SOCIO-ECONOMIC ASPECTS OF MILKFISH FARMING IN THE PHILIPPINES

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This paper attempts to assess the present technology in milkfish farms including fish pens, in the Philippines. Data were based on a survey of 1394 milkfish pond operators, 1175 of whom were adopting monoculture of milkfish and 219 adopting polyculture system, throughout the country. For fish pens, 170 operators were interviewed.

The fish farm and the operator

Milkfish ponds in the country averaged 13.39 ha for monoculture and 8.11 ha for polyculture farms (Table 1). Rearing ponds occupied the biggest area, 85 percent and 84 percent of the farm area respectively. Moreover, majority had 2 nursery ponds with total area of 0.57 ha.

Fish pens were smaller, averaging 6.5 ha with the smallest area at 0.16 ha and the largest 45 ha.

Table 1. Area and type of ponds in milkfish farms, Philippines

Item	Fishpond			Fish Pen
	Monoculture	Polyculture	Both	
Ave. Operational area (ha)	13.39	8.11	12.56	6.50
Nursery pond	0.59	0.45	0.57	-
Transition pond	1.41	0.78	1.31	-
Rearing pond	11.32	6.78	10.61	6.50
Others	0.07	0.10	0.07	-
Presence of different pond type (%)				
Nursery	79	71	78	-
Transition	59	39	56	-
Others	34	35	34	-

A majority of the operators were male between 40-50 years of age and had some formal education (Table 2). Fish pen operators were slightly younger than those operating fishponds.

Aside from fish farming, the majority of fishpond operators were enaged in other occupations such as fishing and farming. Still, more than one-half of the year (full time equivalent) was devoted to fishpond operation. In contrast, fish pen operation is labor intensive thus, most operators were engaged full time in the operation requiring about 9.1 months of work from the operators.

The respondents already had experience in operating fishponds the length extending to 16 years. However, the present fishponds had been managed by them for about 10 years, indicating that some had acquired experience either from family fishponds or other farms. Operators of fishpens, a new enterprise, had 2 years experience in the present fish pen and one year elsewhere.

Cultural practices

Regular checking of dikes for leaks and seepage, repair of gates and other pond accessories, cleaning, drying and leveling of pond bottom are among the various activities in preparing the pond for fish culture. In some farms, pond plowing is done mainly to bring sub-surface nutrients to the surface and to eliminate predators and other nuisance that tend to burrow in the soil.

Table 2. Some characteristics of milkfish farm operators in the Philippines

Item	Fishpond			Fish pen
	Monoculture	Polyculture	Total	
Sex (%)				
Male	95	89	94	98
Female	5	11	6	2
Average age (years)	50	51	50	43
Educational Attainment (%)				
None	6	6	6	5
Primary	20	17	20	24
Intermediate	20	28	21	24
High School	27	23	26	27
College	27	26	27	20
Ave. yrs. of schooling	7.5	8.0	7.6	7.3
Operator with other occupation (%)	62	66	63	43
Labor use (months)				
Fishfarm	6.7	5.1	6.4	9.1
Other occupation	4.2	5.0	4.3	2.8
Not gainfully employed	1.1	1.9	1.3	0.1
Yrs. in fish farm operation	16	16	15	3
Yrs. operating present farm	10	11	10	2

General pond repair, cleaning and levelling of pond bottom were usually done only when deemed necessary. Drying of ponds, however, was a common practice in milkfish ponds (87%).

If the pen structure can no longer hold the stock, either the weak parts are replaced or the whole structure is changed. Many of the fish pens were relatively new; about three-fourths had not been changed. Eleven percent reportedly changed their pens once a year, the rest every two or three years at most. Checking of pen structure both above and below the water surface was done almost daily.

All sample fishponds and fish pens reported having pests and predators; fishes, lizards, water snakes, snails, frogs, and birds were the most common. Majority of fishpond operators eradicated pests commonly with the use of pesticides. Endrin, Brestan, Gusathion, Aquatin and tobacco dust were the most preferred pesticides (Table 3). Endrin, Gusathion and Aquatin were used at the rates of 7.0, 11.7 and 13.2 ounces per ha, respectively. On the other hand Brestan was used at the rate of 0.6 kg/ha. Treatment with pesticides lasted for about 8 days (for Gusathion) to 12 days (for tobacco dust). Generally, ponds were treated once prior to stocking. Liquids and emulsifiable concentrates like Thiodan, Gusathion, etc. were poured, sprinkled or sprayed on the pond soil while tobacco dust and other dry pesticides were broadcast or spread with rakes.

Table 3. Type and rate of pesticides used in milkfish farms in the Philippines

Item	Fishpond (milkfish)		Total
	Monoculture	Polyculture	
	percent[a]		
Used pesticides			
Yes	73	66	72
No	27	34	28
Types of pesticides used			
Endrin	50	64	52
Brestan	35	17	32
Gusathion	17	10	16
Aquatin	15	9	14
Tobacco dust	12	-	10
Thiodan	5	-	3
Others[b]	8	10	8
Rate of application			
Endrin (oz./ha)	7.4	4.4	7.0
Brestan (kg/ha)	0.7	0.4	0.6
Gusathion oz/ha)	9.5	25.0	11.7
Aquatin (oz/ha)	12.4	18.0	13.2
Tobacco dust (kg/ha)	126.0	19.0	110.0
Thiodan (oz/ha)	7.3	12.0	7.9

[a] Total percentage may not equal 100 since some respondents used more than one type of pesticides.

[b] Others include, sodium cyanide, folidol, eradex, aquavit, creoline, endox, resitox, tubli, shelltox, levacide, hytox and d'penethron.

To rid the fish pens of unwanted fishes, the seine net is usually passed across the water in the pen enclosure once or twice. Sometimes, electric shock was employed.

Application of fertilizers was more commonly practised in monoculture farms (67%) than in polyculture farms (40%) (Table 4). Inorganic fertilizers applied singly or in combination with organic fertilizers was more preferred. Of the inorganic fertilizers the incomplete types especially the nitrogenous-phosphorus were more popular than the complete formulations. The former was applied at the rate of 11 kg N and and 16 kg P per ha while the latter at 13 kg N, 13 kg P, and 9 kg K per ha. Nitrogenous fertilizers were applied at the rate of 23 kg N per ha.

Table 4. Fertilizer use in milkfish farms, Philippines.

Item	Fishpond		Rate
	Monoculture	Polyculture	
	percent		
Used fertilizer			
Yes	67	40	63
No	33	60	37
Type of fertilizer used			
Organic	19	19	19
Inorganic	53	57	54
Combination	28	24	27
Rate of use per hectare			
Chicken manure (sacks)	31	3	29
Stable & hog manure (sacks)	11	141	31
Guano (sacks)	5	-	5
Sagana 100 (kg)	67	-	67
Nitrogen (N)	24	14	23
Phosphorus (P)	13	-	13
Nitrogen-Phosphorus			
N	11	14	11
P	16	16	16
Nitrogen-Potassium			
N	7	-	7
K	7	-	7
Complete			
N	13	13	13
P	20	13	18
K	7	13	9

Organic fertilizers used were chicken, stable and hog manure, guano, compost, rice bran, night soil, mudpress and Sagana 100. Of these, chicken droppings was most widely used at an average rate of 31 sacks/ha in monoculture farms and 3 sacks in polyculture farms.

Only 2 percent of the monoculturists and 3 percent of the polyculturists employed the platform method of application which according to the Philippines Recommends for Bangos, 1976 is the most efficient and effective method of applying fertilizers. The most common practice of fishpond operators was to spread the fertilizers on watered or wet pond surface or to broadcast them randomly.

According to the Laguna Lake Development Authority, "there must be any addition of any kind of chemical or organic fertilizers in the lake. Such can trigger the occurrence of algae bloom which can very seriously affect water quality that three pens used chicken droppings intensively.

Stocking and cropping practices

In the Philippines, ponds were stocked either with fry, fingerling or both. Seventy one percent of the monoculture ponds stocked fry while only 36 percent used fingerlings, mostly from Central Luzon and Southern Luzon. The amount of fry stocked in monoculture farms was about 70 thousand pieces equivalent to 6.21 thousand per hectare of rearing area while for fingerlings, it was 46 thousand pieces/farm/year or 3.91 thousand per hectare.

Milkfish fry was also commonly used in polyculture farms except in Southern Luzon where fingerlings were preferred (81%). Milkfish comprised about two-thirds of the total stock in polyculture farms; the stocking density of these farms are: milkfish-prawn farms 4.43 thousand pieces; milkfish-prawn-crab, 4.95 thousand and milkfish-siganid, 7.21 thousand pieces.

Fingerlings were used in fish pens and stocked at a rate of 35.56 thousand per hectare. Two operators stocked fry. These, however, were first nursed to fingerling size in half-submerged inverted mosquito nets before they were released to the rearing pens.

Very few operators, 17 percent in monoculture and 18 percent in polyculture farms practiced acclimation of stock lasting for some 30-50 hours. In contrast, most fish pen operators acclimatized newly arrived stock in pen nurseries for about six hours. Stocking was done during the cooler hours of the day mostly in early morning or early evening.

The average mortality rate from purchase to stocking in monoculture farms was 11 percent for fry and 13 percent for fingerling while from stocking to harvest, it was 34 and 26 percent, respectively.

Majority of the milkfish farm operators considered the size of fish in deciding to crop (Table 6).

Table 6. Cropping practices in milkfish farms in the Philippines

Item	Fishponds		Total	Fish pen
	Monoculture	Polyculture		
	percent[a/]			
Factors considered in deciding to harvest				
Size of fish	71	84	73	79
Demand for fish	26	33	27	41
Weather condition	5	13	6	29
Others	29	33	30	-
Manner of harvesting				
Selective	20	32	22	35
Total	79	68	77	48
Both	1	-	1	17
Method of harvesting				
Pond draining	53	79	57	-
Gill netting	37	86	45	83
Pasubang	32	92	41	-
Seining	21	17	20	33
Fish corral	13	19	14	-
Others[b/]	3	3	3	-

[a/] Percentage total more than 100 since some respondents reported more than one answer.

[b/] Others include cast net, dip net, drive-in-net, filter net.

Pond draining was practiced by most (57%) ponds in harvesting the crop. This was followed by gill netting and pasubang as employed by 45 and 41 percent of the farmers. On the other hand, most fish pen operators used gill nets (83%) and seine nets (33%).

Production

Table 7. Annual cropping rate of milkfish farms in the Philippines, 1974

Item	Number of farms[a]	Quantity Produced Per Farm	Per hectare
Fishpond			
Monoculture	1092	6484	580
Polyculture	187	6246	636
Bangos-sugpo	135	3159	481
Bangos-sugpo-alimango	31	13715	740
Bangos-malaga	11	1488	827
Bangos-alimango	10	6624	498
Fish pen	148	26015	3798

[a] Some farms were damaged by typhoons.

It seems that the fishpond becomes more productive when milkfish is cultured together with other fishes particularly, siganid, prawn, and crab. Milkfish-siganid farms obtained a yield of 827 kg/ha, 70 percent of which was milkfish and 30 percent siganid. Milkfish-prawn-crab fishponds were also a high yielder, 740 kg/ha with milkfish comprising 78, prawn 7, and crab 15 percent.

Table 8. Annual cropping rate per farm and per hectare, 1092 bangos fishponds, Philippines

Region	Number	Rearing Area	Quantity produced	
			Per Farm	Per Hectare
		hectares	kilos	
Ilocos	249	3.26	2307	709
Cagayan Valley	10	10.28	3402	330
Central Luzon	268	17.34	10608	611
Bicol	52	9.21	2323	471
Western Visayas	178	13.17	11888	260
Central Visayas	81	4.87	1407	289
Eastern Visayas	15	33.33	10613	318
Western Mindanao	37	17.28	2921	168
Northern Mindanao	35	34.98	13988	399
Southern Mindanao	53	9.23	4769	516
Philippines	1092	11.17	6484	580

Table 8 shows that Western Visayas, Ilocos and Central Luzon were the high producers of milkfish in the country. Medium productivity regions were Cagayan Valley, Southern Luzon, Eastern Visayas and Northern Mindanao. Low productivity regions were Bicol, Central Visayas and Western Mindanao.

Table 9. Distribution of annual yields per hectare by yield groups and region, 1,092 bangos farms, 1974

Region	Number reporting	Yield Group (kilos per hectare)				
		Less than 100	100-299	300-699	700-1,499	1,500 & above
		Percent				
I. Ilocos	248	5	15	39	33	8
II. Cagayan Valley	10	10	10	50	10	10
III. Central Luzon	268	7	23	31	26	13
IV. Southern Luzon	115	14	35	27	19	5
V. Bicol	52	6	57	27	10	-
VI. Western Visayas	178	3	13	29	36	19
VII. Central Visayas	81	29	38	22	10	1
VIII. Eastern Visayas	15	-	53	33	14	-
IX. Western Mindanao	37	46	24	24	6	-
X. Northern Mindanao	35	20	31	40	6	3
XI. Southern Mindanao	53	9	30	32	21	8
Philippines	1,092	10	25	32	25	8

The annual yield per hectare for each monoculture farm was computed to give an indication of how the yields were distributed among and within regions. Yields ranged from less than 100 kilos per hectare to as high as 5000 kilos or more. The average annual production per hectare was 580 kilos.

About one-third of the bangos farms in the Philippines obtained yields within the range of 300 to 699 per hectare. Another one-third had less than 300 kilos and the other one-third had more than 700.

The availability in individual farm yields as presented in Figure 1 indicate the skewness of the yield distribution. Farms which yield more than 4000 kilos per hectare were found in Ilocos, Central Luzon, Southern Luzon and Western Visayas.

In Western Visayas, more than one-half of the fishponds studied yielded more than 700 kilos per hectare. In fact, 19 percent obtained yields of 1500 kilos or more with the highest being 5,813 kilos per hectare, an exceptional yield obtained by one operator in the region. However, there were 5 farms which produced less than 100 kilos of bangos per hectare. The lowest yield was 20 kilos.

Ilocos, likewise, was a high yielder of bangos with 41 percent of the fishponds producing more than 700 kilos per hectare. A few (5%) obtained yields below 100 kilos.

On the other hand, almost one-half of the sample farms in Western Mindanao were not even able to produce 100 kilos from a hectare of pond area. The highest yields obtained in the region were 926 and 700 kilos obtained by two farms. Bicol was another low producer with almost two-thirds producing less than 300 kilos per hectare.

Production in fish pens, 3798 kilos per hectare was more than six times that of fishponds.

About two-thirds (725 farms) of the milkfish ponds used fertilizer (Table 10). Of these, 54 percent used inorganic fertilizer only, 18 percent used the organic, and 28 percent used both.

Fertilizer-users obtained higher yields, 688 kilos on the average, compared with the 308 kilos for the non-users. In almost all regions, fishponds applying fertilizers obtained higher yields, the difference of which ranged from 10 percent in Eastern Visayas to as much as 194 percent in Central Visayas. In Southern Luzon yields of fertilized farms were more than twice those obtained by the non-users and in Central Luzon, the difference was 294 kilos per hectare.

Figure 1. Distribution of annual yield per hectare by yield group and region, 1092 fishponds, 1974

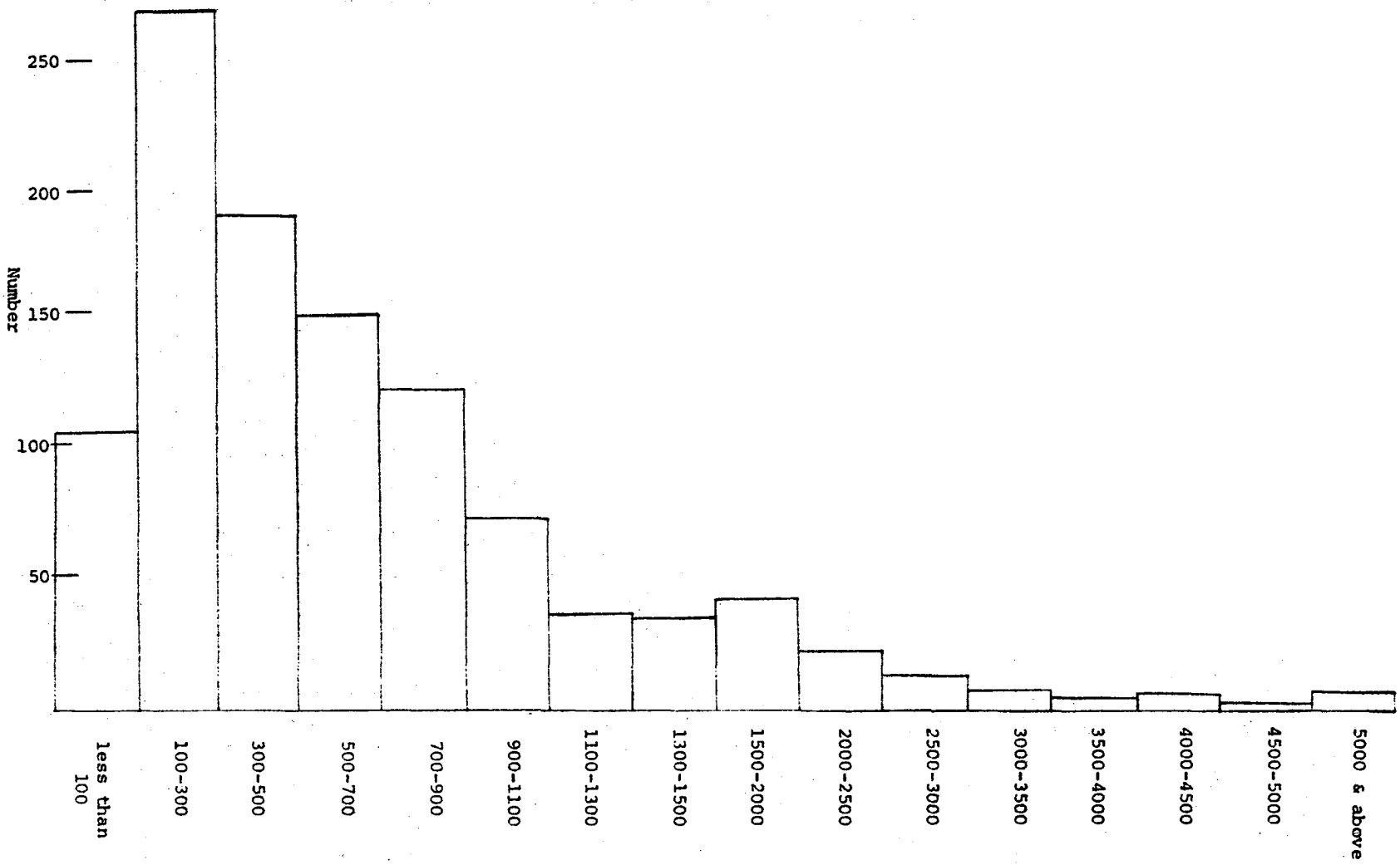

Table 10. Annual cropping rate per hectare by use of fertilizer by region, 1,091 bangos fishponds, 1974

Region	Used Fertilizer		Used Organic Fertilizer		Used Inorganic Fertilizer		Used Both Types of Fertilizer		Did not use Fertilizer	
	No.	Cropping Rate	No.	Cropping Rate	No.	Cropping Rate	No.	Cropping Rate	No.	Cropping Rate
I. Ilocos	172	723	9	728	143	712	20	834	76	608
II. Cagayan Valley	8	290	2	297	2	395	4	281	1	-
III. C. Luzon	211	696	53	688	92	575	66	910	57	251
IV. S. Luzon	43	565	16	832	19	388	8	691	71	271
V. Bicol	30	239	22	231	5	254	3	277	22	291
VI. W. Visayas	154	918	7	597	61	977	86	901	24	575
VII. C. Visayas	42	373	5	307	32	354	5	677	39	127
VIII. E. Visayas	3	341	1	257	2	350	-	-	12	309
IX. W. Mindanao	11	157	5	282	4	90	2	100	27	177
X. N. Mindanao	12	465	7	395	3	260	2	1112	23	382
XI. S. Mindanao	39	542	2	916	31	548	6	384	14	361
Philippines	725	686	129	570	394	623	202	844	366	308

Among the users of different types of fertilizer, it seemed that those applying both organic and inorganic types realized higher yields, 844 kilos per hectare, than those using only one type. Users of inorganic fertilizers obtained a yield of 623 kilos, more than 50 kilos higher than that of organic fertilized farms.

In Cagayan Valley, Central Visayas, Eastern Visayas, Western Mindanao and Southern Mindanao, all sample farms studies stocked with fry. All other regions had farms using fry and fingerlings but a greater proportion used fry except in Central and Southern Luzon which are really the seat of nursery ponds in the country. In general, ponds stocked with fingerlings had higher productivity per hectare compared with those stocked with fry (Table 11). The difference was about 34 kilos. However, in Southern Luzon, Western Visayas and Northern Mindanao, fry stocked farms produced 921 kilos per ha compared to 707 kilos in fingerling stocked farms.

Supplementary feeding was not a common practice in milkfish fishponds with only 20 percent of the operators supplementing the natural food in the pond. These farms obtained an average production of 658 kilos per hectare while those not supplementing got only 540 kilos, a difference of 118 kilos per hectare.

The effect of pesticides could be substantial as indicated by the yield of farms using pesticides which was 628 kilos per hectare, a difference of 338 kilos over farms not using chemicals.

Two methods of harvesting are employed when the milkfish are ready for market. One is total harvesting where the whole crop is harvested at one time and the other is selective harvesting where several partial croppings are done until the stock is completely cropped. It seemed that total harvesting was the better method as indicated by the 615 kilo-per-hectare yield of those employing this method. In contrast, farms using the selective method of harvesting realized a yield of only 426 kilos, a difference of 189 kilos.

Among the farm size groupings, highest yield per hectare was obtained by farms with sizes of 5-10 hectares. As farm sizes further increase, the yields went down, that is, for farms larger than 5 hectares fish productivity per hectare was inversely related with farm size.

Cost and returns in milkfish farms

Annually, an average monoculture milkfish farm in the Philippines realizes a gross income of about ₱2294 per hectare. Polyculture farms grossed about ₱3432 per hectare (Table 12). The combination milkfish-prawn-crab obtained the highest receipts, ₱4312 per hectare followed by the milkfish-siganid farm, ₱4238 per hectare.

Table 11. Annual cropping rate and costs and returns in monoculture milkfish farms

	No. of Farms	Per Farm	Per Hectare	Cost/ ha.	Returns/ ha.	Net Income/ ha.
Type of stock						
Fry	713	6511	585	1215	2179	964
Fingerling	305	7125	619	1007	2550	643
Fry/fingerling	73	5333	544	1683	2167	484
Use of fertilizer						
Did use	725	8322	686	1755	2668	913
Organic	129	8356	570	1760	2358	598
Inorganic	394	6284	623	1473	2628	1155
Both	202		844	2123	2914	791
Did not use	366	2850	308	646	1270	624
Use of supplementary feeds						
Did use	323	8583	658	1744	2711	967
Did not use	769	5605	540	1304	2067	763
Use of pesticides						
Did use	729	7355	664	1726	2514	788
Did not use	313	4322	379	854	1802	948
Method of harvesting						
Selective	213	5739	426	1129	1674	545
Total	863	6453	615	1547	2471	924
Farm size						
1.0 & below	171	356	647	1905	2727	822
1.01 -5.0	356	1450	630	1705	2570	865
5.01 - 10.0	181	4636	741	1877	2933	1056
10.01 - 20.0	189	7401	621	1426	2425	999
20.01 - 50.0	140	15102	594	1448	2315	867
50.01 & above	55	39038	495	1317	1968	651

Table 12. Costs and returns per hectare in milkfish farms, Philippines, 1974

Item	Gross returns	Total exp.	Net farm earnings	Rate of return: Over operating expenses	Rate of return: Over fixed Capital
	pesos per hectare			percent	
Fishpond					
Monoculture	2294	1458	836	57.4	16.0
Polyculture	3432	1480	1952	131.9	46.7
Bangos-sugpo	3183	1380	1803	130.7	34.0
Bangos-sugpo-alimango	4312	1576	2736	173.6	80.4
Bangos-malaga	4238	2146	2092	97.5	39.4
Bangos-alimango	1996	819	1177	143.7	46.7
Fish pen	15580	11731	3849	32.8	50.0

Gross income in fish pens, ₱15,580 per hectare, was approximately 6.8 times higher than what was obtained in ponds.

An annual operating capital of more than ₱1,450 per hectare was required to operate a milkfish pond.

The value of stock, hired labor, fertilizer and commission were the major items of expenditure in milkfish ponds comprising 31, 18, 14 and 14 percent of the total cost respectively.

The milkfish-siganid farms incurred the highest operating capital mainly due to the high cost of "padas" or siganid fry. The cost of seeds amounted to ₱810 per hectare in these farms, almost twice the cost of stock in other farms.

Approximately ₱11731 was required to operate a hectare of fish pen in Laguna de Bay. The cost of fingerlings was the primary item of expense comprising 69 percent of the cash expenditures.

Net farm earnings was computed by subtracting the total farm expenses from the total receipts. This measures the return to the operator's labor, capital and management. The net farm earnings in monoculture farms amounted to ₱836 per hectare or a rate of return over operating expenses of 57.4 percent or a return over fixed capital of 16 percent. Among the regions, net returns was highest in Ilocos where approximately ₱1.03 of net profit was returned for each peso spent.

Polyculture farms realized a net farm earnings of more than twice that of monoculture farms (₱1952/ha). Rate of return over operating expenses was rather high, 131.9 percent and return over fixed capital was 46.7 percent. Among the 4 combination of fishpen, milkfish-prawn-crab realized the highest net returns, ₱2736 per hectare and milkfish-crab the lowest with ₱1177.

The net farm earnings in fish pen operation amounted to ₱3,849 per hectare or about 4.6 times more than milkfish ponds. The rate of return over operating expenses in fish pen operation was only 32 percent due to big operating capital required to operate a fish pen, however return to operators fixed capital was higher, 50 percent.

By type of fertilizer used

Fertilizer-using farms profited by about 46 percent more than those which did not apply fertilizer. The additional cost of fertilizer was more than compensated by a greater production and therefore, income. The use of inorganic fertilizers generated more income compared with the organic or both type of fertilizers. However, among those three farm groups, highest gross return was reported in the latter amounting to ₱2,914 per hectare. Coupled with the high gross returns was high operating expenses resulting in a low rate of return (37%) to operating capital.

By use of supplementary feeds

Supplementing the natural food by artificial feeds substantially increased fish production and consequently the income generated. Users of supplementary feeds obtained a net income of ₱967 per hectare, 27 percent higher than that of the non-users.

By use of pesticides

The use of pesticides to eradicate pests substantially increased the level of production. However, the marginal increase in yield was lower than the incremental change in operating costs. Thus, the earnings of farms using pesticides was lower by 17 percent compared to the non-users. Those using pesticides spent about ₱2.60 to produce a kilo of fish while it was ₱2.20 without the use of these chemicals.

By Farm size

The total receipts, expenses, and net income per farm generally increased with farm size. However, on a per hectare basis, those measures increased from the smallest to the farm size group of 5-10 ha then started to decline as the farm becomes larger. The annual receipts per farm among farm size groups increased at an increasing rate from 1 hectare and below to 5-10 hectares, then continued increasing but at a decreasing rate. Comparatively the operational expenses per hectare were higher in the three smaller size groups than in the bigger farms. It costs more to operate a hectare of a small farm than a big farm. Highest net return was obtained by farms of 5 to 10 hectares.

Credit practices

Table 13. Credit requirement of fish farm operators by type of farm

Item	Fishpond			Fishpen
	Monoculture	Polyculture	Total	
Source of operating capital (%)				
Owned	77	87	79	89
Borrowed	23	13	21	2
Both	-	-	-	9
Sources of credit				
Friends/relatives	36	44	37	47
Rural banks	28	26	28	40
Others a/				
Amount borrowed	20888	7994	18862	55200

a/ Others include commercial banks other than the rural banks.

A majority of the milkfish fishpond operators relied on personal resources to finance their business operations with more of the polyculture farmers (87%) using their own capital than the monoculture farmers (77%). This could mean that most operators were either self-sufficient or the scope of their operations was limited to their financial capabilities.

More of the milkfish fish pen operators relied on their own savings as source of their capital (89%) than the milkfish fishpond operators (79%).

Friends/relatives were more preferred by milkfish fishpond and fish pen operators as source of credit, however monoculture fish farms preferred banking institutions as source of credit (64%) than polyculture farmers (56%).

Fishpen operators acquired the biggest loans averaging ₱55,200 used mostly for operational purposes. Monoculture milkfish ponds acquired a higher loan of ₱20,888 per operator than the polyculture milkfish farms (₱7,994).

Some operators encountered problems in borrowing. The problems cited by the fishpond operators were high rate of interest (20%) and delayed release of loan (22%) while fish pen operators reported too much red tape/paper work (13%) and high rate of interest (13%).

Extension and other services

About one-fourth of the fishponds and 41 percent of the fish pens were reached by government extension workers. For those who were reached by these technicians, questions were asked on what information were provided to them and whether the recommendations were followed. One-half of the operators received information on cultural practices particularly on the use of fertilizer, production and use of plankton, and improved care of fingerlings. One-fourth were given information on the availability of fry at the BFAR office and still 9 percent reported that extension workers conducted seminar in fishpond operations.

Fishpond operators were more receptive to improved techniques with 71 percent following the recommendations extended to them compared to only 45 percent of the fish pen operators.

Probably because of lack of extension assistance, fishpond operators tended to become observant of other operators. In some areas neighboring fishponds may be far but 59 percent followed what they consider as "better methods" used by others.

Only a few fishermen's organization exist. Of the 1396 sample fishponds and fish pen operators very few were members of an organization. Of the members, two-thirds reported that they actually did not get any benefit from the association.

A majority of the operators find the industry wanting of government assistance. According to them the primary assistance the government can give to improve the industry is on credit, the control of prices of inputs as well as output and the provision of technical support.

Appendix Table 1. Receipts per hectare in fish farming by type of farm

Item	Fishpond			Fishpen
	Monoculture	Polyculture	Total	Milkfish
Cash farm receipts				
Fish sold	2206	3290	2378	15442
Other fishes sold	34	78	41	4
Other cash receipts	1	-	a/	a/
Total cash receipts	2241	3368	2419	15446
Non-cash farm receipts				
Value of fish sold at home	18	30	20	66
Value of fish given away	18	29	20	48
Value of fish for other purposes	-	5	1	20
Increase in inventory	13	-	11	-
Other non-cash receipts	4	-	3	134
Total non-cash receipts	53	64	55	-
Total farm receipts	2294	3432	2474	15580

a/ Less than ₱0.50.

Appendix Table 2. Expenses per hectare in fish farming by type of farm

Item	Fishpond			Fishpen
	Monoculture	Polyculture	Total	
Cash farm expenses				
Stock bought	447	470	451	7562
Fertilizer	220	122	206	5
Chemical	32	24	31	-
Supplementary feed	18	34	20	276
Hired labor cost	250	349	266	1360
Value of commission	179	33	203	258
Food for laborers	10	26	12	137
Ice	5	3	5	73
Equipment purchased	44	33	42	807
Lease	135	26	118	-
Interest on borrowed capital	16	-	13	-
Transportation	-	-	-	282
Miscellaneous	81	55	77	198
Total cash expenses	1437	1472	1444	10958
Non-cash farm expenses				
Fry gathered, given free	2	1	2	-
Unpaid family labor	15	4	13	30
Decrease in inventory	-	-	-	529
Others	4	3	4	214
Total non-cash expenses	21	8	19	773
Total farm expenses	1459	1480	1463	11731