This number is expected to increase with the development of the EEZ.

Fisheries have also made a dent as an export industry. The industry has had a positive balance of trade in fish and fishery products, contributing, on the average, five percent to the country's export earnings for the period 1980-90.

Philippine exports of fish and fish products registered a record high of P11.53 billion in 1990, which is 42 percent and 31 percent higher than recorded exports in 1988 and 1989, respectively. The foreign exchange balance sheet for the sector suggests that approximately US\$8 is generated for every US\$1 expended. While the country also imports fish and fish products, notably frozen sardines and mackerel, fish meal and frozen tuna, this amount represents, on the average, only about nine percent of fish exports.

The major fish exports are prawns and shrimps followed by tuna and seaweed. Other products for export include shell craft articles, cuttlefish/squid, live fish, Capiz shells, milkfish, sea cucumber, and others (Table 4). Shrimps and prawns account for the dramatic increases in the country's fish exports, with Japan, the United States and Canada absorbing most of these products. An interesting feature of the country's shrimp industry is its predominantly aquaculture-based production compared to the world's marine-based shrimp supply.

Tuna ranks second to shrimps among fish exports. About 55 thousand metric tons valued at P2.9 million have been exported in 1990. Exports, however, show a volatile trend. Its share to total exports declined from 72 percent in 1981 to 46 percent in 1988, attributable mainly to the declining competitiveness of the tuna industry relative to other suppliers (e.g., Thailand) with lower production costs and better quality tuna.

Seaweeds, in contrast, are a promising export product. Exports of this product have been observed to be on the increase with Denmark as the major market. In 1990, seaweed exports amounted to 35 thousand metric tons valued at P1.2 million.

#### B. *The Aquaculture Sector*

Because of the land-based nature of aquaculture, in particular, the fishpond industry, it is this sector that will be directly affected by the CARP. To gauge the extent of such impact an understanding of the economics of aquaculture and of the existing conditions that relate to tenancy arrangements, productivity and profitability as affected by farm size and ownership is essential.

Table 4  
**PHILIPPINE EXPORTS OF FISH AND FISHERY PRODUCTS  
 AND THE MAJOR COUNTRIES OF DESTINATION IN TERMS OF VALUE, 1990**

Commodity/Country	Quantity (MT)	FOB Value (In Million Pesos)	Percent Share To Total
Shrimp/Prawn	25,205	5,434	47.1
Japan	19,492	4,258	36.9
USA	3,882	808	7.0
Guam	436	82	0.7
Others	1,395	288	2.5
Tuna	55,070	2,861	24.8
Germany	12,254	528	5.4
USA	13,016	590	5.1
Japan	9,389	547	4.7
Others	20,411	1,096	9.5
Seaweeds, dried	35,346	1,192	10.3
United Kingdom	3,961	274	2.4
Denmark	10,676	180	1.5
France	5,967	137	1.2
Others	14,742	601	5.2
Cuttlefish/Squid	3,225	378	3.3
Japan	1,689	271	2.4
USA	827	63	0.5
Hongkong	489	30	0.3
Others	200	14	0.1
Shellcraft Articles	1,823	301	2.6
Germany	626	106	0.9
Japan	218	54	0.5
Italy	310	36	0.3
Others	669	105	0.9
Fish Kept Alive for Transport	5,800	157	1.4
USA	2,307	81	0.7
Taiwan	1,191	23	0.2
Hongkong	224	18	0.2
Others	14	34	0.3
Capis Shells	480	147	1.3
USA	166	71	0.6
Germany	90	32	0.3
Canada	16	6	0.5
Others	208	38	0.3
Natural and Cultured Pearls	0.158	102	0.9
Hongkong	0.097	80	0.4
Japan	0.060	22	0.3
Others	0.001	1	-



Table 4 (continuation)

Commodity/Country	Quantity (MT)	FOB Value (In Million Pesos)	Percent Share To Total
Seacucumber (Trepang)	1,751	80	0.7
Hongkong	1,474	41	0.4
Korea	169	31	0.3
Singapore	37	7	-
Others	71	2	-
Bangus (Milkfish)	868	82	0.5
USA	601	44	0.5
Hawaii	62	4	-
Guam	80	4	-
Others	125	8	-
Other Commodities	13,471	813	7.0
Total	143,039	11,529	100.0

- Negligible

Source: BFAR, Fisheries Profile, 1990

## 1. Profile of the Aquaculture Industry

Aquaculture embraces a wide range of activities, carried out in water- or land-based areas. Water-based areas involve culture in fishpens, fishcages or mariculture (i.e., culture of oysters, mussels and seaweed) while land-based areas primarily involve culture in fishponds, both brackishwater and freshwater. As of 1990, there were 237,438 hectares of fishpond in the country, of which 14,531 hectares were freshwater and 222,907 hectares brackishwater (Philippine Fisheries Profile, BFAR, 1990). Comparatively, the area covered by fishpens, fishcages and mariculture is minimal, totaling only 13,108 hectares, of which 92 percent are considered as fishpen areas.

Fishponds generate, on the average, 24 percent of total fisheries production and provide employment to an estimated 150,000 workers. The industry is primarily dominated by the culture of milkfish or bangus which accounts for 31.4 percent of aquaculture production by species, as compared to 11.5 percent for tilapia and 8.0 percent for shrimps and prawns (Table 5).

## 2. Industry Organization

*Scale of operations.* The aquaculture industry can be further classified in terms of the size of its operations, to wit: (a) small scale, (b) medium scale, and (c) corporate or large scale. Based on a socioeconomic survey of the Philippine aquaculture industry (Table 6) the above classification is differentiated as follows: The small-scale operator has land areas varying from a fraction of a hectare to at most 10 hectares. He usually manages alone or with the help of family members, or at most one or two casually-hired helpers. The farm uses traditional technology and relies on the natural productivity of water and land which results in relatively low production. The operator usually has limited schooling, leads a simple life, and has limited business opportunities.

A medium-scale operation, on the other hand, is characterized by bigger areas of about 10 to 50 hectares. The operator/owner usually has a high level of education and is more aggressive in adopting new technology. Normally, production is three to four times higher than that of a small-scale operation.

In contrast to the small- and medium-scale operators, the large-scale or corporate operators manage fishponds of 50 or more hectares. They adopt a higher level of technology, use skilled manpower, and produce high-valued outputs like prawns.

*Ownership and tenure.* There are three methods of granting sites for aquaculture purposes (Rabanal and Delmundo 1988). These are through: (a) a government short- or long-term lease (i.e., 10 to 25 years) which is renewable; (b) a title to the site after meeting certain conditions and after a certain period of time; and (c) a government concession granted for a specific privilege over a definite area for a given duration, for instance, milkfish fry collecting concessions in designated coastal waters. In the Philippines, the government lease is widely adopted although privately-owned fishponds dominate (Table 6). A combined tenurial arrangement (partly-owned and partly-leased) is also possible.

Table 5  
STATUS OF AQUACULTURE INDUSTRY, 1990

	Quantity (in metric tons)	% to total
<b>1. Production by Culture</b>		
Fishponds	303,630	45.0
Brackishwater	267,814	
Fresh water	35,816	
Fishpen	24,379	3.3
Fish cage	20,931	3.1
Mariculture (oyster, mussel, seaweeds)	322,176	48.0
<b>Total</b>	<b>671,116</b>	<b>100.0</b>
<b>2. Production by Species</b>		
Seaweeds	291,176	43.3
Bangus (milkfish)	210,882	31.4
Tilapia (cichlid)	76,142	11.5
Shimps/Prawns	53,989	8.0
- Tiger Prawns	47,591	
- White Shrimps	779	
- Endeavor Prawns	5,619	
Mussel	17,515	2.6
Others	21,412	3.0
<b>Total</b>	<b>671,116</b>	<b>100.0</b>

Source: 1990 Philippine Fisheries Profile, Bureau of Fisheries and Aquatic Resources (BFAR).

Table 6  
 FEATURES OF THE AQUACULTURE INDUSTRY IN THE PHILIPPINES  
 SUMMARY OF FINDINGS FROM VARIOUS STUDIES

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)	(no.)	Ownership	Tenurial Arrangement (Distn)	Market Structure
1. Aida R. Librero Resources Productivity in Milkfish Culture in the Philippines (Oct. 1979)	1,175/nationwide	Fishpond	Milkfish	1 & below	- 178	owned	- 51%	38% of produced is marketed.  Market Outlet ----- Fishfarmers generally sell to wholesalers, the rest sell directly to retailers or on a consignment basis. Consignment is generally practiced by large farms.  Price Received ----- Selling to retailers. commanded the highest price - (P5.05/kilo); consignment basis (P4.96) and wholesaling (P4.86)  Dist'n. by Market Destination ----- in the same barrio - 118 operators in the same municipality - 446 " in the same province - 446 " in big cities (Manila, Cebu Iloilo) - 200 "
				1 - 5	- 392	leased	- 46%	
				5.01 - 10	- 192	combination	- 3%	
				10.01 - 20	- 201			
				20.01 - 50	- 153			
				more than 50	- 59			
						Method of Delivery ----- picked up - 478 delivered - 705		

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)		Ownership Tenurial Arrangement (Distn)	Market Structure
2. Elizabeth S. Nicolas and Aida R. Librero/ A Socio-economic study of Fish Pen Aquaculture in Laguna Lake, Phil. (Oct. 1979)	174/Laguna de Bay (Rizal & Laguna)	Fishpen	Milkfish (97%) Tilapia (3%)	1 & below 1.01 - 5 5.01 - 10 10.01 & above (148 samples only)	- 26 - 69 - 34 - 9	NA	99% of produces is marketed.  Distribution by Outlet ----- wholesale - 132 operators (76%) retail consignment - 42 operators (23%) contractual  Price Received ----- Selling by contractual arrangement result to higher price for the operator while those who sell by retail obtained the lowest price.  Market Outlet ----- Produce is generally sold in Manila.
3. Manuel L. Laopao & Estrella M. Latorre/ The Economics of Brackishwater Fishfarming in Selected Provinces in the Phils. (June 1983)	200/Capiz, Negros Occidental, Camarines Sur, N. Samar & Zamboanga City	Brackishwater fishponds (polyculture)	Milkfish prawn	9.99 & below 10 - 39.99 40 & above	- 83 - 96 - 21	privately-owned - (61%) 122 through purchase- (78%) inheritance - (20%) donation - (2%) government-based - (23%) 48 privately leased - (15%) 29 partly-owned, partly leased - 1	NA

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)	(no.)	Ownership Tenurial Arrangement (Dist)	Market Structure	
4. Zenaida S. Dela Cruz & Maura S. Lizarondo/ Fishpond Operations & marketing Practices in Quezon Province (Sept. 1978)	95/Quezon	Fishpond	Milkfish	10 & below	- 28	owned - 27	Marketing Costs P0.23/kg. ----- Manner of Desposition ----- No. % ----- 1. Bidding 51 53.68 a. Open 24 b. Widespread 27 2. Contract w/ regular buyers 18 18.95 3. No response 26 27.37  Distribution by type of Delivery ----- No. % ----- Delivered 44 46.32 Picked up 18 18.95 Shipped 7 8.42 Both (Picked up/ Delivered) 8 7.36  Distribution by type of Outlet ----- No. % ----- Broker 51 53.60 Wholesaler 12 12.63 Wholesaler 4 4.21 Retailer 2 2.11  Terms of Payment ----- No. % ----- Cash and carry 38 40 COD 19 20 Consignment 13 13.68 Credit 7 7.37	
				prawn	11 - 20	- 41		government-leased - 30
				crabs	21 - 30	- 19		privately leased - 4
					31 - 40	- 3		partly-owned & partly-leased - 4
					41 & above	- 4		sub-leased - 2 (caretaker) - 26 (administrator) - 2

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)	Ownership Tenurial Arrangement (Dist)	Market Structure
5. Ramos. "A Socio-economic Survey of the Aquaculture Ind. of Cagayan Valley" (1978)	138 Respondents Cagayan-81 Isabela-48	Fish farming	Bangus Tilapia Carp Catfish	Bangus farms - 10.27 ha. Tilapia farms - 2592 sq.m. Carp farms - .92 ha. Catfish farms - 4287 sq.m. Combination - 3557 sq.m.	NA	Fishes sold by direct retail. Sold within the barrio and in poblacion markets.
6. Aspuria, Fabro. A Socio-eco. Survey of the Aquaculture Ind. of Bicol" (1979)	102 Respondents Camarines Sur-39 Norte-21 Masbate -42	Fish farming	Bangus Prawn Crab	Pure bangus - 10.97 ha Polyculture - 14.09 ha. Pure prawn/crab - 17.93 ha.	NA	4 types of selling arrangements: 1. direct wholesale 2. consignment 3. direct retail 4. by contract  78% sold to wholesalers
7. Nicolas, Pardocho "A Socio-econ. Study of the Aquaculture Industry in C. Visayas" (1979)	132 respondents Bohol-56 Cebu - 76	Fish farming	Bangus	7.89 ha.	NA	95% of prod. sold to market. 83% sold harvest to wholesalers; 18% direct to consumers.
8. Librero, Lapie "Crab Farming in the Phil.: A Socio-econ. Study" (1979)	61 respondents	Crab farming	Crab	Pure crab - 8.8 ha. Crab/Prawn - 13 ha. Crab/Milkfish - 13.2 Crab/Milkfish/ Prawn - 18.53 ha. Crab & Others - 7.01 ha.	Owned - 37 Leased - 61 Others - 2	Almost all products are sold in wholesale basis at an average price of P7.63/kg.
9. Librero, Fabro "A Socio-Economic Study of Mudfish Culture" (1979)	36 operators Cagayan Valley-3 Ilocos-4	Fish farming	Mudfish	1693 sq. m.	NA	70% sold, 25% eaten, and 5% given away

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Species	Farm Size (has.)	Ownership Tenurial Arrangement (Distn)	Market Structure
10. Librero, et. al. "Milkfish Farming in the Phil.: A Socio-econ. Study"	1175 operators National	Fish farming	Bangus	16 ha.	Owners/Lessess : 67% Caretaker : 33%	4 types of selling arrangements: 1. wholesale (61%) 2. consignment (25%) 3. retail (14%) 4. by contract (3%)  60% delivered Bangus to buyers. Charging of delivery cost prevalent.  Market outlets: 1. w/in barrio (16%) 2. w/in town (38%) 3. w/in prov. (37%) 4. Outside prov. (17%)  Method of payment: 1. Cash (84%) 2. Credit (20%) 3. Installment (2%)
11. Librero, et. al. "An Econ. Analysis of the Prod'n. of Prawn in Luzon" (1979)	104 operators Ilocos-5 S. Luzon-78 Bicol-21	Prawn farming	Prawn	10.26 ha.	NA	99% were sold to the market.  4 types of selling arrangements: 1. wholesale 2. consignment 3. retail 4. by contract  Average price: 1. wholesale - P40.39 2. consignment - P51.13 3. retail - P53.44 4. by contract - P43.35



Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)	Ownership Tenurial Arrangement (Distn)	Market Structure
12. Tidon, Librero "A Socio-Econ. Study of Tilapia Farming in the Phil." (1978)	131 respondents National	Fish farming	Tilapia	Small farm - 251 sq.m. Medium farm - 3027 sq.m. Large farm - 2.22 has.	NA	87 respondents sold fish to market as near as 2 km. in Cag. Valley and 3 km. in Ilocos to as far as 87 km. in other regions. Payment was in cash. 76 of them sold on retail basis while 18% sold on wholesale basis. Of 87 farmers, 62% delivered their prod. to buyers.
13. Pamulakiakin, Dizon, Ramos, "A Socio-Econ. Survey of the Aquacult. Ind. of S. Luzon" (1979)	580 respondents	Fish farming	Bangus Tilapia Carp Gurami Dalag Hito	Bangus farms - 5.66 has 1. Monocult. - 5.82 has. 2. Polycult. - 5.42 has  Freshwater - 5.64 has. 1. Tilapia - 10070 sq.m. 2. Carp - 940 sq.m.	NA	Bangus: 4 selling patterns: 1. wholesale - P5.02/kg. 2. consignment - P5.50/kg. 3. retail - P3.78/kg. 4. by contract - P5.08  63% of farmers don't deliver fish to buyers. 28% delivered w/ charge. 19% delivered free.
14. Ramos, Aspuria "A Socio-Econ. Survey of the Milkfish Farmers in E. Visayas" (1979)	18 Operators Southern Leyte-8 Northern Samar-10	Fishfarming	Bangus	43.33 has.	NA	99% sold After harvest, crop is immediately disposed. Retail: P4.98/kg. Wholesale: P4.74/kg. 87% of oper. delivered crops to buyers, 20% had buyers who picked-up bangus on farm. 63% sold within prov'l. location, 38% sold as far as 107 km. Price highest in Dec. and lowest in Aug.

Author/Title (date of publication)	Sample Size/ Location	Type of Aquaculture Industry	Specie	Farm Size (has.)	Ownership Tenurial Arrangement (Distn)	Market Structure
15. Lapie, Aspura "A Socio-Econ. survey of the Aquaculture Ind. in Mindanao" (1979)	220 respondents	Fish farming	Bangus	24.67 has.	NA	97% of total prod'n went to market. Majority sold products on wholesale; 18% sold directly to consumers.
16. Tidon "A Socio-Econ. Survey of the Aquaculture Ind. of C. Luzon" (1979)	370 respondents	Fishfarming	Bangus Tilapia Carp Prawn Mudfish	Bangus farms - 20.75 has. Tilapia farms - .60 has. Carp farms - 1.65 has. Mudfish farms - 1800 sq. m. Catfish farms - 200 sq. m.	NA	Bulk of crop marketed. 85% of oper. delivered fish to buyers. Delivery was usually without charge. Market outlets were usually within towns or prov'l location.
17. Nazareno, Nicolas, Librero "A Socio-Econ. Survey of Aquaculture Ind. in W. Visayas" (1979)	294 respondents	Fish farming		19.95 has.	NA	4 Types of Selling Arrangement: 1. wholesale 2. consignment 3. retail 4. contract  6% sold directly to wholesalers. Consignment common among big farm oper. (23%). 9% sold to retailers, 4% sold by consignment. 37% sold within town; 36% sold within prov; 28% sold to other provinces. Distance of market outlets-179.4 km.

NA - not available

A study of Dannhaeuser (1986)<sup>1</sup> observed that the tenancy arrangement in fishponds differs depending on farm size. In small sized farms averaging 1.9 hectares, tenancy arrangement varies from a very simple structure, wherein the owner operates and manages the farm himself and hires temporary wage labor whenever the need arises, to a three-tiered tenancy arrangement wherein the roles of ownership, capitalization and caretaking are performed by different individuals. About six percent of the aqua farms surveyed fall under the former arrangement while 37 percent are in the latter arrangement. The remaining 57 percent of the farms employ a two-tiered tenancy arrangement involving either an owner with a caretaker or an owner with a lessee.

Except for the simple tenancy structure, share-cropping is widely practiced in the other tenancy arrangement. The usual sharing scheme between a caretaker and an owner is one-third and two-thirds of the net profit respectively (i.e., after deducting operating costs). The former provides labor while the latter provides the land and capital. In the case of a three-tiered arrangement the lessee pays a fixed prepaid rent to the owner, and the returns are shared equally by the lessee and caretaker after deducting all costs including lease. Leaseholders may at times operate the ponds without the help of the caretaker, hence retain the total profit.

The tenancy arrangement in aquaculture as indicated above is similar to the tenancy arrangement practiced in traditional agriculture. The major difference though is that the tenancy relation in the former approximates a patron-client bond and not a personalized social inequality as in the latter. This arises because caretakers in aquaculture tend to be less subservient than rice tenants, aside from enjoying some monopoly over technical expertise and having greater opportunities to defraud owners.

In contrast to small-scale aquaculture, large-scale aquaculture employs a four-tiered tenancy arrangement consisting of caretakers, a manager, a leaseholder and the owner. At the very least, when owners choose not to lease their farms, a three-level tenancy structure (i.e., owner, manager, and caretakers) is observed. The managerial position arises because of the need for a number of caretakers to man the different production units in the farm. Such practice is also common in medium-scale rice cultivation where the owner appoints an individual as the "right-hand man." The manager is basically the link between the owner and the caretaker who coordinates production and marketing activities as well as supervises personnel needs.

Dannhaeuser (1986) noted the share-tenancy arrangement in both small-sized and large aqua farms. This is perhaps because the owner is still dependent on the caretaker for the efficient functioning of his farm. Hence, by allowing the caretaker a share in the farms profits, the trust between the owners and caretakers is maintained. In contrast, under a fixed wage system, trust tends to be lost because the caretaker's earning is not affected by the farm's profitability. The sharing scheme in large aqua farms, however, is minimal in contrast to the sharing scheme in small-sized farms. Caretakers' remuneration in large farms generally consists of a *share*, a *wage* and *credit*. The share received is usually five percent of the gross return (with only marketing costs deducted). The wage is a monthly living allowance, about 80 percent of which is in the form of a *caretaker's loan* previously advanced to him and later on deducted from the five percent share after the fishes have been sold. Unlike the small-scale aqua farms where

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1. Based on a survey of brackishwater fishponds in Lingayen Gulf. The sample consists of 74 small-scale operating units and eight large-scale aqua farms.

caretakers frequently tap owners or lessees for credit, in large-size farms the credit system is embedded in the pay system. Managers, on the other hand, receive a wage and a share of the caretakers' commission.

*Farm size.* According to size, fishponds are generally classified into small (farms with less than 10 hectares), medium (farms of 10-50 hectares in size) and large (farms of more than 50 hectares). Table 6 shows that most fishponds in the country are medium-sized. Further, there are more farms classified beyond the 5-hectare retention limit of CARP. Fishponds have an average size of 7.9 hectares, the majority of which are *bangus* farms. The average farm size for prawn farms is 16 hectares, while mudfish/*tilapia* farms are smaller (0.3 hectare) since these species are generally cultured in fishcages/fishpens rather than in fishponds.

*Marketing/distribution system.* The marketing system for aquaculture products is basically similar to that of capture fisheries. Fresh fish are sold either in the local wet markets or in areas outside the farms. A sale is made by fishbrokers through open or secret bidding. Prices generally vary depending on the available supply each morning. However, fishfarmers who sell large quantities of fish are able to bargain for higher prices.

Other studies done on fishfarmers in the country (Table 6) noted that: (a) the most frequent buyers of fishfarmers' produce were the brokers, wholesalers and cooperatives. Only a minimal amount was sold directly to retailers, wholesalers-retailers and consumers; and (b) on the average, most of the produce (98 %) is marketed.

The dominance of wholesalers as the major distribution outlet specifically for the small-scale fishfarmers may have a bearing on their credit activities. As in traditional agriculture, the fisheries sector is also faced with the difficulty of obtaining financing from institutional sources, and therefore relies mainly on noninstitutional sources for its financing requirements. Because informal lending is based on personalistic relationships, it is often the case that interlinked activities come about as a means of dealing with the asymmetry of information and of improving credit enforcement.

Interlinked relationships are fairly common in the fisheries sector. The usual practice is for traders to provide for operational expenses and for loans to be paid in terms of the produce valued at prefixed rates (Ruckes 1989; Teitze 1987). The provision of credit also serves as the lender's means of establishing a relationship with the fish producer who not only provides them with a constant supply of fish but also serves as a source of future investment. This practice is primarily observable in artisanal fisheries. The lack of literature on the extent of informal lenders' influence over/relationship with the small-scale fishfarmers, however, prevents one to infer about the credit-output link in aquaculture. However, given the common characteristics of smallscale fishermen and their objective conditions (e.g., level of technology used, absence of collateral, etc.), it may be hypothesized that a similar practice occurs in the sector.

### 3. Cost and Return Analysis

*Investment and intensification.* Aquaculture is a highly capital-intensive undertaking as indicated by its high capital investment requirements and cost of operations (Table 7). Even its use of simple

Table 7  
 INVESTMENT AND OTHER INPUTS, AQUACULTURE INDUSTRY IN THE  
 PHILIPPINES, VARIOUS SURVEYS

Author/Title	Reference Period	Farm Size (ha)	Capital Investments (per hectare)	Operating Capital (per hectare)	Labor Requirement (mandays/hectare)	Credit Source & Financing
1. Aida R. Librero/Resources Productivity in Milkfish Culture in the Philippines	1977-1978	Ave.=13.39	N.A.	P1,458/ha	N.A.	N.A.
2. Manuel Laopao and Estrella M. Latorre/The Economics of Brackishwater Fishfarming on Selected Province in the Philippines	CY 1981	Small = 4.60 Medium = 16.04 Large = 74.86 Ave. = 15.66	P26,562/ha	S = P5,501/ha M = P2,171/ha L = P1,858/ha	S = 45 M = 24 L = 10	N.A.
3. Zenaida S. dela Cruz and Naura S. Lizarondo/Fishpond Operators and Marketing Practices in Quezon Province	CY 1977	Ave. = 16.14	P12,902.74/ha	P4,352.91/ha.	616	Banks (20.0%) Private money lenders (1.05%) Friends/relatives (70.37%)
4. Aida R. Librero and Nicostrato Perez/Differential Productivity and Income Generation of Fish Culture Technology in the Phil.	1978-1979	Ave. = 9.79	P703/ha a/	Monoculture P2,439/ha Polyculture P3,907/ha	Mono = 32 Palay = 60	N.A.
5. Elizabeth S. Nicolas and Aida R. Librero/A Socio Economic Study of Fishpen Aquaculture in Laguna Lake, Philippines	1974-1975	Ave. = 6.09	P7,700/ha	P12,000/ha	150	Self-financed (89%); Borrowed capital (9.3%) RBs (37.5%) Informal (62.5%) Both (1.7%)

Author/Title	Reference Period	Farm Size (ha)	Capital Investments (per hectare)	Operating Capital (per hectare)	Labor Requirement (mandsy/ha)	Credit Source & Financing
6. Amaryllis Torres and R.F. Ventura/Economics and Social Impacts of the Aquaculture Production Project	1972	Ave. = 15 ha	N.A.	S = 2,481 M = 1,567 L = 1,418	S = 168 M = 65 L = 53	N.A.
7. Ramos, A Socio-economic Survey of the Aquaculture Ind. of Cagayan Valley	1977	Bangus-10.27 ha Tilapia-2592mm Carp-9200mm Catfish-4287mm	Bangus-P318 a/ Tilapia-P214 Carp -P280 Catfish -P316	Bangus-872	Bangus-13.6 Tilapia-37 Carp-24 Catfish-16.1	NA
8. Aspuria, Fabro. A Socio-eco. Survey of the Aquaculture Ind. of Bicol.	1978	Bangus - 11.0 Prawn/crab-17.93	farm land-P1,918 construction & dist - P3,409 bldg., materials and transpo-170	Bangus-P609 Prawns/crab-P862 Polyculture -P1,132	Bangus -17.8 Prawn/crab 30.96 Polyculture 45.31	Informal where payment last for one day to 1 week w/o interest
9. Nicolas, Parducho. A Socio-econ. Study of the Aquaculture Industry in Central Luzon	1978	Bangus -7.89 ha	P1,211 a/	P658	30:5	NA
10. Librero, Lapie. Crab Farming on the Phils: A Socio-Econ Study	1978	crab 8.8 crab/prawn 13 crab/milkfish 13.32 Polyculture 18.53	P2,893	P1,398	31.8	NA

Author/Title	Reference Period	Farm Size (ha)	Capital Investments (per hectare)	Operating Capital (per hectare)	Labor Requirement (mandays per ha)	Credit Source & Financing
11. Librero, Fabro. A Socio-econ. Study of Mudfish Culture	1978	Mudfish-1693m	306/farm	120/farm	29.5/farm	NA
12. Librero, et. al. An Economic Analysis of the Production of Prawn in Luzon	1978	Prawn farming-10.26	Acquisition-P6372 Dev't-Cost-P5599 Rent - P824 Others-P458	P1,337	NA	NA
13. Tidon, Librero. A Socio-Econ. Study of Tilapia Farming in the Phil.	1977	Tilapia small-251m medium-3027m large 2.22 ha	Tilapia- P4,678	P964	32/farm	NA
14. Pamulaklakin, D. A Socio-Econ. Survey of the Aquaculture, Ind. of S. Luzon	1979	Bangus Monoculture-5.82 ha Polyculture-5.42	Monoculture-P261 Polyculture-P346	Monoculture-P1,033 Polyculture-P1,402	Monoculture-15 Polyculture-81.7	NA
15. Lapie, Aspuria. A Socio-econ Survey of the Aquaculture Ind. in Mindanao	1978	Bangus-24.67 ha	P4,524 (exclgd. land)	P15,901/farm	18.6	NA

a/ Excludes farm land, construction and development cost.

NA - not available

Source: Delos Angeles M. et. al. Economics of Philippine Fisheries and Aquatic Resources: A Literature Summary. PIDS Working Paper Series No. 90-17, July 1990.

fishpens or fishcages involves a substantial amount of money compared to the financial requirements of small scale rice and corn production. Furthermore, the cost also varies depending on the level of intensification, that is, the extent to which improved technology in pond design, fertilization, feeding, stock manipulation and pest control is employed. Intensification can be classified into (a) traditional, (b) extensive, and (c) intensive. Traditional fishfarming makes use of traditional techniques such as dependence on the natural productivity of water, little control over stocks and the use of simple equipment. The extensive system similarly uses simple equipment but utilizes some amount of supplemental feeding and pest control. Intensive fishfarming, on the other hand, utilizes a sufficient amount of fertilizers, pesticides, feeds and stocks. It also involves large investments for engineering and infrastructure improvements. A comparison of the typical costs and levels of intensification for the culture of panacoid shrimps in Southeast Asia is shown below (Rabanal 1987).

Type	Development equipment cost (₱/ha )	Annual operating cost (₱/ha crop)	No. of croppings per year	Production (kg./ha/yr.)
Traditional	20,000-50,000	5,000-10,000	variable	100-400
Extensive	50,000-100,000	10,000-50,000	2	500- 2,000
Semi-intensive	200,000-500,000	100,000-200,000	2.5	2,000-6,000
Intensive	500,000-1,000,000	200,000-500,000	2.5	7,000-20,000

Although survey results reveal that most fishfarms in the country use intensive culture (i.e., supplemental feeds/pesticides are applied), the practice is generally more of the extensive type because of the observed minimum usage level of fertilizer, feeds and pesticides (Laopao and Latorre 1983).

*Source of Financing.* Only a few studies have looked into the aspect of credit sourcing and financing for aquaculture. Studies conducted on fishpond communities (Librero 1976) and fishfarmers (Azurin 1976) noted the importance of financing to aquaculture. These studies observed that: (a) fishfarmers generally utilize their own funds to finance about 60 percent of their operating costs, with the remaining 40 percent borrowed from external sources; (b) about 55 to 60 percent of fishfarmers avail themselves of credit assistance from formal institutions for supplemental funds; and (c) an estimated 30 to 40 percent of fishfarmers go to relatives and friends for financial assistance. The informal lenders, primarily friends and relatives, were found to have been the major source of financing for the sector. Bank credit, on the other hand, was sourced mainly from the rural banks which are basically conduits of government special credit programs for the fisheries sector.



#### 4. Productivity, Farm Income, Ownership and Farm Size

In general, production per farm is directly related to farm size. Therefore, regions with larger farm areas have comparatively higher production. Productivity, however, is not related to farm size. A study on milkfish productivity by region (Librero 1977) noted that Ilocos farms with an average rearing area of 3.3 hectares yielded 709 kilos per hectare, compared to farms in Northern Mindanao with an average rearing area of 35.5 hectares which yielded only 399 kilos per hectare (Table 8). The highest net return was noted for farms from five to 10 hectares. However, a similar study done by Torres and Ventura (1983) observed the following: (a) gross income and net income progressively increase as farm areas increase from less than 20 hectares to 40 hectares and more; (b) expenses incurred decrease per hectare and per kilo of fish, as total farm size increases; and (c) small farms incurred a deficit after deducting all expenditures. These findings seem to imply that larger fishfarms are more economical to operate than small ones. Furthermore, fishfarms which are 10 hectares or bigger realize better net earnings.

The only study which analyzed the factors affecting the productivity of fishponds using an econometric model was that by Laopao and Latorre (1983). Using three different forms of productivity, that is, yield per hectare, production per farm, and gross income per farm, the factors found to be significant and with a positive effect on production in all three models were: (a) capital investment, (b) fertilizers, (c) pesticides, (d) fry/fingerling, and (e) labor. Farm size was found to be a positive and significant factor only for the first two models. The effect of tenure and technology factors on production was also determined using dummy variables. The results showed that: (a) privately-owned farms are more productive than leased farms, (b) intensive culture is more productive than extensive culture, and (c) monoculture farms are more productive than polyculture farms.

### III. STRUCTURE OF CREDIT MARKETS IN THE FISHERIES SECTOR AND THE CARP

Studies on rural credit markets in the country and other developing countries abound (Adams and Vogel 1986; Lamberte and Lim 1987; Braverman 1990; Floro and Yotopoulos 1991). These studies revealed the existence of an "urban bias" in the allocation of credit where formal financial institutions prefer to lend to big, nonagricultural clients. Such bias arises largely from accountability and informational problems and the inability of formal rural credit markets and the government to institute policies or programs that will minimize these problems.

In general, lending to agriculture is riskier than commercial lending because of the characteristics inherent in agriculture such as: (a) the seasonal nature of agricultural production; (b) the geographically-dispersed location of farmers; (c) the high susceptibility of the sector to natural calamities; (d) the large covariance of risk, i.e., adversities often affecting a large number of loan recipients simultaneously; and (e) the basically subsistence nature of agriculture, making it difficult for the sector to meet the requirements imposed by formal financial institutions. Coupled with this is the absence or undeveloped state of insurance markets that could cater to these risks.

Table 8  
COST AND RETURN ANALYSIS, AQUACULTURE INDUSTRY IN THE PHILIPPINES  
(Various Surveys)

Author/Title (date of publication)	Reference period	Average Production farm size(kg/ha/yr. (ha ) per cropping)		Gross income (per hectare per cropping)	Net income (per hectare) per cropping)
1. Aida R. Librero. Resources Productivity in Milkfish Culture in the Phil.	1977-1978	13.4	580	P2,294	P368
2. Elizabeth S. Nicolas and Aida R. Librero. A Socio-Economic Study of Fishpen Aquaculture in Laguna Lake, Phil.	1974-1975	6.1	3,798	P15,580	P3,489
3. Manuel L. Laopao and Estrella M. Latorre. The Economics of Brackishwater Fishfarming in Selected Provinces in the Phil.	1981	15.7	S = 602 M = 882 L = 1,034	S = 8,443 M = 4,769 L = 6,775	S = 2,942 M = 2,598 L = 4,917
4. Zenaida s. Dela Cruz and Maura S. Lizarando. Fishpond Operations and CY 1977 Marketing Practice in Quezon Province	CY 1977	16.1	969	P4,589.79	Bangus= P1,228.28 Sugpo = 13,739.81
5. Aida R. Librero and Nicostrato Perez. Differential Productivity and Income Generation of Fish Culture Technology in the Phil.	CY 1978-79	9.8	Mono = 1,034 Poly = 700	Mono = P5,705 Poly = P8,439	Mono= P3,266 Poly = P4,532
6. Amaryllis Torres and R.F. Ventura. Economics and Social Impacts of the Aquaculture Production Project	1972	15.0	S = 1,343/farm M = 3.579/farm L = 14.092/farm	S = 10,967 M = 32,901 L = 135,789 All = 51,108	S = 2 M = 300 L = 505 All = 412

Table 8 (continued)

Author/Title (date of publication)	Reference period	Average farm size (ha )	Production (kg/ha/yr. per cropping)	Gross income (per hectare per cropping)	Net income (per hectare percropping)
7. Ramos. A Socio-Economic Survey of the Aquaculture Ind. of Cagayan Valley	1977	Bangus-10.3	Bangus-330	Bangus-P1,816	Bangus-P944
		Tilapia-2592mm	Tilapia-94/farm	Tilapia-P1,690	Tilapia-P678
		Carp-200mm	Carp-103/kg/farm	Carp-P5,702	Carp-P1,012
		Catfish-4287mm.	Catfish-28 kg/farm	Catfish-P40	Catfish-P58
8. Aspuria, Fabro. A Socio-Economic Survey of the Aquaculture Ind. of Bicol	1978	Bangus - 11.0	Bangus 300	Bangus P1288	Bangus P 679
		Prawn/Crab-17.93	Prawn 55	Prawn P 981	Prawn P 166
			Crab 476	Crab P3,111	Crab P2,249
			<u>Polyculture</u>		
		Bangus 280			
		Prawn 48			
		Crab 123			
9. Nicolas, Parducho. A Socio-Economic Study of the Aquaculture Ind. in C.Visayas	1978	Bangus-7.89	Bangus-289	Bangus-P1,025	Bangus-P367
10. Librero, Lapie. Crab Farming in the Phils: A Socio-Econ. Study	1978	Crab - 88	Mono-339	P3,882	P2,484
		Crab/Prawn-13	Poly-698		
		Crab/milkfish 13.3			
		Polyculture 18.53			
11. Librero, Fabro. A Socio-Econ. Study of Mudfish Culture	1978	Mudfish-1.697 mm	206	P335	P215
12. Librero et al. An Economic Analysis of the Production of Prawn in Luzon	1978	Prawn-1026	Prawn - 243	Prawn-P2,782	Prawn -P1.445
13. Tidon, Librero. A Socio-Econ. Study of Tilapia Farming in the Philippines	1977	Tilapia	Monoculture-418	Tilapia -1,768	Tilapia-804
		Small - 251 mm	Polyculture	Tilapia-	Tilapia-Carp -188
		Medium-3027 mm	Tilapia-Carp-776	Carp -3,160	Tilapia others -
		Large - 2.22/ha	Tilapia-bangus-	Tilapia	535
		others - 334	Others-2,056		

Table 8 (continued)

Author/Title (date of publication)	Average Reference farm size period (ha )	Production (kg/ha/yr. per cropping)	Gross income (per hectare per cropping)	Net income (per hectare percropping)	
14. Pamulaklakin, D. A Socio- Econ. Survey of the Aqua- culture Industry of Southern Luzon	1979	Bangus Monoculture - 5.8 Polyculture - 5.42	Bangus Monoculture - 471 Polyculture - 969	Mono - 1,684 Poly - 2,778	Mono - 651 Poly - 1,386
15. Lapie, Aspuria. A Socio- Econ. Survey of the Aqua- culture Industry in Mindanao	1978	Bangus - 24.67	361	30,675	14,774

NA - not available.

Source: Delos Angeles, M. et al. "Economics of Philippine Fisheries and Aquatic Resources: A Literature Summary." PIDS Working Paper Series No. 90-17, July 1990.

In addition, the rural credit market is also faced with informational problems which lead to adverse selection, moral hazards and high transaction costs. Policy distortions also make it difficult for formal lending institutions to be efficient lenders. These make it almost impossible to determine the risk characteristics of borrowers and hinder the credit market from clearing at the optimal price. Floro and Yotopoulos (1991) stressed that these imperfections lead to various arrangements such as credit rationing, credit layering and interlinkages that serve as substitutes for the missing network of complex legal and market institutional infrastructures generally present in developed countries which make lending feasible in these countries.

Credit rationing implies that loan contracts are limited to a relatively "homogeneous set of borrowers." For the formal sector, such borrowers are characterized by well-defined property rights, enforceable formal contracts and credit guarantees. Hence, since agriculture borrowers do not, in general, meet these criteria, they are rationed out of the market and are accommodated by the informal lenders. For the informal sector, the information problems are less severe because of their "personalistic relationships" with borrowers, enabling them to have a more extensive and accurate evaluation of borrowers' risk. Further, informal lenders are able to put mechanisms to work (e.g., interlinked credit) that allow them to minimize credit risk brought about by the inherent characteristics of agriculture.

The extensive discussions and analysis of the structure and nature of the rural credit market, however, have been drawn primarily from the nuances of peasant agriculture. Little has been written about the fisheries credit markets. And while the problems of credit rationing, asymmetric information and market segmentation in peasant agriculture may likewise be observed in the fisheries sector, the extent and characteristics of such problems may significantly differ in the latter. Informal credit transactions and behavior in the fisheries credit markets may also be different. It is hypothesized that the credit problems faced by the fisheries sector are more serious considering the greater uncertainties and risks involved. In addition to the agricultural problems stated earlier, fisheries are also faced with (a) undefined property rights and common property problems; (b) a limited knowledge of fishing potentials and technologies; (c) high susceptibility to environmental hazards (e.g., pollution); (d) highly variable prices; (e) high storage cost; and (f) generally backward social and economic conditions of the fishing community.

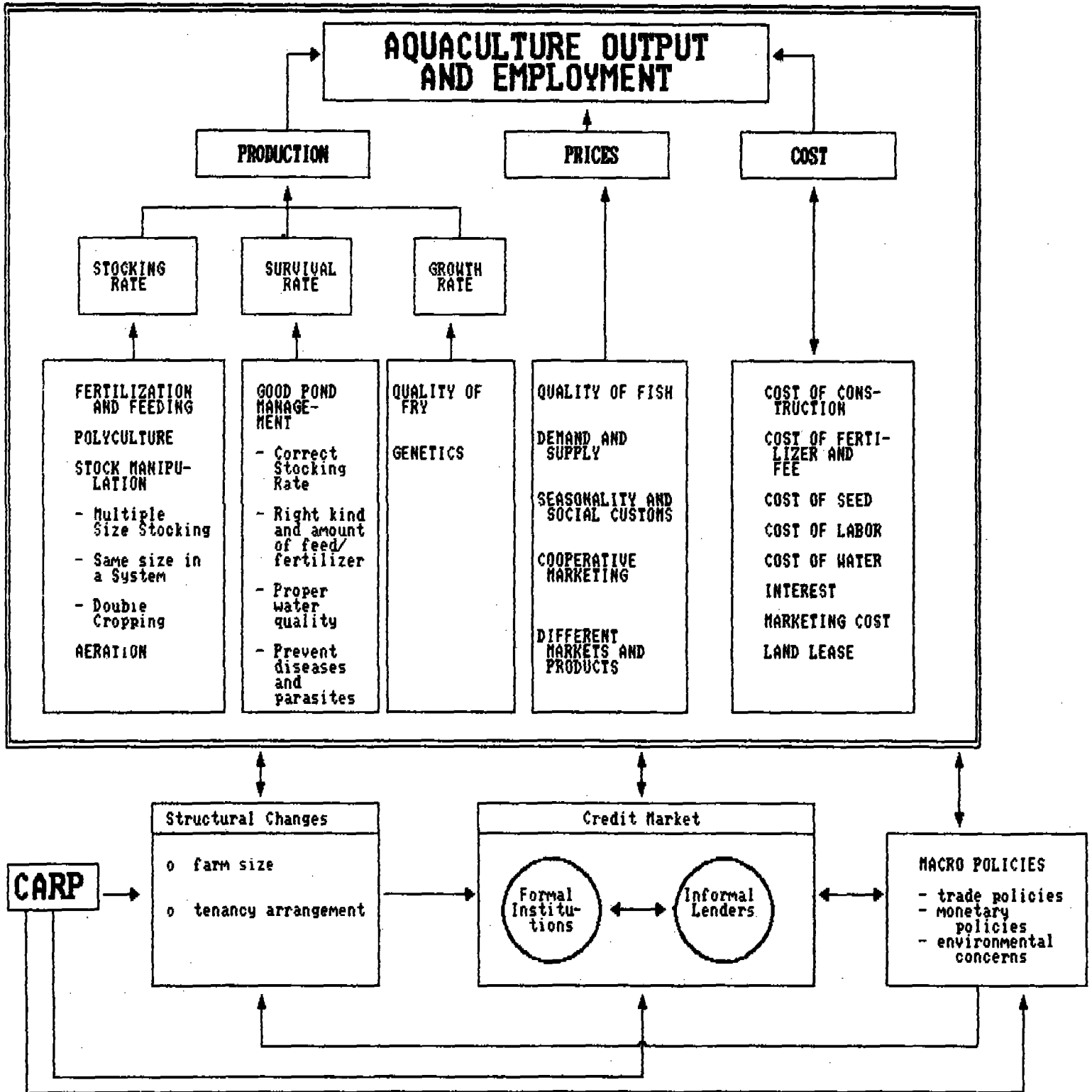
In this regard a conceptual framework for examining the fisheries credit market in the context of the economics of aquaculture and risk management is suggested here.

#### A. *Economics of Aquaculture*

Many forces--biological, physical and environmental--affect aquaculture. The interplay of these forces with economic factors results in various production possibilities and, hence, different levels of profitability. A schematic diagram in Figure 1 is presented to show these complexities. This model is based primarily on pond culture, which is the most prevalent aquaculture system being used. Three major factors noted to be the primary means to increase productivity are: stocking rate, survival rate and growth rate (Shang 1981).

Stocking rate, which is the quantity of fish in the pond, is influenced by space and natural food. The maximum standing crop (i.e., the maximum weight a fish stock can sustain) is variable but can be

Figure 1  
FACTORS AFFECTING THE AQUACULTURE SECTOR



increased by fertilization and supplemental feeding, polyculture, stock manipulation, and aeration (Hickling 1962).

Increases in survival and growth rates, on the other hand, depend mainly on genetic improvements and pond management manifested in correct stocking rate, the right kind and amount of feed/fertilizer, proper water quality and pest prevention.

Reducing the costs of purchasing and marketing is also necessary to increase profitability. This requires a "least cost combination" strategy, specifically on pond construction and the use of inputs.

Another important factor to consider for profitability is the price received for the product. In general, prices are determined by supply and demand conditions, with the fishfarmer, specifically the small operator, as the "price taker." However, it would be to the advantage of the fishfarmers to have an improved bargaining power, and this can be done through:

- (1) an improvement in the quality of fish through proper packaging during transport and storage;
- (2) a scheduling of harvests in consideration of seasonality, that is, selling the product when supply is expected to be low; and
- (3) cooperative marketing and product differentiation. Cooperative marketing, in general, improves the bargaining position of fishfarmers. Likewise, increasing the value added of fish (e.g. frozen, salted, and smoked fish) may also improve revenue.

The above considerations in the fishery sector are in turn affected by socioeconomic factors and instituted structural changes that impinge specifically on the sector's profitability. Adversities emanating from these factors--biological, physical and socioeconomic--thus present a risk in aquaculture investment.

#### B. *Risk Element in Aquaculture*

The risk element of a sector is a crucial factor in its ability to attract financing. In the case of aquaculture, banks are reluctant to lend to it because of the perceived risks. The risks commonly experienced in aquaculture operations are discussed in greater detail by Webber (1973) who classified them into three types--biological, physical, and social and economic risks.

Biological risk is manifested in terms of the susceptibility of fish to disease-inducing organisms that may cover the whole fish population. Fishes are also in constant risk of aquatic predators and competitors. Another biological constraint is the uncertainty of the productive ability of some species which makes it difficult to ascertain productive capacities. This risk is further aggravated by the limitation of having to measure the number of animals in the production system at any one time, and by the lack of knowledge on the nutrition of the species. The former factor is necessary because it has a bearing on the proper management of water quality, feeding rate and disease.

In contrast to biological risk which directly acts on the organism, physical risks act on the ecological system. Such risks include environmental activities--e.g., pollution, extended periods of

cloudy days, and excessive fertilization, which all affect water quality and the maintenance of oxygen levels. Risks caused by natural perils, storm, floods, etc., can likewise have devastating effects on the sector, resulting in great financial losses. Laxity in the enforcement of laws particularly on resource conservation aggravates physical risks. For instance, the inability of the government to enforce selective logging and reforestation, as well as other forestry conservation methods, has resulted in the erosion of logged areas, causing the heavy siltation of coastal areas where brackishwater ponds are located, thus affecting fishpond productivity. Advances in pesticide control through the use of chemicals (e.g., DDT, tea seed) and the direct disposal of raw sewage in rivers or seas increase bacterial counts that are generally disease-inducing organisms and create pesticide pollution (Juliano and Baylon 1990).

Social and economic factors are also important considerations in aquaculture undertakings. Political instability, weak enforcement of property rights, labor unrest and regulations that tend to be biased against the industry are critical elements for the profitability of the venture. Unlike the biological and physical risks which affect only the production aspect, these risks affect all activity levels from production to processing and marketing.

A favorable economic climate is necessary for aquaculture. Immense inflation pressures result in increased costs and reduced earnings. Similarly, property rights need to be enforced, because thievery is common, and the securing of fishponds represents a substantial part of the costs of operation. Nicolas and Librero (1979) reported that 69 percent of the total labor requirement involves safeguarding the pond.

A major structural reform instituted is the land reform program. While the previous land reform law (PD No. 27) covered only the rice and corn areas, some repercussions in the aquaculture sector were noted, in particular, the conversion of rice and corn land to aqua farms (Dannhaeuser 1986). In turn, a number of aqua farms subdivided their holdings among trusted individuals into smaller parcels in anticipation of a land reform for the aquaculture industry. Management and operations, however, remained under the control of the original owner.

PD No. 27 impacts directly on the fisheries sector via the tenancy security proviso of the said decree, which covers sectors such as aquaculture that involve a "tenant-tiller" relationship. The law which defined the relationship between the owner (or lessee) and caretakers had two salutary effects. First, it allayed the caretaker's fear of the possibility of being removed from tenancy, and second, the reform fostered a contradiction between tenancy security against the need for trust between those who manage and those who operate, and the process of land transactions. Such a contradiction occurs because the tenancy security enjoyed by the caretakers as a result of the reform does not diminish the monopoly power of the owner (or lessee). The caretakers are still dependent on the owner for capital while the owner, in turn, depends on the caretakers' technical expertise and honesty. Hence, in aquaculture, agrarian reform did not bring about a change in the tenancy arrangement (i.e., share-cropping still dominated) because the owner continued to have a stake in the farm's output. This is in contrast to rice/corn farming where agrarian reform brought about a change in the tenancy arrangement from a share-cropping system to a lease system or fixed payment mode.

Dannhaeuser pointed out the need for organizational changes to accompany the land reform program. Such changes should be distinct for the aquaculture sector, taking into account the peculiarities



of fishpond culture. One important consideration of a land reform program is the strengthening of the bargaining power of caretakers, implying the creation of a land reform package that will make them less dependent on owners, for instance, in terms of financial or credit requirements.

Market changes associated with price fluctuations are also critical for fishfarm operators. Although aquafoods are high-valued products, their dependence on export markets creates risks caused by changes in trade policies and by highly variable world demand. The lack of marketing infrastructure (e.g., cold storage) may lead to monopoly in the provision of inputs for fish farmers as exemplified in the limited supply of fry (Guerrero 1991), as well as to monopsony in output markets (Panatoyou 1987).

The risks caused by social and economic factors cannot be understated. The current problems that beset the aquaculture industry are caused by inadequate government policies on the import/export of needed commodities, the nondiversification of markets for export commodities, and inadequate policies on investment (Juliano and Baylon 1990).

### C. *Credit Constraints in Aquaculture*

As indicated earlier, financing is essential for aquaculture development. The flow of financial resources to the sector is, however, limited not only because financial capital is scarce but also because of the implications on aquaculture of biological, physical, social and economic risks that expose the sector to various dangers which are, in general, noninsurable. The insecurity of ownership in aquaculture, on the other hand, discourages investments because the benefits realizable from the sector which could be earned over the years become uncertain in the event that the government decides to call off lease agreements (Panatoyou 1987). Examples of insecurity of ownership hindering aquaculture development in Southeast Asia have been reported. In northeast Thailand, farmers with no ownership titles were reluctant to invest their limited savings in either land improvements or pond construction for fear that they would not be allowed to reap the full benefits of their investments (Kloke and Potaros 1975). A similar situation was reported in Malaysia where lack of ownership discouraged pond investments and high stocking rates for a more profitable intensive culture (Bakar and Rahad 1980). Multiple ownership, as in the case of cooperative ownership, has analogous effects as mentioned above. Very often under the cooperative system no single owner has the incentive to invest. Another disadvantage for aquaculture is that it is a relatively new industry, and there are only a limited number of viable successful operators from whom banks can draw yardsticks to evaluate project proposals (FAO 1973).

As in agriculture, large fishfarmers have been the main beneficiaries of the government's special credit programs (Gerhardsen 1976). The majority of the small fishfarmers have limited or no access to credit. The available credit supply favors short-term credit which does not match the credit requirement of aquaculture.

While an established, large-scale aquaculturist may not find it difficult to get loans, the small-scale operator is unable to meet the conditions of formal financial institutions. First, he lacks an acceptable collateral. The land on which his pond is located cannot usually serve as collateral because, in most cases, lands, particularly those of small fishfarmers, are under lease contract either with the government or private owners and are hence generally of little value as collateral (Hamlisch 1976). For instance, in the Philippines, the Fishpond Lease Agreement (FLA) that defines holder-ownership or

rights over the land is not considered by banks as strong collateral for loans, especially the FLAs covering undeveloped areas (Dingcong and Llanto 1991). The conditions that constrain FLA's acceptability as a collateral are: (a) ownership of land is retained by the government, and, in cases of default, the leasehold rights assigned to the banks become nonperforming assets until such time that a new FLA holder takes over the area; (b) in the event that the FLA is canceled, improvements in the area are forfeited in favor of the government, making it difficult for banks to recover their loans; and (c) Presidential Decree No. 1585 issued in June of 1978, which provides for the right of the government in pursuit of national interest to revoke, alter, rescind or modify the lease agreement, prejudices the rights of banks that have granted loans on the basis of FLAs. The CARP, which puts retention limits on FLAs of only five hectares, is expected to further lessen the acceptability of FLAs as collateral due to some perception about a decrease in the value of land and its possible negative impact on the profitability of aquaculture investments. In a recent discussion on FLAs as negotiable instruments for credit (ACPC 1991), it was reported that banks were willing to accept FLAs as collateral if, upon default of the borrower, they were to be given more authority to effect the transfer of the leasehold rights to another party.

A second reason why the small-scale fishfarmer has difficulty in obtaining loans from formal institutions is that there usually are no banks in the vicinity to serve the small-scale operator. Third, he lacks a credit history or business record which banks can use in order to obtain knowledge of his character and creditworthiness. Fourth, he may be ignorant of credit facilities available for his needs, and fifth, credit costs may have been prohibitive for him. Aside from interest cost, bureaucratic hassles create an additional burden for the fishfarmer (FAO 1972). While the informal sector presents an alternative source of financing for the small-scale fishfarmers, the high initial capital required may render investment in the sector unprofitable if financed through the informal sector, where interest rates are much higher as compared to the institutional rate of interest (Panatoyou 1989).

#### **IV. CREDIT POLICY AND INTERVENTIONS IN THE FISHERIES SECTOR: THE PHILIPPINE EXPERIENCE**

##### **A. *Loans to the Fisheries Sector***

The fisheries credit market is also characterized by the co-existence of both the informal and formal sources of credit. The informal sources are mainly private moneylenders and relatives and friends, and there is no accurate estimate of their size. Nor are there surveys on the fisheries sector, particularly on aquaculture, which may be used to gauge the extent of influence of informal lenders. A few studies, however, reported that the fishfarmers' dependence on informal sources is about 70 percent (de la Cruz and Lizarando 1978; Nicolás and Librero 1977).

Loans from the formal sources, on the other hand, come from commercial banks, rural banks, thrift banks and specialized government banks. Of the total fisheries loans provided by these banks, the bulk was given to commercial fisheries and to large aquaculture operators. Credit for small-scale marine and aquaculture fisheries was practically nonexistent under the banks' regular loan activities. If these sectors were ever provided with financing, it was because of government intervention through special loan programs/schemes.

For the 11-year period covering 1980 to 1990, a total of P29.56 billion was channelled to the fisheries sector representing only about 9.21 percent of the total institutional loans granted to agriculture (Table 9). Except for the forestry sector, the fisheries sector had the lowest share among the major agricultural commodities. Granted loans classified according to the type of bank revealed that private commercial banks (PKBs) gave the bulk of the loans to the fisheries sector for the period 1986-90 (Table 10). Among government banks, the most active is the Land Bank of the Philippines (LBP). The recent trend is in contrast to the previous years (i.e., 1965 to 1977) when government banks particularly DBP and PNB were the major sources or conduits of fisheries loans (TBAC 1978).

#### **B. *Past Credit Policies and Programs for Aquaculture***

Because the private banking system shunned the financing of aquaculture, particularly the small-scale sector, the government was expected to take the initiative in financing pioneer ventures, infrastructure facilities and small-scale operations for the industry. The government thus intervened through credit policies and schemes aimed at directly subsidizing bank credit sourced from budgetary appropriations and foreign loans to meet the fishery sector's financing requirements.

*Credit Policies.* Foremost among the credit policies that affected the fisheries sector were:

- (a) Presidential Decree No. 704 (issued in 1975) which declared fisheries as a preferred area of investment. Among other things, this law created the Fisheries Loan and Guarantee Fund (FLGF) which was administered by the Central Bank through government-owned or controlled banking and financial institutions. The fund was made available to finance the development, rehabilitation and maintenance of fishponds, fishpens, as well as the acquisition of fishing boats and fish processing and marketing facilities. The FLGF also provided a guarantee cover of up to 85 percent of the loan.
- (b) PD No. 717 (issued in 1975) or the Agri-Agra Loan Quota which mandated financial institutions to allot 25 percent of their loanable funds to agriculture, fisheries and agrarian reform beneficiaries.
- (c) Several Central Bank (CB) Circulars and Letters of Instructions (LOIs) that provided for incentives for the bank and the farmer or fishfarmer. These circulars and LOIs, provided for the following:
  - 1) Relaxation of collateral requirements for rural banks and PNB borrowers which are participating in the government food production program;
  - 2) Acceptance of any duly registered transfer certificate issued to tenant farmers in an amount not less than 60 percent of the value of the farm holding;
  - 3) Conversion of all agricultural guarantee funds into a single trust fund to be administered by the Land Bank;
  - 4) Establishment of the Barrio Guarantee Fund and Barrio Savings Fund for the guarantee of all cooperative loans; and

Table 9  
 AGRICULTURAL PRODUCTION LOANS GRANTED, BY COMMODITY: 1980-1990  
 (In million pesos at current prices)

	1980		1981		1982		1983		1984		1985		1986		1987	
	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share
CROPS	15,508.5	74.04	17,829.7	70.26	17,211.4	67.10	18,989.8	67.61	18,932.5	68.67	18,124.7	76.86	18,796.9	74.13	21,270.4	77.09
Rice	1,556.6	7.43	1,641.7	6.47	1,622.9	6.33	1,884.3	6.71	1,085.9	3.94	1,223.5	5.19	1,393.1	5.49	2,128.5	7.71
Corn	147.1	0.70	202.9	0.80	250.8	0.98	207.3	0.74	177.5	0.64	182.1	0.77	226.7	0.89	546.3	1.98
Coconut	1,945.6	9.29	2,900.8	11.43	2,153.3	8.40	2,134.9	7.60	1,573.2	5.71	5,107.6	21.66	3,007.2	11.86	3,055.6	11.07
Sugarcane	7,602.4	36.29	6,521.3	25.70	8,927.6	34.81	8,200.3	29.20	6,968.8	22.01	5,040.5	21.41	4,142.8	16.34	5,512.9	19.98
Other Crops	4,256.8	20.32	6,563.0	25.86	4,256.8	16.60	6,563.0	23.37	10,027.1	36.37	6,563.0	27.83	10,027.1	39.54	10,027.1	36.34
LIVESTOCK & POULTRY	2,818.4	13.46	3,482.0	13.72	4,116.9	16.05	4,270.1	15.20	3,897.3	14.14	2,403.3	10.19	2,359.0	9.30	2,423.9	8.78
FISHERIES	1,012.1	4.83	1,644.8	6.48	1,819.9	7.10	2,397.1	8.53	1,654.6	6.00	1,319.2	5.59	2,533.3	9.99	2,698.4	9.78
FORESTRY	1,607.4	7.67	2,420.1	9.54	2,500.6	9.75	2,428.7	8.65	3,085.7	11.19	1,733.3	7.35	1,667.2	6.58	1,200.2	4.35
GRAND TOTAL	20,946.4	100.0	25,376.6	100.0	25,648.8	100.0	28,085.7	100.0	27,570.1	100.0	23,580.5	100.0	25,356.4	100.0	27,592.9	100.0

a/ SSLA loans cannot be disaggregated by commodity.

Source: ACPC Year End Credit Report

Table 9  
cont'n.

	1988		1989		1990		Average Amount	Average Share
	Amount	% Share	Amount	% Share	Amount	% Share		
<b>CROPS</b>	19,715.6	66.76	20,850.5	66.82	25,154.4	61.88	19,307.7	70.11
Rice	3,084.4	10.44	3,679.0	11.79	5,416.7	13.32	2,247.0	7.71
Corn	471.9	1.60	655.2	2.10	602.8	1.48	393.7	1.15
Coconut	3,633.0	12.30	1,527.5	4.89	3,104.9	7.64	2,740.3	10.17
Sugarcane	5,963.3	20.19	6,536.6	20.95	6,238.2	15.35	6,433.0	23.84
Other Crops	6,563.0	22.22	8,452.2	27.09	9,781.8	24.09	7,553.7	27.24
<b>LIVESTOCK &amp; POULTRY</b>	3,559.4	12.05	4,619.9	14.60	7,815.6	19.23	3,796.9	13.36
<b>FISHERIES</b>	4,576.5	15.50	4,222.7	13.53	5,685.4	13.99	2,687.6	9.21
<b>FORESTRY</b>	1,681.0	5.69	1,512.8	4.85	1,993.8	4.90	1,984.6	7.32
<b>GRAND TOTAL</b>	29,532.5	100.0	31,205.9	100.0	41,292.1	100.00	27,835.3	100.00



Table 10  
 LOANS GRANTED TO FISHERIES BY INSTITUTION, 1986-1990  
 (Amount in million pesos)

Institution	1986	% Share	1987	% Share	1988	% Share	1989	% Share	1990	% Share	Average Share
PNB	3.5	0.1	3.0	0.1	45.5	1.0	63.6	1.5	50.8	0.9	0.7
DBP	*		17.5	0.6	48.1	1.1	19.9	0.5	10.1	0.2	9.5
LBP	*		18.6	0.7	61.1	1.3	458.6	10.9	440.8	7.8	4.1
PEBs	2,190.3	86.5	2,144.0	79.5	3,945.7	86.2	3,158.2	74.8	4,660.8	82.0	81.8
SHBs	26.4	1.0	9.9	0.4	16.3	0.4	54.7	1.3	7.5	0.1	0.6
PDBs	99.6	3.9	240.6	8.9	213.2	4.7	203.8	4.8	215.8	3.8	5.2
RBs	213.5	8.4	264.8	9.8	246.6	5.4	263.9	6.2	299.6	5.3	7.0
SSLAs a/	*		*		*		*		*		
<b>TOTAL</b>	<b>2,533.3</b>	<b>100.0</b>	<b>2,698.4</b>	<b>100.0</b>	<b>4,576.5</b>	<b>100.0</b>	<b>4,222.7</b>	<b>100.0</b>	<b>5,685.4</b>	<b>100.0</b>	<b>100.0</b>

\* - data not available

a/ - SSLA loans cannot be disaggregated.

Source: Credit Trends, Agricultural Credit Policy Council.

- 5) **Rediscounting of promissory notes and other eligible credit instruments by the Central Bank at the following preferential rates:**
  - a) 100 percent of the loan value of the outstanding balance under supervised credit programs,
  - b) A charge of one percent per annum rediscount and interest rates under the supervised credit programs, and
  - c) A charge of five percent per annum for other eligible instruments not under the supervised credit programs;
- 6) **Determination of the loan ceiling to a single borrower depending on (a) actual need, (b) the viability of the project to be financed, and (c) the capacity of the borrower to pay;**
- 7) **Intensification of government fisheries credit programs through the provision of maximum DBP financial assistance for its Countryside Development Program and PNB's mobile banking concept;**
- 8) **Creation of the Presidential Committee on Agricultural Credit and the Technical Board for Agricultural Credit to oversee the channeling of scarce credit resources to areas where they will generate the greatest social and economic benefits;**
- 9) **Fostering of credit consciousness and responsible attitudes in the rural areas through the establishment of the National Commission on Countryside Credit Credit and Collection;**
- 10) **Introduction of the "selda" system which assumes the joint-liability concept to enhance more cooperative effort among farmers; and**
- 11) **Enhancement of regional reinvestment of deposits by allotting 75 percent of the total deposits generated from commercial and thrift savings banks, stock savings and loan associations, etc., in a particular region for reinvestment in the area.**

***Credit Programs/Schemes.*** Credit programs in the past for the fisheries sector were implemented through various government agencies and government-owned or controlled banks. The institutions involved were: (a) the Development Bank of the Philippines, a government-owned bank which implemented a credit financing scheme with support from the International Bank for Reconstruction and Development (IBRD); (b) the rural banks and savings and loans associations which served as conduits of the Central Bank--IBRD rural credit projects; (c) the Philippine National Bank; (d) the Land Bank of the Philippines; (e) the National Agriculture and Fishery Council (NAFC); (f) The Development Academy of the Philippines (DAP); (g) the Bureau of Fisheries and Aquatic Resources; and (h) the defunct Agriculture Credit Administration (ACA).

A major constraint to the designing of the credit programs was that, unlike rice farming, fishing was not adaptable to a single-project financing scheme for nationwide promotion (Samson 1978). This was due to: (a) varied types of culture and capture, (b) varied resources and markets in each area, and (c) the need to encourage indigenous technology in each area.



The special credit programs initiated for the fishery sector were generally biased towards the municipal fishing sector. The major credit programs that catered specifically to the aquaculture industry were: (a) the Small Fishermen Credit Fund (SFCF); (b) the Small Foreshore and River Fisherman Program of DBP and PNB; (c) the Kilusang Kabuhayan at Kaunlaran (KKK) Aquamarine Program of the Ministry of Human Settlements; (d) the Coastal Area Resources and Enterprise Development Project; and (e) the Laguna de Bay Fishpen Development Project (LBFDB).

The SFCF program was jointly managed by the Central Bank, LBP, NAFC and DAP. It was a five-year program launched in 1979 aimed at an integrated approach to the development of the fishing industry, primarily municipal and aquaculture fisheries. The program included (a) the provision of fishing equipment, fishing gear and paraphernalia, and fishing boats; (b) the construction of infrastructure, in-plants and cold storage facilities; and (c) the provision of the operating capital of farmers' associations or cooperatives. Out of an initial fund of P2 million, P1 million was earmarked for the Supervised Fisheries Credit Program (SFCP) channelled through the rural banking system. Financial assistance to fishponds and fishpen operators was given on a short-term basis.

The Small Foreshore and River Fisherman Program of DBP and PNB, launched in 1976, was the most ambitious fisheries credit program to extend credit to small-scale fishermen/fishfarmers. The program released loans totaling P400 million. A major prerequisite of the program was for the borrowers to form "seldas," or groups of fishermen, composed of five members per group who were to exert peer pressure on loan delinquents.

The KKK Aquamarine Program was a major part of the national rural development program of the former Ministry of Human Settlements. The program, which was launched in 1979, included the financing of aquamarine prototype projects such as fish cages, seafarming, fish culture, fish capture and fish processing. Though primarily for production loan, the program was also used to finance prawns and tilapia hatcheries and milkfish nurseries. The program had extended a total of P411.42 million to 47,202 borrowers as of 1986 (BFAR 1986).

The Coastal Area Resources Land Enterprise Development Project was a joint undertaking of NEDA, NAFC and the Philippine Fisheries Development Authority (PFDA) geared primarily to the development of the country's fishery resources. The program provided a package of credit, infrastructure and marketing support to fishermen in specific areas (Palawan, Samar, Sorsogon and Masbate). The target beneficiaries were the fishpond and fishpen operators, oyster and mussel growers, and small fishermen. A total fund of P100 million was provided for the period 1981-84.

The LBFDP which lasted for about eight years (1978-86) sought to develop 2,500 hectares of fishpen modules in Laguna Lake. Its main beneficiaries were fishfarmers culturing milkfish and tilapia. The project was jointly financed by the Asian Development Bank (ADB) and The Overseas Petroleum Exporting Countries (OPEC) for US\$15.8 million.

Another major fishery program of the government was the Biyayang Dagat Program (BDP) which lasted for about seven years from September 1979 to 1986. The program was primarily for small- and medium-scale municipal fishermen. However, until 1982 it provided short-term loans for fishpond production inputs and other aquaculture projects. As of 1986, the program had released a total of P101.7

million in loans, benefiting 7,619 borrowers (BFAR 1986). The Agricultural Credit Administration, then a credit agency of the government, had no credit programs for aquaculture, and its focus was mainly the municipal fishermen.

A summary of the features of the financing programs for aquaculture undertaken by major banks is shown in Table 11. It might be noted that DBP and LBP provided long-term loans while rural banks and the PNB lent on a short-term basis.

An evaluation of these credit policies and interventions indicated that they did not favorably work for the fisheries industry and the aquaculture subsector as well (TBAC 1976). This was attributed to the following reasons:

1. *Inadequate loan size.* Due to rising input prices and operational costs, prescribed loan sizes were not adequate to effectively support fisheries projects. The fishery credit programs were not availed of by fishfarmers owning less than 15 hectares (the estimated breakeven size). The actual beneficiaries were the big aquaculture fishfarmers who, ironically, found the loan to be inadequate.

2. *Collateral requirements.* Almost all existing programs required a collateral. But this security imposition hardly assisted small fishfarmers who had no collateral to offer. In addition, fishpond lease agreement holders were scarcely qualified to borrow. This, in effect, made the program accessible only to the propertied and large fishermen.

3. *Burdensome restructuring policy.* The restructuring policy was burdensome for loan borrowers. Aside from having to pay interest, they were charged an additional penalty on their outstanding loan balance. This arrangement exemplified rigidities in the amortization of loans to fisheries that did not correspond to the intricacies of the fisheries sector. The amortization schedule imposed by banks did not correspond to the cash flow of the project, especially considering unforeseen risks.

4. *High transaction costs.* High transaction costs incurred in securing a loan also deterred credit availments. Filing fees, attorneys' fees, transport costs to and from the bank, time spent and other loan-related expenditures constituted the bulk of these costs. All these discouraged prospective borrowers from availing themselves of loans from formal sources. Instead they borrowed from private moneylenders at higher interest rates but at lower transactional expenses.

5. *Low repayments.* A low repayment rate was experienced by the majority of formal lending institutions engaged in aquaculture financing. Reasons cited for this were poor production, inadequate inputs, low technology level, management deficiencies, insufficient technical manpower, and the lack of marketing and infrastructure support.

### C. *Current Credit Policies and Programs*

The fisheries sector continues to be a priority concern of the government. However, with the general failure of past credit and financing strategies, alternative forms of managing and channeling credit to the rural markets are being sought. The new orientation in Philippine rural financial policy is towards minimum government intervention in the provision of credit and a greater role of market forces

Table 11  
FINANCING PROGRAMS FOR AQUACULTURE, BY INSTITUTION AND BY MATURITY

Loan Title	Purpose	Eligible Borrowers	Interest Rate	Amount of Loan	Collateral	Terms of Payment
<b>Production</b>						
<b>1. Development Bank of the Philippines</b>						
1.1 Fish Culture	a. Rehabilitation of damaged fishponds	a. those engaged in inland fishing industry	a. 12% p.a. for unsecured loans of P5,000 and below	Based on actual needs of the project	a. real estate/ chattel mortgages	a. 7-10 years for rehabilitation
	b. Construction of new fishponds	b. those intending to engage in inland fishery production	b. 14% p.a. for secured loans of P5,000 and above		b. leasehold rights	b. 13-16 years for construction of new fisheries
	c. Development of existing fishponds					c. 10-13 years for development
<b>2. Philippine National Bank</b>						
2.1 Rehabilitation of damaged fishponds and fishpens by floods and typhoons	a. repair of dikes/pens	a. operators of fishpens	a. 12% p.a.	a. Not exceeding 70% of appraised value of real estate securities and improvements  b. not exceeding 50% of the appraised value of chattels	a. real estate properties	one year
	b. purchase of fingerlings, inputs, etc.	b. fishpond operators			b. chattels	

Loan title	Purpose	Eligible Borrowers	Interest Rate	Amount of Loan	Collateral	Terms of Payment
<b>3. Rural Banking System</b>						
3.1 Short-term financing program for fisheries production and development	a. enhance fish production	a. experienced fishpond operators with not more than 5 hectares fully developed fishpond	12% pa.a.	a. P3000/ha. maximum for brackish water fishpond for bangus and sugpo combination	real estate chattel mortgage	one year
	b. provide operating capital	b. fishpen operators with not more than 3000 square meters of tilapia culture		b. P7000/borrower maximum for bangus fishpen and P3,300 per 1,000 sq. m. for tilapia		
		c. fishermen engaged in fry collection		c. P500/borrower maximum for fry collector		
<b>4. Land Bank of the Philippines</b>						
4.1 short-term fisheries loan	a. purchase of fry	a. individuals	a. 9% p.a. for loans below P5,000	based on actual needs	a. real estate	1-5 years
	b. initial operating capital	b. partnerships or corporations at least 60% of which are Filipino equity	b. 12% p.a. for loans above P5,000		b. chattels c. securities	

Loan Title	Purpose	Eligible Borrowers	Interest Rate	Amount of Loan	Collateral	Terms of Payment
<b>Marketing and Processing</b>						
<b>1. Development Bank of the Philippines</b>						
1.1 on-farm post-harvest processing equipment and facilities	a. construction of ice-making storage and other facilities	a. those experienced in fishing business with ongoing storage and processing concern	a. 12% p.a. covered by land collateral	a. 80% of appraised value of titled collateral and 60% of untitled  b. 60% of appraised value of building, machinery & equipment	a. real estate  b. chattels	10-13 years
<b>2. Land Bank of the Philippines</b>						
2.1 On-farm post-harvest processing equipment and facilities, marketing and processing	a. cold storage financing b. warehousing c. purchase of trucks d. salting and drying facilities e. packaging	a. those engaged in any of the on-farm post-harvest activities	a. 12% p.a.	a. P1.0M and below small-scale b. over P1.0M and under P4.0 M for medium-scale c. over P4.0 M for large scale	a. real estate b. chattels c. securities	10-15 yrs.

Source: TBAC, National Workshop on Aquaculture Development Strategies, Tropical Palace, Metro Manila, Aug. 2-4, 1978.

and private institutions in the allocation of financial resources. It specifically calls for the mobilization of deposits by the private banking system and for efficient financial intermediation in cognizance of the view that financial liberalization by itself is not a sufficient condition to increase the flow of credit to the rural sector ( Lamberte and Lim 1987).

One of the most important changes that occurred was the creation of the Comprehensive Agricultural Loan Fund (CALF), which was a consolidation of the funds of the previous commodity specific credit programs. The CALF instituted various credit and credit guarantee schemes that were expected to be more responsive to the needs of the rural sector.

Of those schemes the four most important are: First, the credit guarantee which aims to encourage banks to lend to the rural sector by reducing the default risks generally associated with small farmer agricultural credit. This is made possible by government guaranteeing at most 85 percent of the risk exposure of the banks to the targeted beneficiaries. The scheme is operated through the facilities of three existing guarantee institutions: (a) the Philippine Crop Insurance Corporation (PCIC), which provides a guarantee for small farmer production credit; (b) the Quedan Guarantee Fund Board (QGFB), which provides a guarantee to cover the inventory financing of storable crops; and (c) the Guarantee Fund for Small and Medium Enterprises (GFSME), which provides a guarantee to small and medium enterprises for medium-term credit. The status of CALF guarantee coverage is presented in Table 12. Among the three guarantee institutions, the GFSME is noted to have guaranteed the highest volume of loans for the aquaculture sector. Second, the management by CALF of the Integrated Rural Financing (IRF) Program in coordination with the Land Bank of the Philippines (LBP). The IRF, begun in 1983, continues to operate in light of its moderate success during the first phase. The program has two distinct features: (a) it employs the comprehensive credit line approach for small farm households through the rural banking system and cooperatives; and (b) it emphasizes institutional development, which is focused on organizing and strengthening small farmers through participating nongovernmental organizations (NGOs). The farmers are first trained in basic enterprise management and value formation prior to the availment of bank credit. Third is the Development Assistance Program for Cooperatives and People's Organization (DAPCOPO) which was launched in May 1990. DAPCOPO is a short-term program created to bring the small farmers into the mainstream of the financial system via cooperatives and similar organizations. This program is for those farmers with good projects who do not have access as yet to bank credit due to the lack of a credit record, collateral and familiarity with the banking system. The objective is to provide the farmers with first-hand experience in credit handling which will create credit records for them and enable them later to gain access to the financial system's resources. It also envisages the evolution of cooperatives into strong financial conduits that would be able to compete with the banking system. Fourth is the Fisheries Sector Program (FSP). The program, which is implemented by the Department of Agriculture through a loan from the Asian Development Bank (ADB), consists of a package of policy and institutional reforms and program activities designed to improve the production of the coastal and aquaculture sector. This package has six components, namely: (a) fishery resource and ecological assessment, (b) coastal resource and management, (c) research and extension, (d) law enforcement, (e) infrastructure and marketing support, and (f) credit.

Credit is delivered through the IRF credit delivery system of the ACPC-LBP wherein cooperatives and rural banks retail the loans provided through the LBP. Private banks are encouraged to lend to the sector out of their own resources under guarantee by the PCIC-CALF and the GFSME-CALF,

Table 12  
STATUS OF CALF GUARANTEE COVERAGE, BY TYPE OF COMMODITY

	Loan Amount Covered (FM)	Percent Share
PCIC-CALF	635.911	32.2
Commercial Crops	384.378	19.5
Vegetables	121.216	6.2
Livestock	34.372	1.7
Fruits	28.274	1.4
Rootcrops	29.332	1.5
Fishery a/	22.012	1.1
Others	13.327	0.8
GGFB-CALF	1,085.665	55.0
Sugar	391.337	19.8
Meat Products	293.000	14.9
Coffee	107.632	5.5
Dressed Chicken	42.397	2.1
Cacao Beans	40.000	2.0
Palay/Corn	43,592	2.2
Others b/	167.707	8.5
GFSME-CALF	245.747	12.5
Vegetable Farming	109.072	5.5
Feed Milling	26.475	1.3
Prawn/Bangus Culture	24.830	1.3
Broiler-Contract Growing	17.400	0.9
Coco Oil Processing	15.000	0.8
Grains Trading	10.913	0.6
Rice Production	4.939	0.2
Others c/	37.118	1.9
BPnB-CALF	5.436	0.3
Public Market	4.680	0.3
Lapu-Lapu Culture	0.500	*
Tilapia Culture	0.256	*
TOTAL	1,972.759	100.0

\* Negligible

a/ Mainly aquaculture - fish cages, bangus/prawn and seaweeds

b/ Includes prawns and fish products

c/ Includes seaweed farming, fish culture

Source: Agricultural Credit Policy Council.

which will expand their guarantee cover to include aquaculture, fishery and nonfishery related projects in the priority areas. Initial funding for the credit component amounts to P100 million, and the program is set to be completed within the period 1990-94.

## V. CONCLUSION: RESEARCH GAPS AND PRIORITIES

The projected credit requirements of the fisheries sector will amount to about P31.0 billion for the five-year period 1991-95 (Rural Finance Development Plan 1990). This amount seems understated because the estimates only considered production credit. There may be a higher credit demand in view of the rising cost of fisheries inputs (e.g., pesticides, fertilizers, construction materials), especially the imported inputs which imply higher development, operating costs and capital investments. The implementation of the CARP which reduces the effective rearing areas of ponds to only five hectares implies the adoption of an intensive culture practice for the industry to remain viable. This cultural practice, as indicated earlier, requires an operating capital ten times more than that of extensive or traditional culture.

The capital needs of the aquaculture sector are indeed huge. With funding as a major constraint, a viable and efficient credit market that meets the industry's requirement for investment capital, input purchase, crop financing and essential consumption expenditure of labor in the sector is imperative. While the preliminary and very limited information seems to point to the need for government intervention in various areas such as infrastructure, marketing and credit, this perception may be more apparent than real.

An understanding of the aquaculture sector is essential, for it is not enough to know the socioeconomic conditions of the fishfarmer. It is equally important to have a better and improved understanding of the economics of production and marketing of fisheries products and of the impact of factors (e.g., CARP) that bear on the profitability and viability of the sector.

A critical area is the policy environment affecting the aquaculture sector. For instance, we must have a clear understanding of the likely impact of agrarian reform as well as of a host of macro policies, in particular, trade and financial policies. Such policies affect the marketability of produce especially for the exported products, the cost of operation, and the availability of financial resources. The CARP, which limits farm size to five hectares, would have a direct effect on the tenancy arrangement and on the production and cost structure, resulting in changes in output and employment. Considering that the aquaculture industry in the country is characterized by an increasing cost structure, economies of scale may require a larger farm size (i.e., more than five hectares) for the industry to remain viable. An agrarian reform program may therefore bring about serious repercussions to the industry, which can be aggravated by the resultant decrease in formal institutions' lending activity to the sector due to the higher risks posed by small aquaculture farms.

The reluctance of formal financial institutions to lend to the small fishfarmers would increase the sector's dependence on informal institutions characterized by high interest rates and "interlinked" arrangements that may put the fishfarmers at a disadvantaged position.



Lastly, the financial concerns of the CARP beneficiaries need to be addressed because the highly capital-intensive nature of the industry and the sensitivity of aquaculture output to quality inputs underscore the demand for financial resources.

There is thus a need to study past and existing aquaculture credit programs/schemes in the country to draw lessons from their failure or success. The apparent lack of systematic studies on the structure, nature and characteristics of the fisheries credit markets, in general, and of small-scale aquaculture, in particular, limits the ability to make long-range investment plans and appropriate credit policies and programs for the sector. Specifically, some credit issues that need to be addressed are: (a) whether it is necessary to adopt specialized credit facilities; (b) the proper incentive structure to create; (c) whether credit schemes should be used as channels of government's welfare objectives; and (d) whether loan guarantees will be more effective than subsidized credit insofar as inducing credit availability and accessibility is concerned. Until problems or barriers to credit financing of the sector are well understood and properly addressed, the sector will remain undercapitalized, with resultant adverse effects on investment and output.

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