NATURAL RESOURCE MANAGEMENT PAPER SERIES

umber 9 December 1987

GROUP FISH FARMING UNDER THE SMALL FARMERS DEVELOPMENT PROJECT AT CHANDRANAGAR

Parashar B. Malla

HMG-USAID-GTZ-IDRC-FORD-WINROCK PROJECT
STRENGTHENING INSTITUTIONAL CAPACITY IN THE
FOOD AND AGRICULTURAL SECTOR IN NEPAL

FOREWORD

This Natural Resource Management Paper Series is funded through the project, "Strengthening Institutional Capacity in the Food and Agricultural Sector in Nepal," a cooperative effort by the Ministry of Agriculture (MOA) of His Majesty's Government of Nepal and the Winrock International Institute for Agricultural Development. This project has been made possible by substantial financial support from the U.S. Agency for International Development (USAID), the German Agency for Technical Cooperation (GTZ), the Canadian International Development Research Centre (IDRC), and the Ford Foundation.

One of the most important activities of this project is funding for problem-oriented research by young professional staff of agricultural agencies of the MOA and related institutions, as well as by concerned individuals in the private sector. This research is carried out with the active professional assistance of the Winrock staff.

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The views expressed in this Research Report Series are those of the authors, and do not necessarily reflect the views of their respective parent institutions.

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Michael B. Wallace
Series Editors

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Parashar B. Malla*

INTRODUCTION

A "small" farmer is one whose productive resources are minimal and limited. From the resources at his disposal, he has to generate sufficient income to support his family. The income generated is often barely enough to meet basic needs and he has to depend for his livelihood upon others who have more resources. Being dependent, the small farmer is easily exploited and therefore has little chance to progress. Over time meager resources are subdivided among family members and the problem increases. As the small farmers of Nepal remained in the backgound for a long time they were unable to reap any benefits of development. Most were unaware of what was being done in the process of rural development. Those who were aware were reluctant to approach the various developmental agencies for fear that their requests would be rejected. Two decades of planned development elapsed before it was realized that the condition of small farmers had deteriorated as the fruits of development were appropriated by the affluent. In 1975 the Small Farmers Development Program(SFDP) was initiated with pilot projects in two districts (one in the hills and one in the Tarai). The Food and Agriculture Organization of the United Nations (FAO) guaranteed funds to launch the project and the Agricultural Development Bank of Nepal (ADB/N) carried it out.

In the decade since SFDP began, small farmers have become hopeful and enthusiatic, illustrated by an increased demand for project offices. However, most requests are turned down not only because of financial constraints but also to maintain the quality of service that has been possible so far. At the end of Fiscal Year (FY) 1983/84, 121 projects were operating and 41 planned for the next year. Although ADB/N is the main executive agency, almost all agencies involved in rural development have been associated with the program. To ensure coordination among these agencies at a national level, a Sub-Project Implementation Committee (SPIC) at the district level and a National Small Farmers Development Coordination Committe at the national level have been formed.

Studies evaluating SFDP have shown that the receiving mechanism of farmers had improved and the incomes of those under projects had increased compared with non-project farmers. Because of this success many international agencies have come forward to help with the program.

The basic aim of program is to strengthen the receiving mechanism of small farmers through group coordination. The first step in an SFDP project is to organize farmers, tenants and landless laborers into groups. A small farmer is now defined as one residing in a rural area with an annual income below NRs.950. The group approach is expected to provide much needed psychological encouragement to carry out developmental activities.

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* Parashar B. Malla is Section Chief, Evaluation Division, Agricultural Development Bank, Kathmandu, Nepal.

Study Area

The study area is Chandranagar Village Panchayat in Sarlahi District. Sarlahi is in Janakpur Zone of the Mid-Development Region. Chandranagar, one of 100 village panchayats in Sarlahi, is about nine km northeast of Malangwa, the district headquarters. It has a population of 5480 people in 862 households. About eight percent of the population is literate and just over 50 percent of households own land. Agriculture is the main occupation and livestock raising is part of the farming system. Some also work in services and small trades.

The village is connected to the East-West Highway by a partially gravelled dirt road. There is also a dirt road between Malangwa and the village. There are several small streams in and around the village and two, the Jhim and Katahi, expand during the rainy season making it difficult to travel in and out of the village at that time. However, although twice weekly markets provide daily necessities, the villagers must go to Sonbarsa in India, about nine km away, for larger purchases.

The services of a cooperative society, agriculture and livestock development sub-center, public health and malaria eradication offices are available to the residents. There is also a post office and a lower secondary school in the village.

The exploitation of small farmers by their bigger counterparts is a major problem faced by many villagers but illiteracy and superstition have restricted their participation in developmental activities. An unhygenic environment, poor housing and a lack of productive assets were other problems. Due to the number of small farmers and the many problems they faced, an SFDP project was set up in Chandranagar in FY 1982/83.

Small Farmers Development Project, Chandranagar

The SFDP at Chandranagar is one of 162 similar projects now in operation in Nepal and it is the third to be launched in Sarlahi district. Since its inception, the project has focused on ways to improve the lives of local small farmers through the utilization of their skills with the resources available to them. Forty-nine groups have been formed with a total membership of 372 households. The project office has also expanded its working area to cover three panchayats. As of February 1985, ten groups out of the total are all female. The number of families involved and goups formed, by panchayat, is given in Table 1.

Table 1. SFDP Group Data, by Panchayat

Panchayat	Number of Households	Groups: Male	Female	Total
Chandranagar	326	29	9	38
Naukelwa	28	8	1	9
Bhaktipur	18	2	-	2
Total	372	39	10	49

Source: Field Survey

Various economic and social activities both on an individual and group basis have been carried out under the SFDP. Group members bear joint liability for any activity carried out by a group member. Among the economic activities undertaken are cash crop production, farm mechanization and irrigation, livestock development, fisheries, cottage industries and agricultural produce marketing. The SFDP is providing credit to those involved in these activities and by February 1985 had extended NRs.1,688,000. Of this, NRs.293,000 has been repaid (Table 2).

Table 2. Loans Taken and Repaid by Small Farmers Under SFDP

Purpose	Loan Taken	% of Total	Loan Repaid	% of Total
Cereal Crops	224	13	119	41
Cash Crops	56	3	18	6
Agricultural Tools	210	13	17	6
Marketing	137	8	22	7.5
Livestock Raising	965	57	92	31
Irrigation	31	2	3	1
Cottage Industries	65	4	22	7.5
Total	1688	100	293	100

Source: Chandranagar SFDP

Social and community activities under SFDP include an adult literacy, family planning, road and bridge construction/repairs, making compost pits and building toilets. Other areas under the project are afforestation, construction of a meeting hall and grain storage. The SFDP, with the help of allied agencies, has also provided training for small farmers in cash crop farming, horticulture, vegetable farming, livestock care and health, public health, and record keeping.

To meet emergency expenses and also for social ceremonies, group saving funds and grain stores have been created. The farmers contribute a fixed amount of each every month. So far, NRs.15286 has been collected in savings and 395 maunds (one maund equals 37.32 kg) of paddy and 20 maunds of wheat has been stored. The groups also hold plays for educational purposes as well as for entertainment.

Group fish farming also increases income and employment. In the project area there is a large lake called Nadiman covering 52 bighas (one bigha equals 1.68 acres) which was unused except for occasional irrigation by nearby farmers. Some fishing was done but no thought had been given to harnessing the economic potential of the lake.

OBJECTIVES

After group organization, plans were made to take advantage of local resources. The Group Organizer (GO) motivated the groups to drain and clean up the low lying marshy areas in the village, and they started to breed fingerlings and raise fish. The low lying area belongs to the local village panchayat and the groups have leased it from them. Some groups have also leased ponds from private individuals in which to raise fish. Already the endeavour is making money for the farmers. It

seemed useful to document the process and discover the underlying principles of the operation, the benefits accrued, problems encountered and future prospects. The specific objectives of this study are to:

- examine the social and economic characteristics of the small farmers involved in group fish farming;
- document the process of project identification and operation;
- analyze the financial benefits accrued by participating farmers;
- study the problems encountered and measures taken; and
- explore further possibilities to improve the situation.

METHODOLOGY

Both primary and secondary data have been used in this study. The small farmers themselves were the source of primary information on fish farming, and secondary data was gathered from the SFDP Office, Panchayat Office and other local developmental agencies. A questionnaire was designed to gather demographic information on the farmers' families, land cultivation, other occupations, education, and livestock ownership.

All the farmer groups involved in community fish farming were contacted. Group leaders provided detailed information about the group, its members and activities. Some group members were also interviewed. Other group information was obtained from SFDP Office records, the GO, and through personal observation and used as a basis for exploring potential for improvement of current fish farming practices.

The study was conducted during February 1985. Descriptive and analytical tools are used to present the study findings. The costs and returns from fish farming have been described for each group.

STUDY FINDINGS

The Small Farmers

In Chandranagar, eight groups were involved in fish farming under SFDP. Only one farmer had constructed his own pond. The rest leased ponds that belonged to the local panchayat or to individuals. Another group had taken on contract a stretch of the two streams for fishing. A sub-group acquired fishing nets which they rented on request. The study considered only the nine groups (including the sub-group) involved in fish rearing or harvesting.

There are 79 members of the groups, but as only one member of one of the groups was involved, 67 farmers were actively engaged in fish rearing. The average age of these farmers was 36 years. Their families averaged six people, and nearly half of these were children.

An average of 1.04 bigha was cultivated by each farmer of which 83 percent was partially or fully irrigated. Of the total land cultivated, only 42 percent (0.30 bigha irrigated and 0.14 bigha unirrigated) belonged to the small farmers themselves. Thirteen (19 percent) small

farmers did not cultivate any land and 12 (21 percent) did not own land but cultivated others' land on lease or rental.

Forty one (61 percent) farmers were illiterate, 13 (19.5 percent) had had a formal education and the remaining 13 could just manage reading and writing. The farmer with the most education had attended school for ten years. Of the 67 farmers, two were trained in livestock health, two in record keeping and one in fish farming. The main occupation was farming but those who did not cultivate any land hired themselves out as agricultural laborers. Five were also engaged in small trade, one in teaching, two in government service and one was a barber.

The small farmer households under study owned an average of two chickens/ducks and two goats. Two households shared a buffalo and three shared five bullocks.

The farmers were not only engaged in fish farming but had also taken loans from SFDP for other activities. Six had acquired buffaloes, eight had bullocks, two kept horses, 12 reared goats, 22 had calves and two farmers kept cows. Three farmers acquired loans for marketing goats and one for the purchase and sale of paddy.

Paddy was the main crop. Early paddy, wheat, maize and pulses were also cultivated but in general, two crops were planted in a year.

Fish Farming

As part of the effort to educate small farmers and to make them aware of developmental activities and the potential of group enterprise, they are taken to visit other SFDP areas. On one visit they saw a successful group fish farm in Mahendranagar which made them realize that group fish farming was an enterprise which was easily manageable, gave quick returns and added a significant amount to their incomes.

Table 3. Pond Area, Number, Lease and Ownership

Group	Area (Bigha)	Number of Ponds	Lease Period (Years)	Lease Cost (NRs.)	Ownership
Sub 2	0.65	1	10	10000	Private
11	0.75	2	10 and 8	12000	Panchayat
2	0.35	1	10	6300	School
7(Ka)	0.40	1	10	7600	Private
25	0.95	2	9	16060	Panchayat
16	0.60	2	9	Not Known	Panchayat
6	0.25	1	10	1550	Panchayat
15	0.30	1	-	-	Own
20	4.50 km	River	1	9000	District

Source: SFDP Records

The GO or the project, who had previously worked at SFDP Mahendranagar, also had the idea of group fish rearing. Examination of the local working area revealed several low lying areas which belonged to the

local panchayat which, if bunded, could be utilized for this purpose. During one of the many regular discussions that took place between the farmers and their GO, it was decided to construct a fish pond. With the approval of the local panchayat officials they leased the ponds, including one owned by the village school. Renovation of the school pond was started in April 1983 by one group. Another began work on a panchayat-owned pond.

As the ponds were built, other groups wanted to try fish farming. Soon there was no more panchayat land available to lease so they approached individuals. Two groups were successful in leasing private ponds. One farmer decided to dig his own pond. Of the nine groups, five leased land from the panchayat, two from private individuals, one from the school and one group won a contract to harvest fish from the river. The period and cost of each lease varied (Table 5).

Cost Estimation and Loan Approval

The cost of pond construction, repairs and fingerlings was based on the recommendations of the Junior Technical Assistant (JTA Fisheries) and a Peace Corps Volunteer (PCV) working in the panchayat. It was estimated that it cost an average of NRs.40000 per bigha to dig a pond. The SFDP was authorized to supervise preliminary loan demands and the GO examined the cost estimates and loan applications made by the small farmer groups interested in fish farming. The recommendation of the GO was then presented to the loan committee of the SFDP which consisted of the GO, the Sajha Society Manager and a representative of ADB/N Malangwa for final approval. Loans were initially channelled through the Sajha Society, Chandranagar but later small farmers received loans directly from the SFDP. The first installments were used to construct ponds and later installments were spent on fingerlings, spawn and feed. Though the SFDP released installments subject to satisfactory work progress, farmers had no difficulty getting money as they worked hard and the GO was involved in credit planning. The groups' acceptance of joint liability for the loans was taken as collateral if necessary, but land ownership and tenancy certificates were also taken as collateral.

Job Allocation

Group fish rearing under the SFDP is based on all members taking an equal share of expenses and returns. There is no specific job allocation but group leaders consult the GO if there is a problem or need they cannot deal with. Usually, the members abide by the leader's decision regarding job assignments. They take turns in pairs guarding the ponds against theft and procuring spawn, fingerlings and feed. During pond construction they all worked together thus saving on time and cost. Later, groups that have harvested fish from their ponds depute two or three members to take the fish to the market and sell it. Mutual trust and understanding among group members was the key to smooth functioning of any group, although no standard mode of operation was adopted.

Meetings and Record Keeping

Groups meet at least once a month, more often if necessary. The GO participates in meetings as far as possible. Members discuss problems, possible solutions and future plans. They also decide on how to use

group income from the venture. Conflicts are solved through discussion in the meetings. If matters remain unsolved, members approach the GO who either calls the group to the SFDP Office or goes to them to settle the conflict. So far no issues have gone beyond the GO for solution.

Minutes of these meetings are kept. Accounts are maintained by a treasurer if there is one; otherwise the resposibility lies with the group leader or any memeber deputed by him on the advice of the GO.

Marketing

Marketing of fish was no major problem for the small farmers. They sold fish at the local markets and at Mahendra Bazar at Bayalbas. Contractors often come to the pond to purchase fish.

Revenue and Expenditure

Some groups have already made money from fish farming, but others are still in the initial stages. A short description of fish rearing, with details of costs and revenues per group is given below.

Sub-Group 2: The pond leased by this group has a static ground water source. Fingerlings were put in the pond in two stages but some of the first batch were washed away by floods. The remaining fingerlings of the first batch, plus those of the second, are expected to be harvested in four or five months. Over 10000 fish still live in the pond. Although no income has been generated yet in this group, they are hopeful of a rich harvest later and expect to repay much of their loan (NRs.22300). Some members contributed some of their money to purchase fingerlings. The group plans to expand into poultry and pig farming.

Table 4. Expenditure on Fish Farming (NRs.)

Group	Sub 2	11	2	7 Ka	25	16	6	15
Pond Construction	18500	8000			28000	17000	6000	6460
Pond Repair			4732	8000				
Fingerlings and Spawn	6760	2500	1000	2085	5000	5396	1480	540
Banana Plant Suckers	300	75		175	300	100	75	
Feed		300			540			240
Rubber Pipe		200						
Piglets		1200						
Total	25560	12275	5732	10260	33840	22496	7555	7240

Group 11: Group 11's pond also has a static underground water source, but water can be fed from Adhwara or Nakha streams. The group took a loan of NRs.12905 which included the purchase price of the piglets. Some fingerlings were eaten by snakes and birds but the group made NRs.5500. NRs.4000 was set aside for loan repayment and the rest was put into a savings account. There are now about 5000 fish in the pond each weighing between 200 gms and two kgs. Group members are confident of the profitability of their enteprise and devote more time to it.

Group 2: Group 2's pond required repairs. In its first year the group made NRs.8627. NRs.2000 was repaid, NRs.4648 was saved and invested and the rest was spent on fingerlings (NRs.869), labor costs during harvesting (NRs.326), shed and workshop construction (NRs.242), lease dues (NRs.200) and bund repairs (NRs.342). In the next three months the group made NRs.5659 more, half of which was shared among the members and half put into a savings account. The group had acquired a loan of NRs.5110 and NRs.3600 remains to be repaid. They hope that about NRs.600 worth of adult fish remain in the pond. The group has made substantial gains and if this trend continues they will not need a loan for repairs and maintenance or for the purchase of fingerlings and feed.

Group 7 Ka: Having negotiated a loan of NRs.10000, this group leased a pond from a private individual. It has a perennial underground water source but needed some repair. The group has made NRs.2300. Their lease cost NRs.400, and the rest was deposited into a savings account to be used on further improving the pond. The pond still contains about 1000 fish worth NRs.5000. The group will allow it to dry up before they start to repair the previous monsoon's damage. After the repairs, they plan to buy ducks.

Group 25: Two fish ponds have been constructed by this group on land leased from the local panchayat. They are fed by the Adhwara stream and Nadi lake. No income has been made so far but the group expect the fish to grow to between one and two kg in about nine months. Fish prices are now NRs.15 per kg and 9000 fish live in the pond. The group is considering breeding spawn to sell as fingerlings to the other groups. It would cost them NRs.225 to buy 50000 spawn and they could make NRs.200 per 1000 pieces if they sold them a month later, or NRs.1 per piece three months later.

Group 16: This group also constructed two ponds on local panchayat land and their water also comes from Adhwara stream and Nadi lake. In eight months the group made NRs.2300, all of which has been deposited in a savings account. About 11000 fish remain in the pond and are expected to weigh one kg each after one year. The group planted Ipil Ipil trees around the pond but they did not flourish. The panchayat is now providing tree saplings for plantation along the bund. They also plan to plant pineapples and pigeon peas there.

Group 6: A pond was built on panchayat land. Fingerling were put into the pond in two batches; half the first batch were subsequently sold for NRs.1000 and 2000 of the second batch were sold for Rs.2000. About 600 fish weighing between 250-300 gms each remain and they are expected to weigh one kg in a year. The group took a loan of NRs.6000 and repaid NRs.2000. The rest of their sales income was put into a savings account. The main problem of this group is that the pond is too shallow and therefore has poor retaining capacity, so they plan to deepen it by three feet. This will cost them about NRs.3000. They also plan to breed 20000 spawn of which half will be sold after three months and the rest harvested only when ready for consumption.

Group 15: Only a single member of this group is involved in fish rearing and he uses his own pond. However, the group decided to help him to get a loan by accepting joint liability for it. The pond is fed by Dhodiyahi steam, but during the dry season this water is diverted to

other farmers' fields for irrigation so water availability is uncertain. The farmer received a loan of NRs.6000 and has over 1500 fish in the pond, weighing about 250 gms each. In the present season, if he is unable to get water he will have to deepen the pond so that the water in it lasts longer, but he has to drain it before starting the work. Then, his expected income (NRs.5000-6000) will be used to repay the loan.

Group 20: This group did not rear their own fish but took a contract from the district panchayat to harvest the fish in Madhuwa Makha and Adhwara streams. The contract for a 1.5 km stretch of Madhuwa Nakha is NRs.6000 and NRs.3500 for a three km stretch of the Adhwara. This money was borrowed from SFDP. The group paid NRs.6500 to the district panchayat and deposited the rest. So far they have made NRs.4000 net of labor costs, have about NRs.6000 worth of fish in the stream. The harvesting of the fish was entrusted to fishermen who took 25 percent of the big fish and 50 percent of the smaller fish as their due. Big fish are defined as anything over half a kilo; anything under that is small. Because of floods, the enteprise was not very profitable. The group, therefore, does not plan to bid for a contract in the coming year. They will buy a piece of land and construct their own pond. A part of the money required will come from their grain savings scheme under which 11 maunds of paddy worth NRs.1100 has been collected.

Fish Varieties, Lease Payment and Loan Repayment

The most popular fish varieties were rahu (Indian carp), bhakur, naini, silver carp, common carp, grass carp and big-head carp. The first three grow more slowly than the rest but fetch a higher price.

The lease costs given in Table 3 cover the entire lease period. Most lease costs are lower in the initial years and increase steadily though in some cases it is evenly distributed over the years. Loans taken by small farmers for fish rearing have been categorised as medium term and are repayable over five to seven years.

Use of Income

Use of income is discussed at group meetings and the GO advises if necessary. Income has been used to repay loans, lease dues, for repair and maintenance, or the purchase of fingerlings. Some money has been retained in savings accounts to be used to meet later expenses of fish rearing and also the credit needs of member farmers in emergencies or for social or religious occasions. Usually no interest is charged on a loan if returned within two months. If it retained for longer, farmers are charged 8.5 percent interest.

Problems

In some cases monsoon floods washed away fish, but often the same storms brought in fish from the streams or lake. Where more were washed away than brought in, profit-making was delayed. Nevertheless, these groups are confident of making enough to at least cover past losses. To solve the flood problem, the farmers will raise the height of the bunds around the pond.

Another problem encountered by a few groups was that their pond water was lost through seepage. They all plan to deepen their ponds in the slack season. Where snakes and birds preyed on the fish the farmers increased their vigilance around the pond.

Groups which planned to expand into piggeries were unable to get the required wood to construct pig sheds. Efforts are being made to get the wood from a nearby forest with the permission of the forest office.

Though there was never any problem selling the fish, fish prices fluctuated in the local market. The price was largely determined by the quantity on sale and competition is fierce because the fish cannot be easily stored. Fish prices fell to NRs.10 per kg but the same quality and variety also fetched NRs.22 at another time.

Occasionally there was a shortage of fingerlings, but the small farmers now consult the local agricultural sub-centre for their requirements. They also go to India to get fingerlings or spawn.

As all but one group operated in leased ponds it was a great problem to make long term investments. Small farmers want to plant timber trees around the ponds, but as the maturity period of these trees is longer than the contract period, they are reluctant to do so for fear of being unable to get compensation. Negotiations and consultations have begun with the owners, as planting timber trees would be beneficial to both the owners and the leaseholders. The best solution would perhaps be to provide compensation to the farmers based on an evaluation at the end of lease period unless the owner renews the lease.

There were no serious operational problems. Differences of opinion were related to where the fish should be disposed of or who was to take them to the market. Other issues were delayed repayment of loans and inadequate vigilance by some group members. These were solved through group discussion with some help from the GO.

Potential

As the financial details of each group show, fish rearing has the potential to raise the incomes of small farmers substantially. Some groups have already made money and those who have not confidently anticipate good returns. Once the banana plant suckers planted by these groups bear fruit, they will have an additional source of income.

Breeding fish spawn seems to be more profitable because it yields quick and high returns as shown by experiements conducted by the small farmers themselves. Hence a small farmer might be encouraged to take up breeding side by side with fish rearing. Farmers have already shown enthusiasm to do this but they must consider the size of the market and the number of outlets open to them to support the price.

The integration of piggeries, duck rearing, and fruit farming with raising fish increases profitability if successful and makes maximum use of the land available. Many have already begun to diversify.

To begin, large groups have shared the proceeds of small ponds so income per capita is not high. A farmer may "own" as little as 0.03

bigha of pond (the highest is 0.5 bigha). Hence future group size should be linked to pond size. This is important because if personal income is not high enough to justify the labor input, farmers may become negligent which could have adverse effects on group functioning.

The farmers who own land that is not fit for cereal or cash crops should be encouraged to dig fish ponds so that there is more incentive to devote themselves to the project.

The farmers tended to put too many fingerlings in the pond (sometimes three times the recommended number), which could have a retarding effect on the growth of the fish. To make optimum use of the pond, they should be encouraged to set limits for themselves.

SUMMARY AND CONCLUSIONS

The SFDP at Chandranagar is one of 162 presently in operation in Nepal. The SFDP has encouraged small farmers in each working area to undertake group activities to raise their income. Group fish farming is one activity undertaken by the small farmers of Chandranagar. The objectives of this study included finding out what motivated the farmers, how they operated, their costs and returns, problems encountered and potential for the future.

The SFDP has sought to improve the economic condition of small farmers and make them self-reliant through group activities and helped them to do this with advice and financial help through loans. The SFDP program has been successful in its objective to make small farmers conscious of the importance of group solidarity. In a group the farmers become stronger and more confident of their abilities to organize successful economic and social activities.

Eight groups and a single member of one group were engaged in fish rearing. Seven had leased ponds either from the local panchayat or from individuals. One group won a contract from the district panchayat to fish a stretch of the two village streams. The single member dug a pond on his own land. Pond size and leasehold varied.

The farmers obtained loans from SFDP to construct fish ponds and purchase fingerlings. Some were soon able to finance their operation from their income. The profits made, though not high at present, are indicative of the potential that exists in raising fish. Others have already been convinced of the benefits and started their own ponds. Eighteen more groups have applied for loans to take up fish rearing.

The desire to utilize local resources and observing the success of others were decisive factors in the motivation of the farmers. The initiative and experience of the GO were also vital in making the project a reality. There was rarely specific job allocation; mutual trust and understanding were the focal point for success.

The farmers readily solved problems of raising loans, flooding and group disagreements over income use. They tried to make the most of available resources, shown by their efforts to expand into pig and duck farming and banana plantation.

Based upon the positive impact of group participation group fish farming should be promoted among small farmers where it is feasible. Low lying marsh areas unsuitable for crop production would be the best alternative. Other aspects to consider are marketing facilities, availability of spawn and fingerlings, and technical aspects. Integration with activities such as duck farming, piggery, and fruit farming would provide additional income and employment as well as serve as a cushion against the failure of any one activity.

There exists scope to increase the income of small farmers with a organized marketing system. This would require farmers to sell their fish in bigger market areas like Janakpur, Birganj and Kathmandu. Group marketing may be organised towards this end. The main hurdle to this is realiable and appropriate transportation.

At present, the individual's share in income is small because many farmers are involved in a small pond. There is a need, therefore, to determine an optimum size for a group, depending upon the size of the pond. A good return per head would induce farmers to strive harder for the best. Most of the fish harvesting at present is being done by individuals from outside the group. If small farmers themselves learn this art, then it would save costs and hence increase income.

A more detailed study might be undertaken a year or two later to determine the impact of this activity as a more clear picture will have emerged during this period.

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