IMPACT EVALUATION

OF THE

SECOND AQUACULTURE

DEVELOPMENT PROJECT

IN DHANUSHA

MARCH 1996
KATHMANDU

SHTRII SHAKTI

Table of Contents

STUDY TEAM MEMBERS

Mr. Deepak Tamang	-	Study Team Leader
Ms. Ananta Shrestha	-	Economist and Gender Specialist
Mr. Shailesh Shrestha	-	Survey Research Specialist
Mr. Shailesh Man Shrestha	-	Financial Specialist
Ms. Rumi Shrestha	-	Research Associate
Mr. Pritam Lal Shrestha	-	Administrative Officer
Mr. Babu Raja Maharjan	-	Transport Assistant

6.	Closing Date	
	- In Loan Agreement	31 December 1992
	- Extended to	15 July 1994
	- No. of Extensions	2
	- Actual	25 November 1994
	Closing Date of IFAD Loan	31 December 1992
7.	Terms of Loan	
	- Service Charge	1 percent per annum
	- Maturity	40 years
	- Grace Period	10 years
8.	Terms of Relending	
	- Interest Rate	6 percent per annum
	- Maturity	15 years
	- Grace Period	5 years
	- Second-step Borrower	Agricultural Development Bank of Nepal (ADBN)
9.	Disbursements	
	- Date of Initial Disbursement	6 June 1988
	- Date of Final Disbursement	25 November 1994
	- Amount Disbursed	$4,511,882.76
	- Amount Canceled	$1,280,010.82
10.	Local - Financed (Actual)	
	- Amount	$2,123,559.00
	- Percentage of Local Costs	46%
	- Percentage of Total Costs	27%

7. **Overall Performance and Sustainability:** The project is rated as generally successful. It has be extremely successful with the production of seedlings which has exceeded targets 15 times over. However, quality fry/fingerlings needs to be produced in order to overcome mortality through fish disease. The EIRR and FIRR are generally satisfactory overall. Dhanusha registers a higher FIRR due to its easy and strategic location. The big, medium and commercial farmers have benefited from the Project. The socio-economically disadvantaged and women have not received any advantage except as labourers and farm help. This last aspect which impinges on poverty alleviation and which is also the goal of the project - **needs immediate attention**. Credit disbursement, recovery, TEF, research and development and coordination has been generally disappointing. Production too! has not been impressive as a result of these constraints.

8. **Feedback:** A number of important lessons have been learned in this Project. They are that coordination needs to be improved drastically. TEF needs better structure and focus. Applied research and species development needs immediate attention. Market outlet and farm gate price has to be assured for better production. Quality fish fry/fingerlings needs to be produced. Labour and rent is rising rapidly. Disease needs to be controlled. Integrated fish farming and increase in WSA for fish farming has to be increased substantially. Improvements in these areas could lead to more effective attainment of the lofty goals set by the Project.

8. Dhanusha district lies in the eastern region of the Terai belt; it borders Siraha to the east, Mahotari to the west, Sindhuli to the north and Bihar state of India to the south. The physical features of this district can be divided between the Churai hills in the north and the southern flat terai region. The climate is tropical to sub-tropical and is hot throughout the year, except for a few months in winter (December-January). Dhanusha has an annual rainfall of 1400 mm, mostly accumulating between mid-June and mid-September, and its elevation ranges between 61-610 meters above mean sea level.

9. The information provided by various district level profiles, cite at least 52 notable lakes in Dhanusha district. A few, especially in Janakpur town, have both religious and economic significance in terms of fish farming. Dhanusha also has a number of rivers, but as a result of the deforestation in the catchment of the northern parts, such as the Churai and the Mahabharat ranges, most, if not all of the rivers are dry during the period from February to June. Kamala, which has both irrigation and hydropower potential, likewise suffers from lack of water during these dry spells. Ambitious schemes such as diverting a portion of the Sun Koshi river for generating hydropower and irrigating the fields in the plains of Dhanusha have been considered, and inhabitants of the district hope that Kamala irrigation system may be augmented to provide them ample irrigation during the dry months.

10. This district is well served by over 40 kilometers of metalled road along the Mahendra highway, 10 kilometers to the Indian border to Dhanushadham, 24 kilometers of metalled road from Dhalkebar to Janakpur and another 16 kilometers to the Indian border. Seasonal but jeepable roads exist to serve most of the settlement in this district. A railway connects the southern portion of the district to Janakpur and Jainagar in India. There is also an airport which connects the district to Kathmandu. On the whole, Dhanusha ranks as one of the best serviced districts in terms of surface communications.

11. The district's population growth rate is estimated to be over (4%), well over the national average. This is due to the influx of people from the hills to avoid severe poverty and influx of Indians in search of Jobs, housing and space. The district profile shows that over (25%) of households own no land, while another (49%) of household own between some and 10 ropanis of land. Seventy four percent (74%) of households raise extra income by labouring, by cutting and selling fuelwood and bamboo, and by seasonal migration to India, mostly to the Punjab to work as labourers in the fertile wheat fields there. A four month stint as an agricultural labourer in the Punjab fetches around 3-4,000 Indian rupees. These incomes, together with either farming their own limited land or labouring in richer farmers fields, provide a minimal subsistence living to a vast majority of the people in Dhanusha district.

12. Directly related to the state of poverty in Dhanusha is the poor health status of women, children and hard labouring men of the district. People visibly suffer from poor diet, over work, unsanitary water, harsh environment, and bearing many children within a short time frame. Among the health related problems are tuberculosis, asthma, malaria, kala azar, diarrhea, and water borne or water related diseases.

2.2.2 The Social Setting

a. At present nearly 76 percent of the supply of fingerlings is being done by the private sector producers and this supply level will be increased to 83 percent by the end of the Plan period. Technical service and credit facilities required for this will be provided through the Fishery Development programme. The private sector will be encouraged in the production of ducklings, too. As the fingerling distribution is a major means of increasing fish production, the level of fingerling distribution of 48 million 651 thousands in the first year of the Plan will be increased to 59 million 857 thousands in the final year.

b. The fish production programme will be implemented as an intensive programme in the areas where scientific management systems can be used in fishing, as a semi-intensive one, where production may be achieved through the use of fingerlings and fertilizers, and as a general programme in areas where production can be made through the distribution of fingerlings only.

c. The nurseries and hatcheries operating in the private sector at present will be utilized to their fullest capacity. For this, the technical services to be made available from the government will be made more effective.

d. Necessary information will be provided to nurseries and hatcheries about the market and sales promotion of the hatched fingerlings.

e. Necessary rules will be made on the basis of existing legal provisions to discourage (over or illegal) fishing (concerning the conservation of aquatic life) with the use of poison in natural waters. These rules will be enforced effectively.

f. At present, the water-cess (toll), on the utilization of water for fishery often exceeds the same for food crops. the water-cess system will, therefore, be made uniform.

g. The marginal land areas such as public stagnant pools, ponds, damp marshy lands, and swamps will be provided on lease for fishery activities to small and marginal farmers on a priority basis.

h. A fishery programme for the production of fish in paddy fields will be launched in some feasible districts of the middle hilly region and the terai. At the same time, in the valleys and other feasible areas in the middle hilly region, a general programme will be implemented for fish production.

i. A feasibility study will be conducted on the production technology in lakes and cages for the production of expensive varieties of fish which is in great demand among hotels. Furthermore, the technology of fish farming in cages and enclosures used in Pokhara will be gradually extended to other feasible lakes and reservoirs.

j. When dams are constructed for various purposes in natural lakes, the concerned agency will be required to erect appropriate ladders along the dam to facilitate the conveyance of the local fish.

2.4 The Assignment

19. The Asian Development Bank (AsDB), has supported the implementation of the "Second Aquaculture Development Project" in Nepal. The AsDAB and the NPC has commissioned Shtrii Shakti (S2) to take the case of Dhanusha district in the central region of Nepal, and carry out an impact evaluation. The main objective of the project is to augment fish production in Nepal through increased fishery activities. Besides, the Project also aims to strengthen the extension, research, human resource development and institutional capability of HMGN. This Project was implemented together with the Department of Agriculture (DOAD) and the Agricultural Development Bank (ADBN). The idea behind the impact evaluation is two fold and they are :

a) to continue to strengthen the fishery sector, and

b) also to strengthen the monitoring and evaluation capacity of the NPC, through local consultants, such that the NPC can undertake such roles in future.

2.4.1 The Rationale and Objective of the Study

20. The overall objective of this post evaluation study is to examine and analyze thoroughly, the current project status vis-a-vis its overall target and performance. In order to do so, a number of issues are to be examined by the evaluators. In brief, these issues are:

i) to examine the direct and indirect impact of the project activities in relation to the beneficiaries.

ii) to examine the impact of the project activities in relation to economic and financial returns; social and institutional development and impact on the environment. These impacts could be both positive or negative.

iii) to examine the process of project implementation, its coordination and supervision as well as its maintenance component in order to ascertain key lessons learned in order to recommend future improvements.

2.4.2 Methodology and Instruments

21. In order to fulfill the TOR, the evaluation team members utilized the approach mentioned below.

- Review of project documents and terms of references (TOR).

- The information essential for the study was collected, validated and analyzed from two basic sources, i.e. primary and secondary sources.

- Field visits and direct meetings with the farmers, contractors and extension officials were the primary source.

2.4.3 SAMPLE SELECTION

24. Although, the bulk of the information was solicited through the process and qualitative methods mentioned above; in addition, this evaluation study utilized the Probability Proportionate to Size (PPS) sampling method (considered scientific) to ascertain the sample frame, sample size, sample points and the eventual sample respondents. In selecting the representative sample, the study considered the following parameters:

a. size and scope of the project (the scope of the TOR was confined to Dhanusha district),

b. topography,

c. topology of the farmers and beneficiaries,

d. relevant donors,

e. relevant pertinent factors.

2.5 EXPECTED OUTCOME

25. The overall explicit objective of this post evaluation study is to examine and analyze thoroughly, the current project status vis-a-vis its overall target and performance. The outcome will be reported in terms of:

i) the direct and indirect impact of the project activities in relation to the beneficiaries.

ii) the impact of the project activities in relation to economic and financial returns; social and institutional development and impact on the environment. These impacts could be both positive or negative.

iii) the process of project implementation, its coordination and supervision as well as its maintenance component in order to ascertain key lessons learned in order to recommend future improvements.

The implicit objective of this post evaluation study is to strengthen the monitoring and evaluation capacity of the NPC.

2.6 LIMITATION OF THE POST EVALUATION REPORT

26. The scope of the field inquiry was limited to just one district. Hence, the sample points selected reflect just the case of one district, i.e. Dhanusha and not the entire operations of the Second Aquaculture Development Project or FDD which encompasses some 21 districts in Nepal.

27. The duration of the study in the field was for a short 15 days and hence not comprehensive.

sessions. The Agricultural Development Bank of Nepal (ADBN) has been the predominant source of institutional credit for fisheries.

3.1.2 Economic Inputs and Targets

34. At the end of Project period in 1992, the per capita raise in farmers income was projected at an annual $ 695. However, this figure could not be corroborated due to lack of socioeconomic data kept by either the Project, ADBN or HMGN. In the case of Dhanusha district, aggregate financial returns were calculated based on FGD discussion with five groups numbering over 60 fish farmers. They were mostly owner operators of old fish ponds. It provides an indicative annual gross income in the region of NRs. 29,000 or an FIRR of 42 %. The micro income figure is higher in comparison to the earlier overall macro estimates for the Project. However, the team believes that this is because Dhanusha and Janakpur are well served and well endowed in many respects. Hence, this district is more of an exception in fish farming than compared to other less endowed districts in the Terai.

35. The annual fish production was expected to be 4,300 metric tons, coming from additional 1,400 hectares of new ponds and 1,100 ha or rehabilitated ponds. The production target, thus, was estimated at 1.72 metric tons per hectare. The government figures for total fisheries production was estimated at 2,000 ha. based mainly on 5,000 ha. of fresh water village ponds throughout the Nepal Terai. At full development, annual fish seed requirements to support output, were to be obtained from both the FDCs and the private hatcheries and was 10.4 million fish fry and 4.4 million fingerlings per annum. This target was largely exceeded!

36. At the end of the project, incremental fish production was anticipated to lift consumption by 130 grams per person over pre-Project levels, to a total of 530 grams per capita per annum. The number of new fish farmers were to be approximately 8,000 families. In addition, in order to bolster the Project and support the institution development of the FDD, 30 fisheries experts were to be trained.

37. There was also emphasis on special focus to small rural households through SFDP to receive fisheries training and access credit. This component aimed at poverty alleviation was largely unfulfilled, since the Project was not sufficiently focused to meet the special needs of the rural landless and the poor with no land certificates. At best, they received some collateral benefits such as part time jobs.

38. The major funding agencies were Asian Development Bank (AsDB), who pledged $ 11 million out of which only 4.2 million was effectively utilized. The IFAD loan which amounted to $ 5 million was utilized to only (15 %) or $ 0.822 million. UNDP allocated $ 970,000 for the Consulting Services and Fellowships Component.

39. The Government (HMGN) allocated an equivalent of $ 1.6 million and ADBN contributed $0.155 million to the Project.

40. The private sector's contribution has been significant in terms of investing in and operating

45. Similarly, a financing agreement was also reached between IFAD and HMGN on 13 November, 1986 for the Project. Under this agreement, a loan of $5,000,000 was reached for 1988 - 1992 period for the Project. IFAD actually disbursed $822,000 (16.44%) until the project came to an end in 1994 and had to cancel the rest of the loan amount.

46. Compared against the original estimates of 23 million dollars as the total Project cost, the actual loan utilization was only $7,978,000 or approximately 35 percent. The AsDAB component was utilized to a tune of $4,512,000 and represents approximately around 41 percent. The IFAD input of $ 822,000, represents approximately around 16.44 percent of the original outlay. Similarly, ADBN investment of $155,000 is only 3 percent of what it had originally planned to invest. On the whole, therefore, the investment and utilization of both loans and matching investments from cooperating agencies have been low.

47. On the whole the total actual costs at Project completion totaled approximately below $8 million or around 35 percent of the original estimates.

48. The planned UNDP investment of $960,000, was to be used for fellowship and consultancies. At the end of the Project approximately 89 percent or $857,000 were used.

49. On the other hand the local component of the loan, which was $5,450,000 for ADBN, was utilized even to a lesser degree and was 155,000 at the end of the Project completion. This represents approximately around 2.84 percent of the ADBN pledged component.

50. HMGN allocation of $590,000 was exceeded and came to $1,632,000 by the end of the Project. This was due to cost overruns on regular salaries and administrative costs, over a longer time frame then originally planned.

Table 2. The Finance Plan and Actual Investments

	Original Estimate ($Million)		Actual	Percentage
Agencies	**Planned**	**Actual (%)**	**Actual investment(%)**	**Total**
AsDAB	11.0	4.512	41	47.82
IFAD	5.0	0.822	16.44	21.74
UNDP	0.960	0.857	89	4.17
ADBN	5.450	0.155	3	23.70
HMGN	0.590	1.632	277	2.56
Total	**23.0**	**7.978**	**35**	**100**

51. The Finance Plan and Actual Investments (Table 2.), show at a glance, the low absorptive capacity of the fish farmers, the rather low institutional strength of the Project and the gross original overestimates of the Project costs. In future, the capability and capacity of the HMG/DOA; FDD; and ADBN on the one hand, and the absorptive capacity and the market for fish on the other hand must be examined very carefully when designing another Aquaculture project in Nepal.

58. Training was provided to the targeted number of Government and private sector participants. However, the training time per individuals was significantly reduced. Most importantly, the training time per farmer limited amount of free time. AFDO total training time was only 1,512 days, about 50 percent of the appraisal goal. The total training time for JT/JTAs was 98 percent of the appraisal target. However, this number is misleading as the JT/JTA training time should have doubled under the 1990/91 reorganization because the number JT/JTAs more than doubled and at that time there was also an approximate 75 percent staff turnover.

59. Despite a reduction in training time for hatchery/nursery operators from 30 to 21 days, training time was increased by nearly 50 percent because twice the number of operators were trained than had been envisaged at appraisal.

60. The farmers training program appears to have reached out to an impressive number of farmers but in such an abbreviated period that it could offer only the most basic information. This lack of effective farmer training was borne out by the 1994 Data Validation and Socioeconomic Survey (DVSES), which found no clear relationship between farmer training and productivity [See PCR Loan No. 792 (SF) Appendix 2]. The impact of the reduction of Government officer training on the Project was very modest. most of the AFDOs, FDD officers, and JT/JTAs had been trained under the First Aquaculture Development Project. In addition, overseas training was provided under the First and Second Aquaculture Projects as stated above.

3.4 Effectiveness of Technical Assistance

61. The Technical Assistance and Consultant services financed under UNDP grant were largely met. Out of 48 person months of Technical Assistance allocated for the Project, 60.9 months were actually spent. However, this figure must be examined in the light of the fact that out of 28 person months only 24.5 person months of expatriate time were used. This left out some needed specialist inputs in hatchery; fish disease; research and development.

62. The Project utilized some unplanned but necessary national specialist in such areas as marketing; socioeconomic field; and fisheries development. It exceeded the 20 person months of allocation by 16.4 person months bringing the sub-total of national specialist inputs to 36.4 person months.

63. The impacts of these inputs were assessed by the Project management as generally helpful and positive.

64. One of the direct result of Technical Assistance has been the strengthening of the extension effort of the Project. This was manifested especially in the production of fry fish/fingerlings, and hatchlings. The output of 80 million fish fry and fingerlings (including imports) exceeded the target by some 5.6 times. Only (15%) came from government farms and rest from private hatcheries, indicating that government's technical assistance and extension to the farmers have paid rich dividend during the Project period.

IV. THE PROJECT RESULTS

4.1 Operational Performance

73. The overall target of the Second Aquaculture Development Project was to increase annual fish production by 4,300 metric tons, over an above the existing Government production figure of 6,650 metric tons in Fy 1984/1985. This estimate was based on 2,200 metric tons of captured fishes from lakes and rivers and 4,450 metric tons from inland aquaculture. It was also estimated that there were around 395,000 ha. of water surface area (WSA) under rivers in Nepal, but the potential for fisheries development and production were low due to climate and topography. Most of the existing fishes came from 5,000 ha. of natural lakes and village ponds. Another 332 ha. of man made reservoirs, such as through dams; also provided some scope for fish farming and enhanced production.

74. In order to produce additional 4,300 metric tons, over an above the Government estimate of 6,650 metric tons, which would have brought the gross annual production to 10,950 metric tons, additional 1,400 ha. of new ponds and 1,100 ha. of rehabilitated ponds would have been streamlined by the Project.

75. The annual fish seed requirements were estimated at 10.4 million fish fry and 4.4 million fingerlings. These targets were largely exceeded since the DVSES of 1994 estimates that around 67 million fish fry fish/fingerlings, representing some 15 fold increase has been achieved by the end of 1994. The PCR 1994 notes - "....although the appraisal projected that 70 percent of the incremental demand for fish seed would be met by the FDCs and 30 percent by the private sector, in effect the FDCs only produced 15 percent of the fish seed. This was due to the fact that fish seed technology transfer by the Government to the farmers were overwhelmingly successful, thus making it redundant as a fish seed producer".

76. In the production front, DVSES notes that the Project has been able to boost incremental fish production by 4,606 metric tons by the FY 1993/94 from the project target of 4,300 metric tons annually. The figure was 8,906 metric tons of fish production for FY 1994. This production figure is slightly below (19%) of what was forecasted to be total annual fish production of 10,950 metric tons (1987/87 plus target annual increment) by the end of the Project period. The figures are based largely on the target and achievements listed on the PCR on September, 1995 which in turn is based on the 1994 DVSES report.

77. The current evaluation team believes that these figures must be treated with some reservation and caution, since it generally tends to inflate the success rate. In the absence of any scientific data collection and validation at the lowest level, i.e. the fish farm; it is the opinion of the evaluation team that the figures are often based on "multiple counts" at the district level! The over enthusiastic reporting on figures, therefore, must be treated with some degree of caution. However, this observation should not cast aspersion on the fact that the Project has been generally successful in both production, marketing, extension and training fronts!

78. Having observed this it is also true that one fundamental question haunts the Project, i.e. if the hatchling, fry fish/fingerlings have been so overwhelmingly produced by the FDCs; and more

84. Reportedly, the Project implemented all of the specific improvements to the FDCs as defined in the Appraisal Report (See PCR, September, 1994). Major FDC construction items included pond improvements, nursery pond construction, water supply/drainage system, new hatchery/hatchery improvements, training facilities and the construction of the Central Fisheries Development Division building and facilities in Balaju. Constructions were of acceptable technical standards. Furthermore, equipment, vehicles, furniture/fixtures and instruments procured have been utilized properly and has enhanced the performance of the Project.

85. As a result of the First and the Second Aquaculture Project activities, fish farmers were generally happy. Satisfactions were expressed in some important areas as a result of the Project. These are:

i) in the area of modern training and introduction of modern technology in hatchery and pond culture. It has increased production from what it use to yield through traditional methods,

ii) incremental activities in commercial and private fish farming,

iii) dramatic increase in private/farmer's level hatchery and seed production know-how,

iv) more intensive utilization of used and old ponds for fish farming,

v) appreciable increase in income due to fish farming or through seedling production.

4.2 Institutional Performance

86. Institutional mechanism and delivery system remains one of the most thorny issue and daunting challenges for Nepal. This is a generic bane and not confined to the Project alone. Institutional performance is also influenced and impacted by many internal and external factors. In the Project, there were fair share of institutional problems, both within the intra DOAD agencies such as NARC, CFDD and Regional DOAD office on the one hand and between FDD, ADBN and DADO in the district level and lower at the Ilaka level.

87. The Fisheries sector as a whole is also not sufficiently coordinated and clear about the role of the National Planning Commission and NARC when it comes to issues such as policies; plans programs and research activities pertaining to the aquaculture sector in Nepal.

88. Political factors and political decisions and pressures also buffeted the institutional mechanism of the Project and created impediments and constraints to a more effective service delivery to the fish farmers.

4.3 Financial and Economic Performance

89. The current Impact Evaluation Team has validated the Financial and Economic Performance of the Project, based largely on the figure of Project Completion Report of the Second Aquaculture Development dated April 1995. This is because the mandate for the current

economy. Increase in non-agricultural activities have created many formal and non-formal employment opportunities in the export-led industrial market, which relies heavily on low wage female labour (See WDD page 61.). These developments are also gradually bound to affect women's role in the Terai belt. The development of aquaculture could be one of them, even though currently this is a male domain.

4.5 Environmental Impact

96. There has been no negative environmental as a result of the Project. This fact has also been borne out by the results of the earlier DVSES and PCR study reports. The evaluation team observed and farmer groups reported, that in fact, there has been a number of positive environmental impact as a result of fish farming. unused dirty ponds have been improved and some plantation carried out around the ponds. The water in the ponds are cleaner and is not a health hazard due to less mosquito breeding. The households around the ponds also have the benefit of cold wind from the ponds.

97. However, there could be potential dangers in future when farmers may resort to using more chemical for sanitizing the ponds in order to get rid of various fish diseases. Ground water and environmental pollution can also be effected through diversified feed products that farmers may use to feed the fish, ducks and pigs.

4.6 Sustainability Issue

98. Sustainability issues must be examined in different perspective. These are on the one hand macro policies, institutions and budgets; and on the other hand, district and local level perspective in terms of delivery mechanism, production, financing and future replicability.

4.7 Central Policy Level

99. At the central policy level, the sustainability and promotion of aquaculture in Nepal has received only lukewarm support from the central Government and policy makers. Even the Eight Plan does not have very encouraging guidelines to improve fish farming, production; research and development other than how much is expected to be produced by the end of the Plan period (See Government Policy above). As such, it appears that aquaculture in Nepal, a "poor cousin" to many other cash crops and supplementary livestock development in the overall Agriculture and Livestock development sector. Reportedly, even the long term "Agriculture Policy Perspective" on HMGN does not give the Aquaculture sector the seriousness it deserves. Hence, certainly at the policy level there is room for better encouragement for this important sector.

100. Despite this serious lacunae; the Department of Agriculture Development has a well defined and well functioning Central Fisheries Development Divisions based now in Balaju. The Division has adequate trained personnel from the centre to the farmers level and Training, Extension and Follow Up System (TEF) exists. Undoubtedly this needs to be strengthened, yet the infrastructure and system is there and is working.

LESSONS LEARNED

1. Project Implementation, coordination and TEF has been generally poor due to lack of coordination and cooperation between various agencies involved.

2. In the absence of simple credit procedures, credit absorption has been low.

3. There has been no substantial increase in water surface areas (WSA) under which new fish farming has expanded.

4. Integrated fish farming has not increased dramatically in the terai.

5. Effective means of fish disease control is a difficult task to accomplish.

6. Diversification in fish species has been limited and introduction of high value fish is costly and requires ready market.

7. Given the opportunity, local farmers can pick up modern technology adequately as evidenced from the production of fish seeds.

8. Community organizing and involving socio-economic ally disadvantaged groups and women group is a difficult task. It needs special expertise and better community organizing.

9. Market outlet is a problem in Nepal for a perishable commodity such as fish.

10. Assuring a fair "farm gate price" could led to better production but is practically difficult to accomplish.

11. Farmers are inhibited by initial cost of fish farming which is made costly by a number of factors such as high fish fry/fingerling mortality, fish disease, poisoning due to anti-social behaviour, cost of labour for digging ponds, and steeply increasing rent.

12. Competing with fish and seeds produced in India is a factor which affects fish farming in Nepal and must be kept in mind by planners and farmers alike.

and high labor cost of new ponds need to be rectified by a government policy that allows better terms to the fish farmers. In this respect, the issue of effective legislation is paramount.

(xii) Research and development has been a "chink in the armour" of the Project and the aquaculture sector as a whole. Research and development must be able to break new frontiers in terms of how to maximize production through more integrated crop-fish farming; freshwater fisheries and additional ponds to be brought under production through better utilization of rain or irrigation waters. Lastly, the diversification from the current crops of fish species to higher value fish production, is an area that merits due attention.

(xiii) Database and MIS, especially at the ilaka and district level, must be strengthened considerably, if we are to monitor and evaluate the progress of the aquaculture sector in a scientific manner in future.

Appendix I

Old Pond Financial Analysis in constant value of Base Year 1995

INVESTMENT	**Per Hecter (Amount Rs)**
Land Rent	59,200
High Construction Cost	10,000
Total	**69,200**
INCOME	
Sales Revenue	**1,33,200**
Less: Expenses	
Land Rent	59,200
Fish Seed	14,800
Manure	1,490
Fertilizer	1,000
Lime	4,800
Water Supply	3,290
Feed	3,000
Labour Charge	14,000
Other Expenses	2,550
Total Expenses	**1,04,130**
Earning before Interest (EBI)	**29,070**
FIRR in %	**42%**

17. How much money do you usually receive each year?

18. Which market do you find more profitable?

19. What is your selling pattern? Did you make any profit?

20. Did you repay any loans? If not why?

21. Due to project intervention, has your family income increased ? If not why? If yes how? (change in food consumption habit, taking more protein etc.)

22. What is the impact on environment due to project intervention?

23. What is your suggestion to the project personnel?

24. Do you think that the project should be continued ? What sort of suggestion do you want to make for the success and the sustainability of the project?

25. What is the impact of the programme on the socio-economic, educational and legal situation of women?

26. Were the female members of your family consulted before starting fishery?

27. Thank you for your time and contributions. We will wind up our discussions here. I was wondering if you have any other important issues or concern that you want us to highlight and where do you feel we have not given sufficient time and attention to it?

NB

* FGDs are ideally administered to a group of 10-15 farmers. The FGD participants are screened according to a set of criteria developed for the project by the Study Team which takes into consideration homogeneity, representations, age, sex and other relative parameters.

Semi- Structure Checklist
(For Community leader, VDC member's etc)

1. Are you familiar about the Aquaculture programme in your village/community?
2. What kind of facilities were provided to the community by the project?
3. Were there any experience before the implementation of Aquaculture programme came in your Vicinity?
4. What are the inputs for the Aquaculture? Is it fully or partially provided by projects? If loan is involved, how much do a farmer receive during the project period ?
5. Do you have any knowledge about the selection criteria of the farmers?
6. What sort of problems did you see in such projects?
7. Do the project personnel regularly supervise or follow- up?
8. Can you tell us, how many families are involved in the programme in your area ?
9. What type of fishes are in high demand?
10. Which market is more profitable?
11. What is the selling pattern?
12. Has the income of the farmers increased due to project intervention ? If not why? If yes how?
13. What were the impacts on environment due to project intervention?
14. Should the programme be continued? What suggestions do you think are important to continue the programme?
15. What is your suggestion to the project personnel?
16. How do you analyze the farmers problems?
17. Is the programme completely successful? If not why? If Yes how?
18. Do you think that the project has positive/negative impact on socio-economic condition of the women of your area? If yes, how?

12. What are your suggestions to improve the loan recovery rate?

13. What could you tell us about the financial sustainability of this project? Do you have anything more to add to these discussions?

Institutional Arrangements

14. What is the delivery mechanism of this Project? Could we have a look at your organizational chart?

15. What are the Strength?
Weaknesses?
Opportunities?
Constraints?

16. How could we overcome the weaknesses, make better use of opportunities and remove constraints? Do you wish to add anything more to these discussions?

Technical Issues

17. Can we examine the Strength?
Weaknesses?
Opportunities?
Constraints?

18. How can we overcome them and make better use of our resources? Anything more that you wish to add?

Extension

19. What are the Strength?
Weaknesses?
Opportunities?
Constraints?

20. How can we overcome them and make better use of our Training Extension and Follow-up (TEF)?

21. Any other issue you wish to add?

Policy

22. What are the policy issues that are worth examining regarding the Aquaculture projects?

23. What are the policy directions and policy shifts that one should emphasize in the future?

24. Anything more that you wish to add?

APPENDIX III

Synthesis of the Focus Group Discussion and Meetings with Farmers

There were altogether five Focus Group Discussion involving 58 farmers in Dhanusha district in the second half of November, 1995. The opinion expressed by the fish farmers are presented below. Please read this in conjuction to the Checklist in Appendix II.

Q1. In all FGD areas most of the farmers knew that there is a government farm in Janakpur. They also knew about the programme of the fish farm like training, fingerlings production and sale. But the people of Lohana VDC did not know about project activities though they had an idea about the office located in Janakpur.

Q2. Some farmers knew the exact date of the programme initiation (2044/2045 B.S.) but the majority of the others did not know. Though they did not know the date, they said the project lasted for 6-7 years.

Q3. They were traditional fish farmers and some of them started as early as 2030 B.S. They learnt about aquaculture by buying fingerlings from the project. One farmer (Boya Lal) used to sell fishes in the beginning. Then he started working in a private fish farm in a near by village. After few years he took the farm in contract and started taking other farms too. Likewise, he started his own hatchery business when the project started. He has been exceptionally successful and his case study is presented in Appendix III.

The farmers of the Lohana are also traditional fish farmers (Malah) and the ponds had only wild fishes. Then Malah's started commercial fish farming by taking the most of the ponds in contract which was cheap at that time. When the villagers saw that Malahs were benefiting from the fish farming they began to use other ponds as commercial farming.

Q4. Most of the farmers started getting involved in the acquaculture project by buying fingerlings from the farm. Those who were familiar with the people working in the project got information about the project through them. Some of them had an opportunity to attend various training programmes provided by the project. One farmer brought some persons from Fishery Development center for an inspection as he was not doing well in the beginning. When he followed the FDC experts advise, he started doing well. He even started a hatchery and nursery farm at the advice of the FDD, which is now one of the largest hatchery farm in the private sector. Many other farmers were not directly involved with FDC.

Q5. Most of the farmers in the fish farm business said they did not get any support and facilities from the project. Some received training from JTs, JTAs. Seven farmers had the opportunity to participate in various training provided by Fishery Training Centre on pond fish production, type, feed, disease, fingerlings etc.. Three farmers had obtained loan from the AsDB. Most of them used to buy fingerlings from FDC and those who did not, bought directly from other farmers or from Indian markets. Those who did not get any kind of training from project learnt the technology from experienced farmers or from India.

average, from the sale of fishes.

Q12. Only male members of the family are involved in fish farming, if needed the women members help in feeding and the use of agricultural lime. Women's involvement is in the form of labor and confined only to some Malah family.

Q13. Problems: Majority of the farmers looks said their problems are as follows: i) Flood. ii) Disease, iii) Over crowding of the fish in the pond. iv) Dirty water. v) Unavailability of the JT, JTAs when needed. They have to take water for test to the central office in Janakpur. By that time, they do that, it is too late and most of the fishes die. vi) marketing. vii) Mangsir and Poush (November - January) are disease prone months, when fishes start having white spots in their head and body. In Chaitra, Baishakh (May - July) there is water shortage. The farmers have to harvest all the fishes even if they are small. viii) Due to jealousy people poison the ponds and kill all the fishes. ix) The village farmers face problems like roads, transportation, electricity for incubators for enhanced production and slow body growth rate due to food deficiency.

Some farmers emphasized on problems such as: a) Loans: The bank is hesitant to give loans to the farmers because they are unable to put forward collateral as required by the ADBN's rules. Due to this reason, they take money from the village money lenders even though the interest rates are exorbitant. b) When the public ponds are taken in contracts by the farmers, they have to deposit earnest money. Suppose if they have to pay Rs.1,00,000 lakh per year, they have to deposit Rs. 10,000 in advance. Due to this problem of repayment, they have to take out the fish prematurely and sell it, even though the fishes are small in size. In order to circumvent such problems, the farmers' feel that if they were given loans by the Government, in simple and favourable terms, they would have the chance to grow the fish and sell it in higher prices and thus earn more profit.

The poisoning of the pond, is a major problem and disease is the next which cannot be controlled by putting agri lime and potash. This measure is recommended by the JT/JTAs. It is only a preventive measure not the cure. The farmers want better solution.

Q14. Project personnel do not come for regular visits so, farmers do not have constant contacts they require. The farmers, themselves, go to the Service Centre if they needed any kind of suggestions. A few farmers said that project personnel, JT/JTA do come and provide suggestions when requested. One, Mr. Ramananda Jha used to visit Nanupatti village often and helped the villagers. But other officers never come for supervision.

Q15. Rohu, Naini, Bhakur (Indian carps) Silver, Bighead, Common and Grass Carp (Chinese carps) are in high demand in local market because it has higher growth rate and can be harvested at least 2-3 times a year.

Q16. The farmers said that the production of the fish depends upon the area of the pond, type of fish, fertility of pond and growth rate etc. But normally they produce 10-20 quintal of fishes in 1 bigha of pond in every six month. Depending upon the market and profitability, they ever send their products to Muzzafarpur, Patna, Darjeeling and siligudhi in India. But Kathmandu is the major buyer of their fish. Some small farmers sell the product in Janakpur and local markets.

1) Certain standard should be set for fingerlings, since the growth of fish depends on fingerlings.

2) Small farmers should be helped as they do not have 1 bigha land to access institutional credit. Small farmers suggested that they should be able to deposit only that land, where they will be constructing a pond. An effective collateral using the pond and their fish farm as guarantee.

3) The fishery officers should be able to demonstrate to the farmers the technology on fish farming by taking one of the pond of the village in hire by FDC, so that the villagers are more convinced. They said that they will be willing to pay all the cost after the production.

4) Due to shortage of labour and the high price, the ponds should be constructed mechanically.

5) Fingerlings distribution should be equal between rich and poor, small and big farmers when there is shortage of it.

6) There should be concession to the small farmers regarding the loan system because they do not have 1 bigha land which is required to deposit for loan.

7) New fish breeds should be introduced (Black carp, African carp, African Mangur) that are in high demand but not available here.

8) On the spot training to the farmers should be provided.

9) JT, JTAs should be technically competent.

10) Simplification of loan process and decrease in interest rate.

Q25. In traditional Maithili family women do not go out of their home, except working in the field. They can go to the offices for job and girls go to the school and be involved in marketing in some extent. The lower caste women collect the shells and sell to increase their income. But there has not been any major change in the lives of the women.

Q26. The female members are informed about their programmes but not consulted and they cannot give any decision on men's business.

CASE STUDY - II

Mr Pavan Kumar Karmacharya has been involved in fish farming since 2042 B.S. He lives in Janakpur Station road and has 12 family members altogether. His brothers' are involved in different fields and he is the only one involved in fishery.

He has won many prizes regarding fish farming. When Fishery Development Project came to Janakpur he saw the profits and started taking public, personal ponds for five years in contract to start hatchery and nursery.

According to Mr Karmacharya Aquaculture Project is successful because

i) rise in fish farmers and contractors
ii) rise in income
iii) availability of new fishes
iv) different training

He says that fishery development could not fulfill its target in fish production which was 5 metric ton/hector. He feels the reasons are

i) J.T., J.T.A. are not aware of fish problems
ii) no follow ups and monitoring
iii) long procedure in loan system
iv) high rate of interest
v) technology of pond construction is primitive

He says that old ponds are profitable but the new ponds are only 4 feet in depth which is not enough for fishes. Water levels are reduced during summers in new ponds. There is 25 - 50% net profits in fish farming and the chances are very low of losses.

The rate of interest (18%) is very high and the profit in fish farming is only after 5 years. But the farmers have to repay the loan after 6 months. Therefore, there is decline in farmers who take loans from the bank.

Fishes are mostly sold in Kathmandu, Janakpur and in wholesale prices. He is satisfied with his business.

When he was asked if the III Phase should be introduced, he says that project should be involved with trainings, technology development and commercial farming should be started.