



# MARKETING AS A FACTOR IN FISHCULTURE DEVELOPMENT IN EL SALVADOR

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TOP: Rural market in San Isidro, with temporary stalls in street, has one market day per week. CENTER: Vendor handling small volume of dried fish. BOTTOM: Dried fish in baskets in rural market.

## SUMMARY AND CONCLUSIONS

Fish has been suggested by the Government of El Salvador (GOES) as a source of high quality protein to improve the diets of low-income Salvadorans. Large quantities of inexpensive fish are needed.

Large commercial fish farms can contribute significantly to the future supply of fish in the cities. For these fish farms to provide one-third of the additional need for fish in urban areas in 1985, ponds totaling 580 hectares will be required.

Family fish ponds represent an important source of fish to rural areas. Fish produced in family ponds can provide animal protein for the immediate farm family and cash income through sales to neighboring families. It is estimated that approximately 359 hectares of family ponds will be required to meet the additional need for fish in rural areas in 1985.

A prerequisite to increased production of pond-raised fish is government input. While technical assistance provided by agencies of the GOES will allow development of large commercial farms, family pond development requires a well coordinated promotion-extension program designed specifically for the small farmer.

Agencies of the GOES have done much to increase pond fish production and efforts in this area should be continued. Though progress is slow and difficult to measure, the development of fishculture is one important means by which the GOES can improve the quality of life for many of the Salvadoran poor.

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# MARKETING AS A FACTOR IN FISHCULTURE DEVELOPMENT IN EL SALVADOR\*

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## INTRODUCTION

THE WORLD FOOD SITUATION has been recognized as an immediate and complex problem. In the most recent food survey conducted by the United Nations, it was estimated that up to 50 percent of the world's people suffer from hunger or malnutrition, or both (12). The majority of these people live in countries commonly referred to as third world or developing nations. These regions are also characterized by rapid population growth and low incomes (26). Thus, a multifaceted approach must be taken to provide a satisfactory solution to the food problem.

Any successful effort to improve the quality of diets in developing countries requires increases in both food production and purchasing power of the population. People must be able to buy any additional food that is produced. It is particularly important that increases in income occur among those in greatest need, the poor.

To improve conditions for many of the world's poor, population growth must be slowed. In past years economic development has resulted in higher incomes, but these advances have been largely offset by population increases. Food production has barely been able to grow with population, so it could not meet the moderately expanded demand resulting from some improvement in per capita income (26).

An increase in the supply of food, particularly foods of higher nutritional quality, is required to improve the quality of life for many of the world's undernourished. In the densely populated developing countries, new agricultural lands are not available at a reasonable cost. Thus, increases in food production must be achieved through improvements in yields (26). Streeter (23) cited examples of how the use of modern cultivation practices and improved varieties of traditional crops and the introduction of nontraditional crops have increased the productivity of agricultural lands in developing countries.

One example from the Streeter report was from the Republic of El Salvador, a country which has much in common with many of the developing regions of the world. One of the important problems facing this country is the need for increased food production.

## BASIC DATA ABOUT EL SALVADOR

### Geography and Climate

El Salvador is a Central American republic bordered by Guatemala to the west, Honduras on the north and east, and the Pacific Ocean on the south. It is the smallest coun-

try in Central America, having an area of approximately 21,000 square kilometers (roughly the size of Massachusetts). There are 321 kilometers of coastline (7). Greatest land distances are 256 kilometers east to west and 96 kilometers north to south, Figure 1.

Mountain ranges divide the country into three geographical regions running east to west: (1) a narrow coastal plain, (2) a populous central plateau where the three largest cities are located, and (3) a mountainous northern region.

The climate is tropical and temperature varies with altitude. There are two distinct seasons, a rainy season from May to October and a dry season for the duration of the year (7).

### Population

El Salvador is the most densely populated country in Central America—182 persons per square kilometer. Its total population in 1973 was estimated at 3,814,000 (5). Guatemala, the second most densely populated Central American country, had 51 persons per square kilometer in the same year (25). The population is increasing at the rate of 3.5 percent per year, a rate that would double population in 20 to 21 years (4).

### Income

Average per capita income in El Salvador was \$324 in 1972 (6). This income was poorly distributed, however, with 80 percent of the population receiving only 37 percent of the income and the remaining 20 percent getting 63 percent of the total (24). This represents annual per capita incomes of approximately \$150 and \$1,020 for the two respective strata.

Income in rural areas was estimated at one-third of the national average (17). Nonfarm families and families owning farms of less than 1 hectare comprised 20 and 40 percent of the rural population, respectively, and received only 7.6 and 19.6 percent of the income in 1970. In contrast, 0.3 percent of the rural families received 22.2 percent of the income, Table 1 (5).

### Nutrition

A nutrition survey in El Salvador conducted in 1963 found that 75 percent of the children suffered from malnutrition. This was considered to be a contributing cause in more than 50 percent of the deaths of children below the age of 5 years. A 1965 survey in 30 rural communities concluded that consumption of animal protein, which was only 26 percent of recommended levels, was one of the most serious nutritional problems of the rural population.

The traditional diet of rural Salvadorans consists of tortillas, beans, and coffee supplemented with rice and cheese. This diet has 900 calories less than the minimum recommended by the General Direction of Public Health in El Salvador and is notably lacking in animal protein (17). Ani-

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mal protein is desirable and in many cases necessary for a nutritionally adequate diet.

## FISH AS A SOURCE OF PROTEIN

Fish compare favorably in price with other sources of animal protein in El Salvador. In the markets of San Salvador, fish cost less per pound than pork, beef, or poultry. Though consumers purchase food rather than protein, it is important that planners of food production programs consider the nutritional value of agricultural products per unit of consumer cost. As shown by data in the table, fish were less expensive per unit of edible protein than other meats, eggs, or milk.

Fish has recently been recognized by the Government of El Salvador as a potential source of animal protein that can be used to improve the diets of lower income Salvadorans. In 1969, USAID and USPC were requested by the GOES to assist the Fisheries Service, General Direction of Natural and Renewable Resources, in a study of the production of fish in inland waters, including the natural lakes, rivers, and artificial ponds of the country (14).

## STATUS OF POND CULTURE

Jensen et al. (14) evaluated the status of fishculture in El Salvador and identified several factors which were limiting its development. They reported that approximately 500 fish ponds with a total area of 53.5 hectares had been constructed, but only 12 percent of the pond area was being managed for fish production. Many pond owners were unaware of the technical assistance and fingerling distribution services provided by the Fisheries Service. Many were dissatisfied with the small size of fish produced, low production, and marketing problems caused by the sporadic supply of fish.

PRICES OF COMMONLY SOLD SOURCES OF ANIMAL PROTEIN AND COST PER KILOGRAM OF EDIBLE PROTEIN, SAN SALVADOR, JANUARY 1974

Product	Price/unit <sup>1</sup>	Protein/unit <sup>2</sup>	Cost per kg of protein
	Colones <sup>3</sup>	Grams	Colones
Fish <sup>4</sup>			
Snook.....	2.13/kg	132	16.15
Shark.....	1.43/kg	132	10.82
Beef <sup>5</sup>			
Loin.....	5.28/kg	180	29.22
Round.....	5.06/kg	180	28.01
Pork <sup>5</sup>			
Loin.....	3.30/kg	163	20.24
Ham.....	2.86/kg	163	17.56
Poultry <sup>4</sup>	2.86/kg	141	20.28
Eggs.....	1.40/doz.	72	19.43
Milk.....	0.44/qt.	34	12.94

<sup>1</sup> Prices of all products except fish were reported in Dirección General de Economía y Planificación Agropecuaria, *Precios comunes de los principales productos pecuarios en la plaza de San Salvador*, 15 de Enero de 1974, (San Salvador: 1974), 1 p.; fish prices were determined from visits to the La Compañía market.

<sup>2</sup> Protein content elaborated with data from United States Department of Agriculture, *Food, The Yearbook of Agriculture, 1959*, U.S. Govt. Print. Off., Washington, D.C., 1960, pp. 244-248.

<sup>3</sup> 2.5 colones = \$1.00.

<sup>4</sup> Fish—39 percent refuse (Spanish mackerel), chicken—32 percent refuse, from United States Department of Agriculture, *Composition of Foods*, Handbook No. 8, U.S. Govt. Print. Off., Washington, D.C., pp. 32, 113.

<sup>5</sup> Beef and pork sold boneless.

Recent investigations conducted at the National Fish-culture Station, Santa Cruz Porrillo, identified solutions to many of the problems previously associated with pond culture in El Salvador. Recommendations concerning species, stocking rates, fertilization, and harvesting methods have been revised (1,22).

The revised culture system utilizes *Tilapia aurea* as the primary species. This species grew faster and reproduced less than the previously used *Tilapia mossambica* (3).

The guapote tigre, *Cichlasoma managuense*, was stocked in combination with the tilapia to produce larger fish. This piscivorous species controlled excess tilapia recruitment, thus preventing overcrowding and stunting (11,22).

The addition of organic or inorganic fertilizers increased production in ponds (22). A supplemental feed containing coffee pulp, a locally available agricultural by-product, has been used in certain instances. Fertilization and supplemental feeding result in higher fish production than that obtained with fertilization only (2,21). Beginning partial harvesting of fish at weekly, bi-weekly, or monthly intervals 4 months after stocking would permit pond owners to correlate supply with need (10,22).

An economic analysis of the inland fisheries of El Salvador (15) included budgets for four alternative fish production systems. All were economically feasible, but profits increased with greater inputs of fertilization and feeding.

An increase in the production of pond-raised fish can occur only through promotion and extension of improved fishculture methods to interested farmers and pond owners. The Fisheries Service has been active in this area.

A *Manual of Fishculture* has been published and made available to pond owners and interested farmers. This manual contains sections on pond construction, biology of culture species, and all aspects of pond management, from the preparation of ponds for stocking to harvesting and marketing (22).

Extension workers have supervised the renovation and management of 60 percent of the total pond area of the country and have assisted farmers who wish to construct new ponds (9). A 5-year program with plans for the construction of 100 communal ponds managed by rural communities for their own benefit was begun in 1973. This will provide fish for the immediate communities and serve as demonstration ponds for surrounding areas (8).

## FISH MARKETING

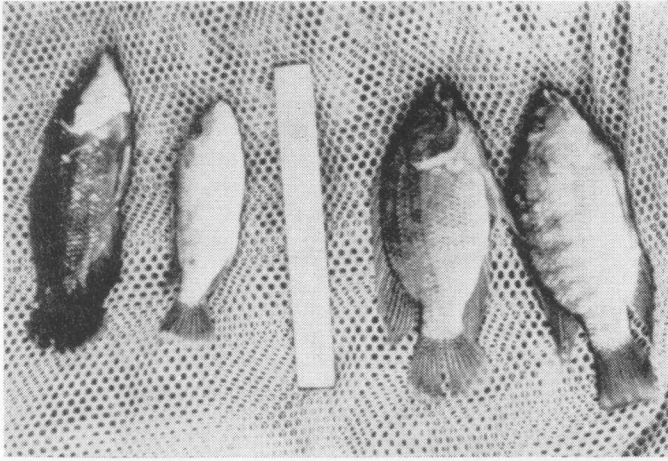
In addition to emphasis on the production of fish, the GOES also has recognized the importance of marketing for the development of fishculture. The following is a brief summary of important results of a survey of fish marketing recently conducted in El Salvador (18).

Most fish consumed in El Salvador came from marine fisheries, both industrial and artisanal. Freshwater artisanal fisheries also contributed substantially to the total supply. The production from fish ponds was insignificant in 1973.

Except in fishing communities, the majority of fish consumed in El Salvador was marketed through established channels of distribution. Major cities served as centers of fish distribution for surrounding areas.

In the large cities, substantial quantities of all types of fish were sold. Less expensive fish comprised a greater part of sales in the small cities. Limited amounts of less expensive fish were sold in rural markets. Both supply and income appeared to influence the consumption of fish.

Within rural areas, both fresh and total fish consumption



**Tilapia mossambica, left, Tilapia aurea, right.**

was greater in the central zone than in other zones. This was attributed to the proximity of towns in the central zone to major centers of fish distribution located in the large cities.

Consumers paid premium prices for all species of the family Cichlidae: the guapotes, mojaras, and tilapias. Consumers preferred freshwater fish over most marine species. Many sources of inland fish were near major markets, so freshwater fish normally reached markets in excellent condition.

Freshwater fish of the family Cichlidae sold for a price similar to that paid for the premium marine species, approximately \$2.20 per kilogram. Other freshwater species were sold for approximately \$1.32 per kilogram, similar to the price of less expensive marine species. Dried fish were the least expensive of all fish types, selling for approximately \$1.10 per kilogram.

The projected demand for fish in urban areas in 1985 was 7,887 metric tons, an increase of 4,354 metric tons over the 1973 urban supply. The 1985 demand in rural areas was projected to be 1,956 metric tons, an increase of 1,077 metric tons over 1973 rural supply.

### PROJECTED NEEDS

In view of the projected demand for fish, production increases in all contributing fisheries are required. The actual trend in supply indicates that this is not occurring. Total domestic production of fish has remained relatively stable at approximately 5,500 metric tons (18). To satisfy the projected demand for fish and avoid increases in imports, domestic production of fish must be doubled by 1985. Much of the increase in production must consist of less expensive fish to benefit low income consumers.

Projected demand for fish refers only to quantities which will be actually sold through the marketing system. A significant part of El Salvador's total domestic production is consumed by fishing communities. In 1970, for example, approximately 20 percent of the total fresh fish supply was consumed in fishing centers along the coast (24). The present demand projection does not include fish consumption by the fishing sector of El Salvador, despite its importance in planning needed production increases.

El Salvador's population was 37.9 percent urban in 1970, but it is estimated to reach 50 percent urban by 1985 (20).

As more people move into urban centers, the demand for food will increase in these areas.

Urbanization requires a more efficient system of distribution for fish as well as other agricultural commodities. Because the production areas, channels of distribution, and centers of consumption are more restricted for fish, urbanization creates additional problems for distribution of fish to rural areas.

In 1973, the majority of the fish supply to public markets came from marine fisheries. Channels of distribution have been established to move the supply of fish from landing sites to major consumption centers. As the population in urban centers increases, the demand for fish will increase and less fish will be available for the rural population.

Fish reaching rural markets usually passed through distribution centers in the cities. The supply situation for rural areas, inadequate in 1973, would not improve as urbanization increased. Continued shortages in rural areas is indicated by projection data showing that 1980 demand for fish in the cities will surpass total 1973 domestic production of fish. In view of the recent stability of domestic production levels, the high consumption of fish in active fishing areas, and the increased demand for fish in urban centers, it is estimated that the deficiency in supply of fish in rural areas will approximate the demand in 1985 (1,956 metric tons). In effect, demand in the cities will utilize the entire supply.

The situation in rural areas becomes even less favorable when income levels are considered. To attract fish out of urban centers, prices must necessarily be greater in rural areas than in the cities. This would prove an additional burden to rural inhabitants, the population sector reported to have the lowest average incomes.

### MEANS OF INCREASING SUPPLY

A substantial increase in the demand for fish in El Salvador is projected for the near future. The domestic supply has not increased significantly in recent years. These trends indicate that efforts to increase fish production in all sectors be undertaken. Not only is there a need for more fish, but large quantities of inexpensive fish are needed to benefit low income consumers.

Means of increasing the production of marine fisheries have been suggested (12,24). Similar development programs may be established to increase the harvest from natural inland waters. Fishing pressure on natural fish stocks is heavy, and the possibility of increasing production of these fisheries is extremely limited.

Fishculture is a means of increasing future fish supplies in El Salvador. Certain quantities may be produced in cages and pens located in suitable natural waters. To a large extent, however, increased production from inland waters must come through the culture of fish in ponds.

Existing fishculture operations in El Salvador can be divided into two major types, large commercial and small family operations, and both can make important contributions to the future supply of fish. Harvests from these operations are destined for two distinct consumer groups.

#### Large Commercial Ponds

Large commercial ponds are located on medium to large scale farms (10 hectares or larger) operated by active commercial producers. These operations are oriented to fish sales in the cities and represent pond areas greater than 0.5 hectare each. Pond owners utilize production techniques which permit the harvest of a large fish (0.11 kilogram or

larger), which is competitive in the cities with fish from other sources.

The advantages of fish culture, both to the producer and consumer, may appear somewhat optimistic in view of the actual situation in El Salvador. Fishculture has not yet been recognized as an economical alternative to the production of other agricultural crops. Though returns are high, the initial investment required for the construction of commercial ponds is high, whether manpower or machinery is utilized. The marketing system is inefficient and margins are elevated, suppressing both supply and demand. Consumption is low and demand is highly seasonal. Fish are not considered by consumers as an everyday alternative to other animal products. Nevertheless, an increase in the supply of fish is needed and fish culture can provide this supply. With costs of production as estimated by McCoy (15) and the market prices found in 1973-74, fishculture appears to be a profitable enterprise. The profits will attract increasing numbers of farmers into fish production. As fishculture becomes established as a valid farm enterprise and pond management techniques are refined, greater numbers of farmers will enter production.

Based on the supply and projected demand under 1973-74 market conditions, an estimate was made of the number of large commercial fishculture operations needed to supply a part of the projected need for fish in urban areas. Assuming that one-third of the additional need for fish in urban areas in 1985 is provided by pond raised fish, approximately 1,450 metric tons would be required. Commercial operations with pond areas totaling 580 hectares, each with an average production of 2,500 kilograms per hectare per year, would be required to provide this supply. The total pond area in 1973 was estimated to be 54 hectares, indicating that 546 additional hectares of commercial operations will be needed to meet the future supply of fish to urban centers.

An increase in fish production in the large, commercial sector would not have a direct impact on the urban poor, given 1973 conditions. The market study indicated that cichlid species, the type produced commercially, demanded top prices in the cities. Low incomes would prohibit the consumption of these large pond-raised fish by the urban poor.

Though freshwater cichlids were more expensive than other fish types in 1973, an increase in production would indirectly benefit low-income consumers. As the supply of pond-raised fish increases, the market price will decrease somewhat. In response to the decrease in price and the preference for cichlid-type fish, it is thought that sales to lower middle and middle class consumers will shift from less-preferred species. The decreased demand for less-preferred species should induce a down-trend in price for these fish. Consumer reaction to price change between fish types would oscillate downward through income groups. The final impact would be increased availability of the cheaper classes of fish to the lowest income group.

### **Small Family Ponds**

Small family operations could provide an important source of fish supplies in rural areas. In view of the low incomes and poor diets, small family operations represent an important type of fishculture development in rural areas of El Salvador.

Family fishculture operations are normally located on small to medium scale farms (1-50 hectares) of subsistence and commercial farmers. The fish production unit of family opera-

tions is less than 0.5 hectare in area. Pond owners utilize management techniques which result in the production of small sized fish (0.11 kilogram or less) at a low cost. Due to the nature of the operation, limited quantities of fish are harvested at frequent intervals, daily in some cases.

Fish produced in family ponds represent an important source of protein for the immediate farm family. Larger family ponds can also provide much needed cash income through sales to neighboring families and to consumers in nearby towns.

Fishculture in small family ponds directly benefits those in need. From a production unit of 0.2 hectare, 600 kilograms of fish can be produced per year. If 182 kilograms of fish per year were consumed by the immediate family, this would leave 418 kilograms to be sold to neighboring families to provide the pond owner with a net cash income from the enterprise. At a selling price of  $\phi$ 1.32 per kilogram, similar to the selling price of less expensive fresh fish in rural areas,  $\phi$ 318 in cash income would be generated. At a selling price of  $\phi$ 0.88 per kilogram, lower than the price of dried fish in rural areas,  $\phi$ 134 in cash income would be generated (see budget in Appendix).

Small family fish ponds can increase food production and income of small farms. Such ponds can be built on marginal lands unsuitable for other crops and be complementary to other farming enterprises. Of even greater importance, they can provide a source of protein for rural consumers and reduce the dependency of rural areas on the cities for fish supplies.

It is estimated that the additional need for fish in rural areas will be 1,077 metric tons in 1985. In view of the possible decrease in supply, the actual needs may approach the projected total demand, 1,956 metric tons. Production of the needed additional 1,077 metric tons of fish can be done in an estimated 359 hectares of family ponds. This pond area is equivalent to approximately 1,800 production units of 0.2 hectare each.

### **RECOMMENDED PRIORITIES FOR FISHCULTURE DEVELOPMENT PROGRAM**

In view of the cost of fish production and the premium price paid for cichlid-type fish, the supply from large commercial operations will increase in future years. As "innovators" demonstrate to other farmers the profit from fishculture, the demand for technical assistance in the construction and management of fish ponds will grow. Though technical assistance to commercial operators should be provided by the GOES, a fishcultural promotion program for this sector is unnecessary. The profitability of fishculture can provide the impetus for large commercial operations to develop independently of government promotion.

There are many problems associated with the development of family fish ponds in El Salvador. Small farmers as a group are usually not the most receptive to new agricultural methods. A package of pond management techniques which less-educated farmers can understand and accept must be formulated. The number of small operations needed requires a well-coordinated extension program with adequate numbers of well-trained field agents. Low-interest government loans are needed. Fish fingerlings must be readily available to farmers at all times. The establishment of an effective national promotion-extension program for family fishculture is an important way the Fisheries Service can benefit many low-income Salvadorans.

## APPENDIX

### Costs and Returns Analysis for a 0.2-hectare Fish Production Unit

#### Assumptions

1. Tilapia fingerlings are available at the National Fish-culture Station for a cost of ₱1.50 per hundred.
2. Special low interest loans for fishculture are available through the Banco de Fomento Agropecuario; interest rate 6.5 percent per annum; principal repayable in 5 years.
3. Chicken manure is available to the farmer for the cost of hauling, ₱0.075 per kilogram.
4. Family labor is utilized in the operation; labor charged at minimum wage for agriculture, ₱0.33 per hour.

#### Capital investment items

Non-depreciable	
Construction of dikes <sup>1</sup> .....	₱660.00
Depreciable	
Water control system for ponds <sup>2</sup> .....	235.00
Seine <sup>3</sup> .....	225.00
Buckets.....	10.00
TOTAL DEPRECIABLE.....	470.00
TOTAL CAPITAL INVESTMENT.....	₱1,130.00

#### Annual costs

Fixed costs	
Water control system (20-year life).....	₱11.75
Seine (5-year life).....	45.00
Buckets (5-year life).....	2.00
Interest on average investment @ 6.5% per annum <sup>4</sup> .....	15.28
TOTAL FIXED COSTS.....	74.03
Variable costs	
Fingerlings <sup>5</sup> .....	40.00
Fertilizer <sup>6</sup> .....	115.00
Labor <sup>7</sup> .....	72.27
Interest on operating capital @ 9% per annum <sup>8</sup> .....	8.30
TOTAL VARIABLE COSTS.....	₱235.77

#### Option 1 – at selling price of ₱1.32 per kg

##### Revenue

Cash revenue – 418 kg tilapia sold @ ₱1.32 per kg.....	₱552.00
Non-cash revenue – 182 kg tilapia for family consumption.....	240.00
TOTAL REVENUE.....	₱792.00

##### Returns

Return to land: rental value = ₱180 per hectare (₱180 x 0.225 ha).....	₱40.50
Return to labor: operating labor + 9% of construction labor (₱72.27 + ₱59.40).....	131.67
Return to management: total revenue – total fixed and variable costs excluding labor – returns to land and labor (₱792.00 – ₱237.53 – ₱40.50 – ₱137.67).....	382.30
CASH INCOME <sup>9</sup> : total cash revenue – total fixed and variable costs excluding labor (₱552.00 – ₱237.53).....	₱314.47

#### Option 2 – at selling price of ₱0.88 per kg

##### Revenue

Cash revenue – 418 kg tilapia sold @ ₱0.88 per kg.....	₱368.00
Non-cash revenue – 182 kg tilapia for family consumption.....	160.00
TOTAL REVENUE.....	₱528.00

##### Returns

Return to land.....	₱40.50
Return to labor.....	131.67
Return to management.....	118.30
CASH INCOME <sup>9</sup> (₱368.00 – ₱237.53).....	₱130.47

<sup>1</sup> Total cost of pond construction	
Clear land: 0.225 ha (0.005 per man-hour) 45 man-hours @ ₱0.33.....	₱14.85
Construction of dikes: 750 m <sup>2</sup> (0.375 m <sup>2</sup> per man-hour) 2,000 man-hours @ ₱0.33.....	660.00
Sod banks: 0.05 ha 16 man-hours @ ₱0.33.....	5.28
Drainage system	
Monk.....	75.00
3 m of 4-in. asbestos cement pipe.....	60.00
Water control structure in stream	
Rock and mortar diversion dike, 3 x 1 x 0.25 m.....	100.00
TOTAL COST.....	₱915.13

<sup>2</sup> Water control system includes cost of diversion dike and drainage structures.

<sup>3</sup> Seine, 30 x 2 m of 2.5-cm stretch mesh (locally made) @ ₱7.50 per m..... ₱225.00

<sup>4</sup> Interest on average investment based on 6.5% of average cost of capital items, not including construction labor (₱235 + ₱225 + ₱10)/2

<sup>5</sup> Fingerlings	
2,000 tilapia @ ₱1.50 per hundred.....	₱30.00
Transportation cost to Fishculture Station.....	10.00
TOTAL.....	₱40.00

<sup>6</sup> Fertilization	
One initial application of 8 kg 20-20-0 (commonly available on the farm) @ ₱75 per 100 kg.....	₱6.00
Chicken manure, 28 kg per week for 52 weeks— 1,456 kg @ ₱0.075.....	109.20
TOTAL.....	₱115.20

<sup>7</sup> Labor, 219 hours @ ₱0.33..... ₱72.27  
Used in the following activities:

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Stocking.....	6											
Fertilization.....	6	5	5	5	5	5	5	5	5	5	5	5
Harvesting.....					10	10	10	10	10	10	10	10
Miscellaneous.....	6	6	6	6	6	6	6	6	6	6	6	6
TOTAL.....	18	11	11	11	21	21	21	21	21	21	21	21

<sup>8</sup> Interest on operating capital, based on 9% of all operating expenses (excepting family labor) incurred before the first harvest at 5 months:

Fingerlings.....	₱40.00
Fertilization.....	52.20
TOTAL.....	₱92.20

<sup>9</sup> After repayment of principal on loan (₱94.00 per year), the actual cash available to the family would be ₱294.50 if fish were sold for ₱1.32 per kg and ₱110.50 if fish were sold for ₱0.88 per kg.

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