

Impact Assessment Survey: Fish Sub Sector; Seed and Feed Intervention in Nepal

Final Report

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I. EXECUTIVE SUMMARY

Commercial fish farming is a popular business among the youth as well as adult farmers who are engaged in agriculture. Fish rearing is not only a source of economic supplement but also a nutrition supplement. Water supply for irrigation to augment crop yield is an added benefit of fish rearing in ponds.

With an objective of studying the endline of Fish feed intervention, this study was carried out in two phases: Baseline study on November, 2014 and Endline a year after. The survey was carried out in two districts of Terai viz. Rupandehi and Nawalparasi; where farmers were actively engaged in commercial fish farming. Around 160 farmers from the two districts were selected for a longitudinal study whereby comparisons were made over time. Among them, 82 farmers were selected as Treatment while the remaining 78 were treated as control based on the source of hatchery the farmers used to buy fingerlings from.

In respect to the social construct, these two study area were highly inhabited by Brahmin and Chhettri followed by Janajati and Madhesi among other ethnic populace. Among the fish rearing farmers, the average agriculture land and pond holding was observed to be higher for the treatment farmers than those of the control farmers. The farmers rear seven major species of fish for commercial purpose viz, Rahu, Naini, Silver, Common Carp, Bighead and Grass carp and Bhaykhur. The number, production and sales changed over the study period depending upon the species. With an increasing trend in fish rearing, a shortage of fingerlings in the market is a looming problem. But, no such shortage was observed in our study domain as it was receiving enough supply of quality fingerlings from local production and import from other districts.

Information for quality fish production and improved pond management is crucial for fish farmers. Most farmers in our study usually get information from the nearby farmers engaged in similar sector. There has been a slight decrease in fish mortality in both districts in both farming groups. The farmer's expectation is higher from increased yield from quality fingerlings than from decreased mortality rate. Majority of farmers held optimistic views towards use of commercial feed and quality fingerlings. However, fish production was seen in increasing trend.

The study shows that the cost of investment in ponds has increased which is accompanied by increased economic returns. The returns of the investment have increased accordingly for both the groups. According to this study, Farmers got high economic return from use of quality seed and feed in fish farming. It was also found that the attraction towards the use of commercial feed was growing among farmers. Although, male still dominate the profession and hold high control over the resources and revenue, female participation has been increasing among the fish rearing farmers in terms of financial decision making as well as utilization of gains.

In overall scenario, although notable significant changes were not noted between the two study periods in terms of decrease in fry mortality, production was seen increasing. This can be attributed towards increasing investments in better management practices and better feeding practices.

ABBREVIATIONS

BC	Benefit- Cost
DID	Difference of Doubles
CBS	Central Bureau of Statistics
DADO	District Agriculture Development Offices
FAO	Food and Agriculture Organization
FDD	Fisheries Department Development section
GO	Governmental organization
HH	Household
Ha	Ha
MoAD	Ministry of Agriculture Development
NGO	Non-Governmental Organization
SPSS	Statistical Package for Social Sciences
VDC	Village Development Committee

CHAPTER 1:INTRODUCTION

1.1 Background

Fisheries sub sector is fairly a new activity in Nepal with a significant growth potential. Cage fish culture, enclosure fish culture in lakes and reservoirs and rice-fish culture are popular production systems, but expansion has so far been limited. Fish culture in marginal irrigated agriculture land, swamps and ditches is a recent intervention in Nepal and has been quite encouraging as a poverty focused and livelihood improvement activity for the rural targeted community (FAO, 2013). The local demand for fish is high, imports are growing and prices are rising. While per capita national consumption figures are increasing, this has largely been serviced by Indian imports, despite local consumer preferences for fresh Nepali fish. Pond fish culture currently produces over 20 per cent of total fish consumed in Nepal (capture fisheries production and imported fish accounts for the remainder). The pond aquaculture market system, however, faces a number of constraints. Among them, inadequate fish seed and feed supply, contamination of carp fry with wild fish, and increased fry mortality in cage culture with onset of winter have been recognized as majors. The primary symptom of under- performance at the pond-level is low productivity. In 2003/2004 the value of total fish production (39 947 tonnes) was estimated at Nepalese Rupees 4 242 million (US\$ 60 million) and contributed over 2 percent in Gross Domestic Production (GDP) – Agriculture. (DOFD,2004). The government reported total aquaculture production reached some 36000 tonnes in 2012. However, the domestic fish supply for the people was only 2.07 kg per capita in 2012, which was far below the regional average of over 20 kg per capita. The government of Nepal has Set the domestic fish supply target at 5 kg per capita for 2032, which implies that the national aquaculture Production has to reach 160 000 tonnes by 2032, a huge leap from the current production level.(FAO, 2013)

Based on initial research undertaken in the fish sub-sector, Samarth-NMDP has prioritized the feed and seed input supply system since the use of low-quality fish seed and inappropriate feed has been established as the 'first- level' cause; which is the most addressable issue to have the biggest endline on increased pond productivity.

The major part of pond fish production takes place in southern part of country- Terai Plain where 94% of total fish Ponds are located and several disadvantaged groups are involved (DOFD, 2004). Hence, an attempt has been made for exploring the status of feed, seed and pond management in those areas. This would not only support Samarth-NMDP for launching a program aimed at the improvement of the underlying pro-poor performance of rural sectors but also lead to opportunities for better access and improved growth for poor and disadvantaged people. This approach will benefit farmers by improving their efficiency in fish production through improvement of their knowledge and accessibility to quality feed and seed available through public /private hatcheries.

1.2 Objectives

The overall objective of the baseline was to produce robust, credible benchmark for farmers who have accessed fingerling from those nurseries who gave specialized feed to the hatchling. In particular, the objectives of study were to assess the intervention's endline of:

Outreach – the number of people recording a positive increase in real income attributable to the intervention, taking into account the counter-factual, where necessary.

Net Attributable Income Change – the average increase in annual real incomes attributable to the program, taking into account the counter-factual, where necessary.

Poverty profile – the proportion of people recording an increase in real income that can be classified as poor.

CHAPTER 2: METHODOLOGY

2.1 Study Area

The study was carried out in two districts; namely, Rupandehi and Nawalparasi.

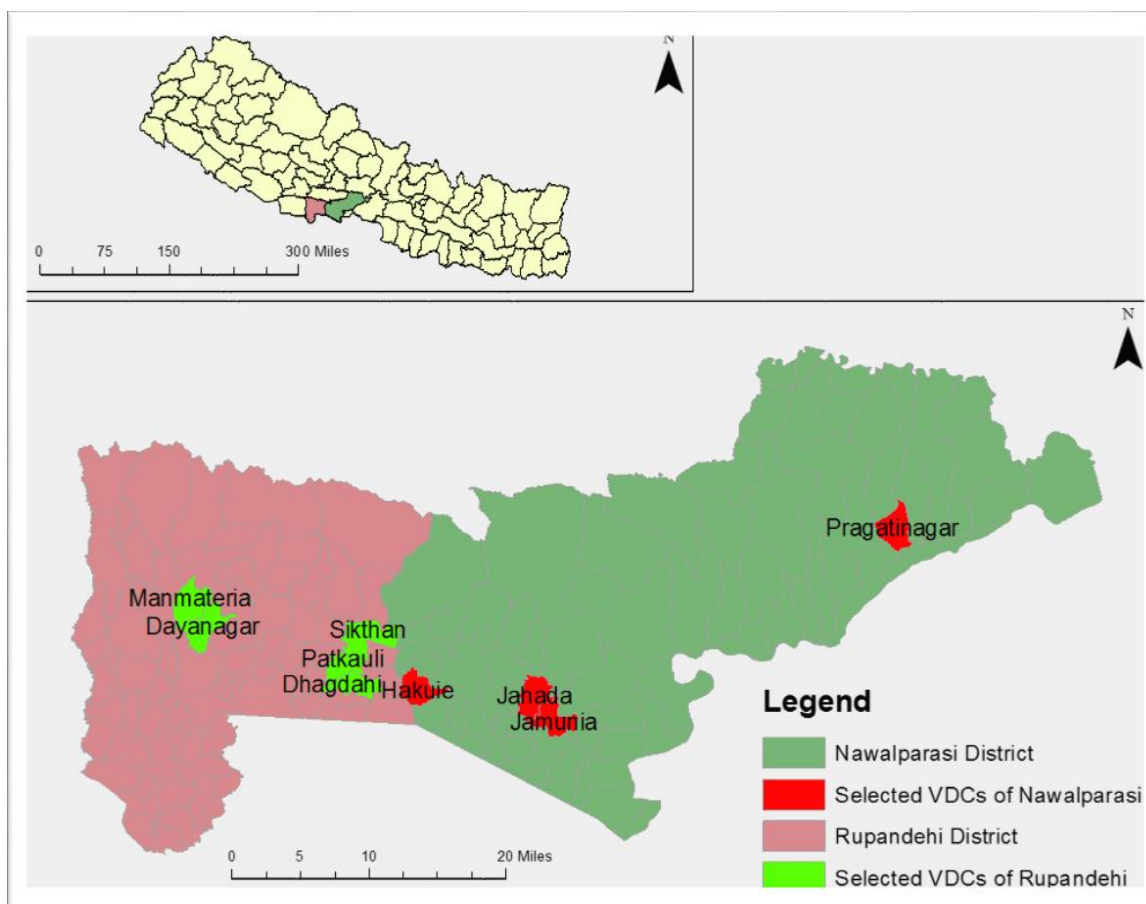


Figure 1 Location of selected sites for study in Rupandehi and Nawalparasi district in Western Nepal

Rupandehi District:

Rupandehi is one of the districts of the Western Development Region of Nepal, situated in the southern part of Lumbini Zone. The district is heavily crowded with a population of 880186 (CBS, 2012) where around 70% of total population are engaged in agriculture sectors. In the district accounts for 82622 ha of cultivable land (DADO, 2010/11). Apart from the major cereals crop production, people are now engaged Fish farming, owing to its rising popularity in the area. In Rupandehi alone, fish farming is practiced in 865 ha area which produces around 3510 tons of table fish which accounts to around NRs 650 million in annual turnover (MoAD, 2013).

Nawalparasi District:

It is located in the Western development region of Nepal which is surrounded by the Narayani River from one side and by some hills in other regions. The population of the district is about 643508 (CBS, 2011). People are engaged in major cereals production like rice, wheat and maize. Commercial fish rearing is growing in the region in recent times. Many cooperatives have also been established for the commercial fish farming in the region (MoAD, 2013).

2.2 Site selection and sampling Techniques

Since, this is a longitudinal study, same site (Rupandehi and Nawalparasi) and respondents who were previously interviewed during the baseline study were sampled for endline survey as well. A total of 160 respondents which include 82 treatment and 78 control groups were interviewed. Treatment groups were identified as the farmers who were purchasing the fingerling from selected hatcheries and nurseries while control were random farmers having the similar characteristics as those of the control farmers. In both districts, treatment and control groups were present. In Rupandehi district, five VDCs were selected: Manmateria, Dayanagar Dhagahi, Sikthan and Patkauli while in Nawalparasi district, Hakuie, Pragatinagar, Jahada and Jamunia VDCs were selected. In those VDCs, wards and HHs of treatment group were purposively selected, based on list provided by SAMARTH during the baseline study. However, HH for control group were selected randomly in the same site.

Table 1 Sample Cluster households in the study

Districts	Selected VDCs	Selected Wards	No. of HH	Treatment(T)/Control(C) Group
Nawalparasi	<i>Hakuie</i>	6,7	18	9T +9C
	<i>Pragatinagar</i>	1	6	2T+4C
	<i>Jahada</i>	3,6,7,8	10	5T +5C
	<i>Jamunia</i>	2,4,8,9	6	4T +2C
Rupandehi	<i>Manmateria</i>	1	8	8 T
	<i>Dayanagar</i>	1,2,3,4,7,9	72	32 T + 40C
	<i>Dhagdahi</i>	2,4	3	1T+ 2C
	<i>Sikthan</i>	1,6,7,9	18	9T +9C
	<i>Patkauli</i>	1,2,3,4,5	19	12T+7C
Total	9	29	160	82 + 78 C

2.3 Data Collection Techniques and Analysis

The data were collected through semi structured questionnaire survey targeted at Fish farmers in the study site.

- **Pre-testing of questionnaires:** The questionnaire was previously pretested in Godawari area of Lalitpur district during the baseline study, so no pretesting was done during this phase as the same sets of questionnaire were used in the survey.
- **Development of Tablet based application for HH Questionnaire survey:** Unlike paper-based questionnaire in the baseline survey, for the endline survey, data was collected in electronic form through portable tablets. A tablet based customized application was developed into which the finalized questionnaire were fed. A short training was organized in order to acquaint the enumerators with technical skills for collecting and entering the data collected at the field was directly entered into the tablet.
- **Household survey:** The tablet based app was used to collect primary data by conducting face-to-face interviews with farmers. List of farmers adopting the intervention was provided by SAMARTH for treatment group. As for the control group, randomly selected farmers were interviewed.
- **Data extraction and Analysis:** Data collected in tablets were extracted and transferred to SPSS and MS-EXCEL. Data cleaning and data analysis was done using software packages; SPSS version 17 and Microsoft excel 2013.

CHAPTER 3: Household Information

3.1 Socio-economic Setting

The sampling approach was socially inclusive with representatives from different caste, ethnic groups, age and gender as represented in Table 2.

It was observed that majority of people surveyed belonged to age group 15-59 (85 %) while remaining were people of age group of 60 years or more. A low participation of women observed in this survey with female accounting for only 11.6% of the total surveyed. In case of treatment group, 13.9 % were women while in control group even less i.e. 9.2 % were female. Around 11% of the total respondents had primary level education while approximately same numbers were Literate only or illiterate. Among the treatment farmers it was found that 41.3 % had secondary education while a mere 2.6 % had attained University education. The study depicts that higher proportion of treatment farmers had attained higher level education as compared to the control farmers.

The highest number of farmers sampled belonged to Brahmin ethnic group followed by Janajati and Madhesi while Dalit and other minor ethnicities were among the least. The same type of ethnic exposure was observed in both treatment as well as control groups. In regards to the family size of the surveyed HHs, it was observed that majority of them have eight or more family members.

No notable changes have been observed in above characteristics from baseline to endline study period.

Table 2 Socio-economic Characteristics of Sample HH

Socioeconomic Characteristics		% within Treatment or Control		Total %
		Treatment	Control	
Age Category	15-59	84.8%	84.2%	84.5%
	>60	15.2%	15.8%	15.5%
Sex	Male	86.1%	90.8%	88.4%
	Female	13.9%	9.2%	11.6%
Education level of Respondents	Primary	8.9%	13.2%	11.0%
	Secondary	44.3%	38.2%	41.3%
	Higher secondary	26.6%	18.4%	22.6%
	University	2.5%	2.6%	2.6%
	Literate only	11.4%	11.8%	11.6%
	Illiterate	6.3%	15.8%	11.0%
Caste / Ethnicity	Dalit	.0%	3.9%	1.9%
	Janajati	38.0%	21.1%	29.7%
	Madhesi	15.2%	25.0%	20.0%
	Brahmin / Chhettri/Thakuri/Sanyasi	46.8%	48.7%	47.7%
	Other	.0%	1.3%	.6%
No. of HH members	Eight or more	34.9%	29.5%	32.3%
	Seven	7.2%	7.7%	7.4%
	Six	6.0%	12.8%	9.3%
	Five	18.1%	19.2%	18.6%
	Four	26.5%	16.7%	21.7%
	Less than three	7.2%	14.1%	10.6%

a. Major Occupation and Source of income

Table 3 Major Occupation of Sample HHs

Majority of respondents were found be engaged in Fish farming activity followed very closely by other Agriculture based occupation. Among the agriculture based occupation highest were involved in crop production. A small number of farmers were involved in Livestock, vegetable production and wages/labour. Among the non-agricultural occupation, few were employed in Business and Job/service.

For Control HH, Fish farming was the first major occupation while for treatment farmers both fish farming as well as agriculture were equally important occupation.

Major Occupation		Treatment or Control		Total
		Treatment	Control	
Agriculture		44.3%	46.1%	45.2%
Agriculture Sub-category	Crop	88.2%	96.9%	92.4%
	Livestock	5.9%	3.1%	4.5%
	Vegetables production	2.9%	.0%	1.5%
	Wages/Labour	2.9%	.0%	1.5%
Fish Farming		44.3%	48.7%	46.5%
Business		5.1%	3.9%	4.5%
Job/ Service		6.3%	1.3%	3.9%

Agriculture based household usually depend on multiple sources of income to maintain their livelihood as agriculture itself is a diverse activity. In the two selected districts, irrespective of cluster, fish farming was the major source of income for surveyed farmers. This was closely followed by crop production. Fish farming as a major income source was about 10 % more in Control farmers in comparison to treatment farmers. Business was third ranked income source for both control and treatment group. Livestock and remittance were other sources for control group while that for treatment group were Job/services, remittance, livestock and others.

These characteristics remained the same during one year study period between baseline and endline survey.

Table 4 Major Source of Income in Sample HHs

Rank	Occupation	Control		Rank	Occupation	Treatment	
		Baseline	Endline			Baseline	Endline
1	Fish Farming	49.4%	47.5%	1	Crop(Paddy, Wheat, Maize)	39.3%	39%
2	Crop(Paddy, Wheat, Maize)	41.8%	43.8%	2	Fish Farming	38.1%	37.8%
3	Business	3.8%	3.8%	3	Business	9.5%	9.8%
4	Livestock	2.5%	2.5%	4	Job/ Services	8.3%	8.5%
5	Remittance	2.5%	2.5%	5	Remittance	2.4%	2.4%
6	Job/ Services	0%	0%	6	Livestock	1.2%	1.2%
7	Others	0%	0%	7	Others	1.2%	1.2%

b. Land availability and its utilization

The Treatment cluster has larger overall agricultural landholding than that of Control cluster. The total average agricultural land holding per HH for treatment HH was 1.54 Ha while that for Control was 1.07 Has according to the baseline study. A small increment in both these values was observed during the endline study; these changes solely accounting for land owned by farmers. An average increase of 0.16 ha and 0.04 Ha of land per HH was found in Treatment and Control group the endline study. Among, the

total agricultural land holding almost about 90 % land was owned by farmers themselves. A small chunk of remaining land was leased while the least was rented in.

Table 5 Agricultural land holding of Sample HHs

Agricultural Land Holding per HH in Ha	Baseline		Endline		CHANGE	
	Treatment	Control	Treatment	Control	Treatment	Control
Land Owned	1.38	1.01	1.50	1.06	0.13	0.04
Land Leased	0.11	0.04	0.13	0.04	0.03	0.00
Land Rented	0.06	0.02	0.12	0.02	0.06	0.00
Total Agricultural Land	1.54	1.07	1.70	1.11	0.16	0.04

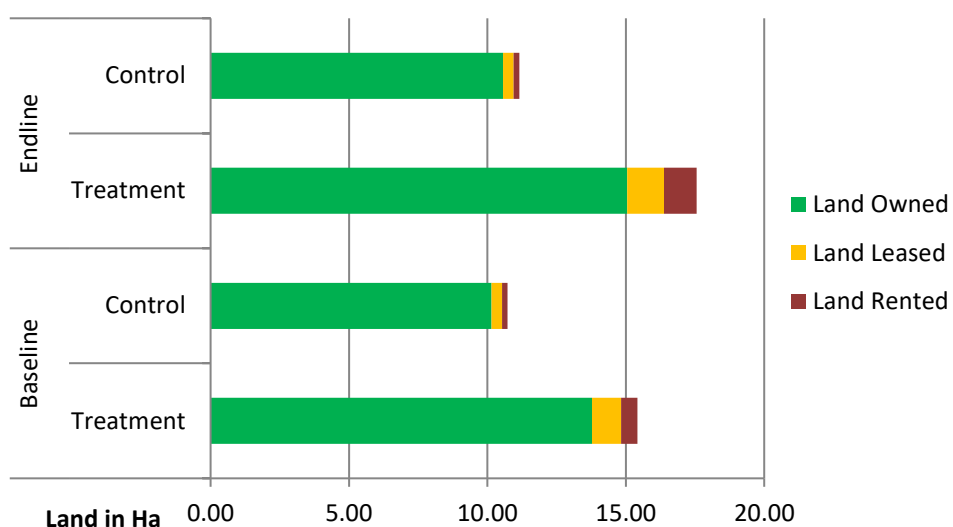


Figure 2 Agricultural Land holding/ HH during Baseline and Endline study

CHAPTER 4: FISH FARMING PRACTICES

4.1 Common fish species

Fish rearing is growing as a promising source of income in the study domain. Farmers were generally found rearing seven different species of fish for commercial purpose as shown in the graph below along with 3 minor species: Tilapia, Pangasid and Mungree.

The Treatment groups were rearing more number of major fish species (Rahu, Silver carp, Naini) than those of control group which is due to rearing of fishes via nursery Pond.

Naini and Rahu were the most reared fish species by a huge margin followed by Common carp, Silver carp, Grass carp, Bighead and Bhyakur respectively in Treatment Cluster. In Control on the other hand, it was Naini, Rahu, Common carp, Bighead, Grass carp and Silver carp.

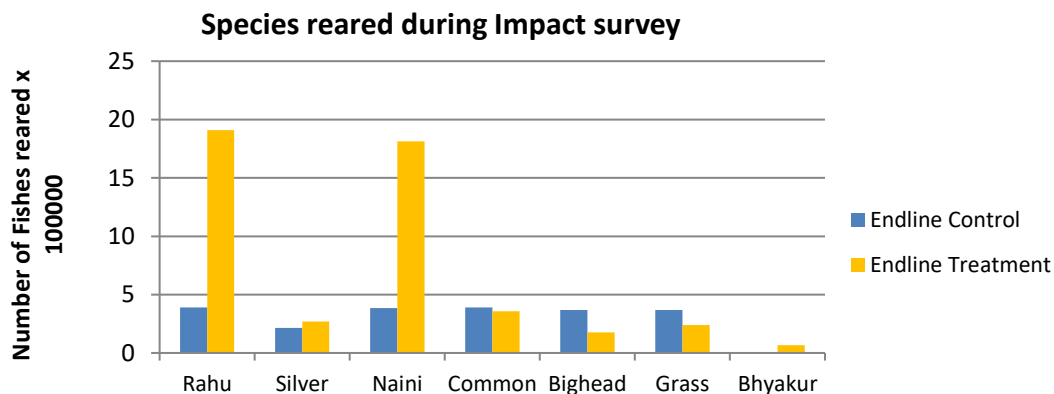


Figure 3 Species of fish reared in treatment and control group

Changes were observed in the individual species as well as total number of fishes reared in the endline study. Positive changes were noted for four fish species reared in control group while for treatment positive changes were noted for 5 fish species. A huge positive increase was seen in Naini species in the Treatment group followed by Bhyakur. In control group no such massive changes in species of fish reared was observed during the study period.

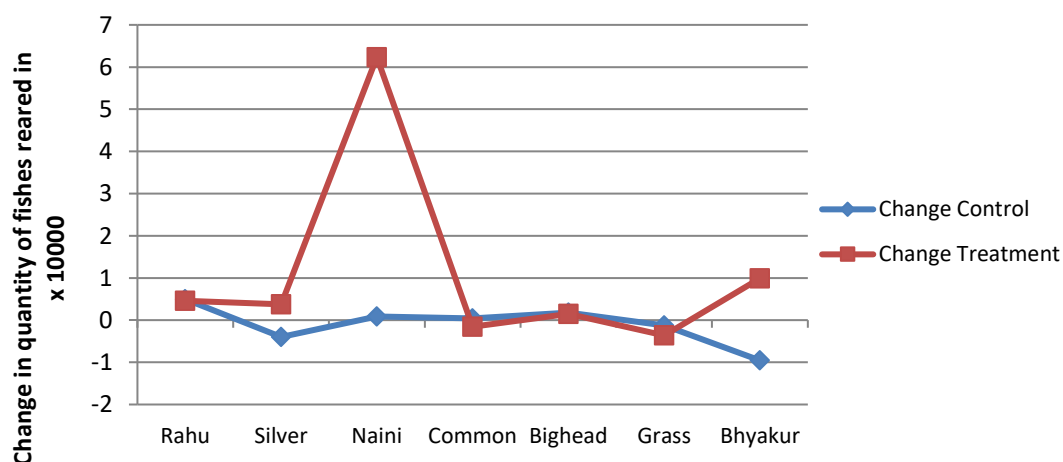


Figure 4 Changes in Species of fish reared

**Note: The data in Figures are expressed in cumulative figures and not per HH*

4.2 Average pond holding size

Popularity of Fish farming is rising among farmers as the major source of income. A total of 368 Ponds were surveyed in two different districts; among them 199 Ponds belonged to treatment house hold and 169 Ponds to control group. Treatment farmers were found to be practicing fish farming for 10.4 years while it was a year less for control farmers. Average pond holdings in treatment farmers were 2.3 Ponds per HH while it is 2.2 ponds per HH in control farmers. The highest number of pond among the treatment was observed as 9 while that in control was 8 as shown in Table 6.

In treatment group the average size pond holding used for Table fish production per HH was observed as 0.38 ha (11.4 Katha) while that in control group it was found 0.33 ha (9.9 Katha) in the endline study. The pond area of both clusters slightly increased with the increase in treatment being a little higher in case of treatment than that of control. The study depicts that the pond volume per HH of control group was 6044.72 m³ while that in treatment was 7298.59 m³ which is both a little higher than what was observed the baseline study. An average of 317 m.sq pond area was under nursery for Treatment while it was 265 m. sq. The pond area under nursery has reduced for both the clusters in the study period. The treatment group was observed to be superior to control in terms of average pond volume as well as area.

Table 6 Fish farming years and no. of ponds used in Endline Study

Parameters per HH in Endline Study	Treatment		Control	
	No. for Fish Farming Years	No. of Ponds used in Fish Farming	No. for Fish Farming Years	No. of Ponds used in Fish Farming
Average	10.4	2.3	9.4	2.2
Minimum	2	1	1	1
Maximum	33	9	42	8

Table 7 Average pond characteristics per HH in Baseline and Endline study

Phase	Cluster	Average Volume of Fish ponds owned per HH	Average Pond area per HH excluding Nursery		Average Nursery Area
		Cubic meters	Square meters	Has(Ha)	Square meters
Baseline	Treatment	7255.56	3685.16	0.37	469.36
	Control	6040.89	3293.13	0.33	279.01
Endline	Treatment	7298.59	3845.53	0.38	317.39
	Control	6044.72	3310.26	0.33	265.49

4.3 Fingerlings purchased per HH

Treatment farmers purchased almost more than a double the number of fingerlings per HH than that of control farmers in both the study phases. For control farmers the highest fingerlings purchase were recorded for Common carp, Rahu and Naini species while for treatment, it was Rahu, Naini and Silver carp. Bhyakur fingerlings were the least purchased fish species for both clusters in both phases. The number of fingerlings purchase reduced for three fish species Sliver carp, Grass carp and Bhyakur in control group. In case of Treatment, decrease was noted for two species Common carp and Grass carp. The total change in fingerlings purchase per HH was positive for treatment while it was negative for control.

Table 8 Number of fingerlings purchased per HH

Species of Fingerlings per HH	Baseline		Endline		Change	
	Control	Treatment	Control	Treatment	Control	Treatment
Rahu	5064	24090	5129	24148	65	58
Silver carp	2889	3379	2836	3427	-53	47
Naini	5063	22167	5073	22956	11	789
Common carp	5118	4549	5123	4529	5	-19
Bighead carp	4833	2218	4857	2236	24	18
Grass carp	4878	3073	4861	3027	-17	-46
Bhyakur	208	711	82	836	-126	125
Total Fingerlings per HH	28051	60186	27961	61159	-90	973

*Note: The fingerlings are inclusive of nursery fingerlings

4.4 Major Fingerlings supplier in the area

Farmers purchase fingerlings from various places based on the number if fingerlings required and the quality of fingerlings available. Shortage of fingerlings in peak period is likely to occur so farmers visit many hatcheries or nurseries to get their required amount. The source of fingerlings for treatment farmers were sixteen different hatcheries and nurseries among which 23 % farmers purchased from Punya hatchery and 16% farmers from Rameshwor Mandal hatchery. Top five nurseries and hatcheries on the basis of farmer's relevancy for fingerlings purchase.

Table 9 Five major Hatcheries supplying fingerlings farmers

	Baseline					Endline		
	Rank	Source of Fingerlings	No. of Farmers	% Farmers		Rank	Source of Fingerlings	% Farmers
Treatment	1	Punya Nursery	15	19%	1	Punya Nursery	18	23%
	2	Rameshower Mandal	13	16%	2	Rameshower Mandal	13	16%
	3	Rabindra Sahaani Hatchery	7	9%	3	Rabindra Sahaani Hatchery	8	10%
	4	Patel Fish farming Hatchery	6	8%	4	Patel Fish farming Hatchery	6	8%
	5	Shanti Bhatta Hatchery	6	8%	5	Shanti Bhatta Hatchery	5	6%
Control	1	Gaurab Nursery	18	24%	1	Gaurab Nursery	17	22%
	2	Bhairab Sarkari	10	13%	2	Bhairab Sarkari	9	12%
	3	Patel Fish farming Hatchery	8	11%	3	Patel Fish farming Hatchery	8	11%
	4	Bhairaba Fish production center	6	8%	4	Bhairaba Fish production center	6	8%
	5	Rabindra Sahaani Hatchery	4	5%	5	Rabindra Sahaani Hatchery	4	5%
						Punya Nursery	4	5%

In case of control farmers, it has been observed around 22% were purchasing fingerlings from Gaurav Nursery . They purchased fingerlings from twenty two different hatcheries and nurseries based on their requirement and quantity available. The dependency of farmers on Punya nursery was found to be increasing during the endline survey for both clusters.

4.5 Ease of access to fingerlings in Treatment

It is hard to get the required number and quality of fingerlings during the peak period as they will be high demand and there are few number of suppliers. However, during baseline study 90.5% of farmers form treatment group felt that they had easy access to the fingerlings. During the endline study, there was a positive increase in this figure and reached 91.5%. In case of control farmers, 86% farmers felt that they had easy access to quality fingerlings in the baseline study whereas in the endline study the change was negative where only 84% felt that they were having easy access to quality fingerlings which was 2% less than that of last year.

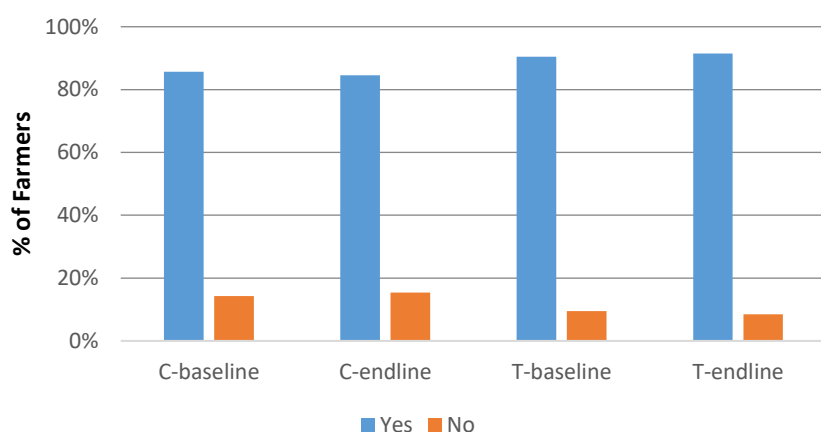


Figure 5 Ease of access to quality fingerlings among the farmers

4.6 Mortality of fish species

Mortality is one of the key factors which affect production of table fish leading to economic losses for farmers. The death of fingerling within the first month of rearing is generally considered as the mortality. Decrease in fish mortality is an indicator of good management practice and increase in economic benefits of the farmers. This achievement can be attributed to farmer's inclination towards quality seed, quality feed as well as the practices of better pond management.

4.6.1 HH mortality of Table Fish Production

Table 10 HH mortality Rate of Table fish

Average HH Mortality % of Table Fish	Baseline		Endline	
	Treatment	Control	Treatment	Control
	13.29 %	11.07 %	12.17 %	9.97 %
Average reduction in mortality	Treatment	Control	DID	
	-5.90 %	-5.76 %	-0.14 %	

The average fish mortality of treatment HH was seen higher than control in both phases although mortality rate has reduced in both HHs over the past year. In each cluster, 34 farmers reported reduction in

mortality of fish. The average reduction in Mortality was higher in treatment group than that in control with about 0.14 % more improvement in terms of mortality reduction.

4.6.2 Species Mortality

Treatment: Notable changes in mortality rate were recorded in treatment farmers depending on fish species. The baseline figures show that the mortality of Common carp was highest (35%) followed by Grass carp and Silver carp. Lowest mortality was recorded for Naini species. Mortality of 2 species with the highest mortality: Common and Grass carp reduced in the endline survey. No changes in mortality was observed for Rahu and Bighead species while for remaining species slight increases were observed. The reduction in mortality rate was highest for Common carp followed by Grass carp species. The average reduction in mortality based on species in treatment was 6 %.

Control: Highest mortality was recorded for Silver carp. The mortality rate reduced for all seven species of fish in control group with highest decrease in mortality in Bhyakur species. The average reduction in mortality based on species in control was observed to be 3.1 %.

Table 11 Total Mortality according to different species

Species\Mortality %	Baseline		Endline		Change	
	Control	Treatment	Control	Treatment	Control	Treatment
Rahu	27.1%	6.2%	25.5%	6.2%	-1.6%	0.0%
Silver	47.5%	28.4%	46.3%	29.5%	-1.2%	1.1%
Naini	27.0%	4.0%	25.4%	5.5%	-1.6%	1.5%
Common	27.1%	35.2%	25.4%	25.1%	-1.7%	-10.2%
Bighead	27.0%	26.4%	26.2%	26.5%	-0.8%	0.1%
Grass	27.4%	29.9%	26.3%	22.2%	-1.2%	-7.7%
Bhyakur	27.5%	23.3%	13.9%	25.5%	-13.5%	2.2%

*Note: The mortality figures above includes nursery fishes as well

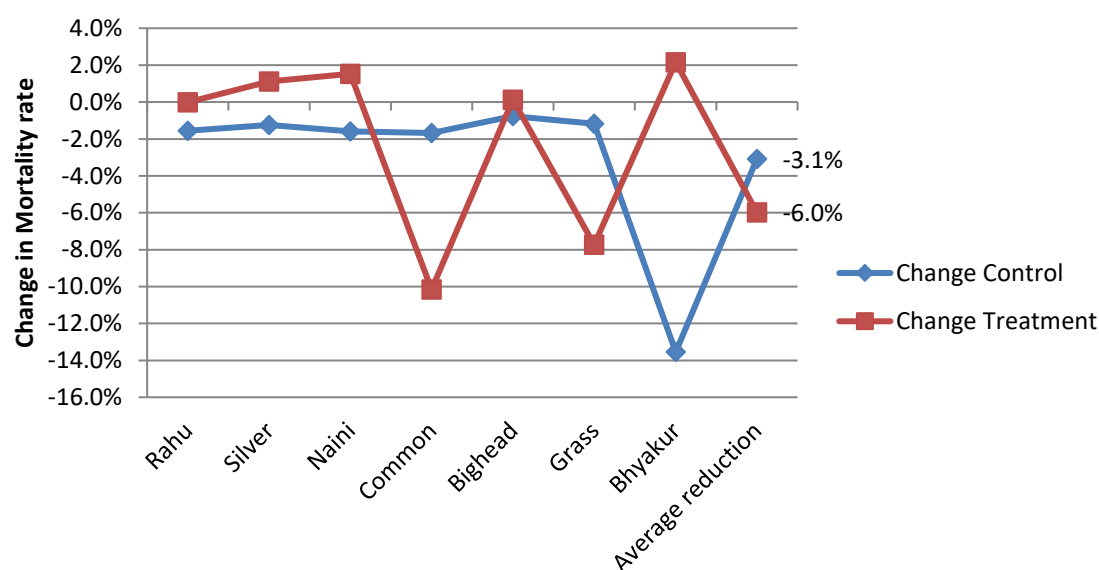


Figure 6 Change in Mortality of fishes based on species during baseline and endline

4.7 Pond Management practices among the farmers

4.7.1 Provision of Water Outlet in the Pond

No significant changes were observed in both control and treatment groups in relation to the pond's access to drainage facility. Although, a negligible increase of drainage system was seen in the Control group, for the Treatment group it remained the same in both baseline and endline study.

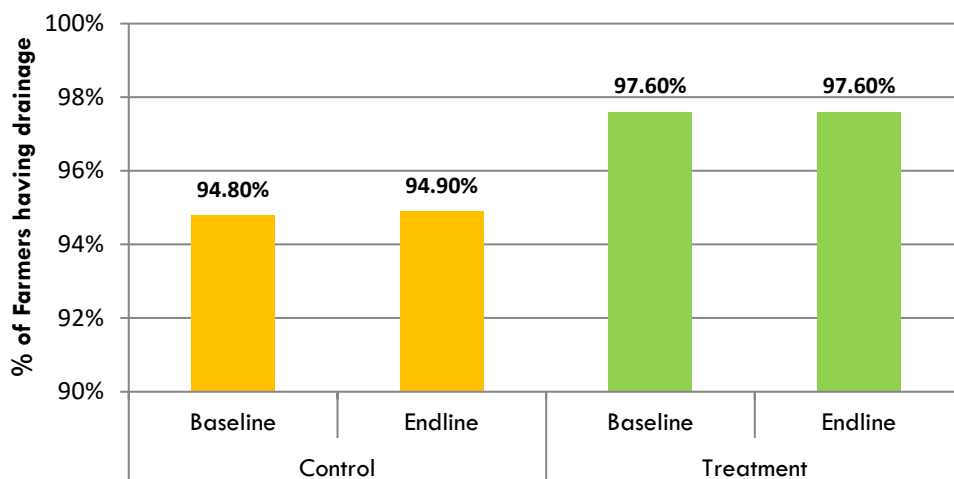


Figure 7 Drainage prevalence among the farmers

4.7.2 Use of Fertilizer in the Pond

The baseline study shows that the use of fertilizer types is same among the control and treatment groups with around 58% using manure over chemical fertilizers. During, the endline study it is seen that the chemical fertilizer use increased insignificantly for both control and treatment groups although the rate of increase was slightly higher for control as compared to the treatment.

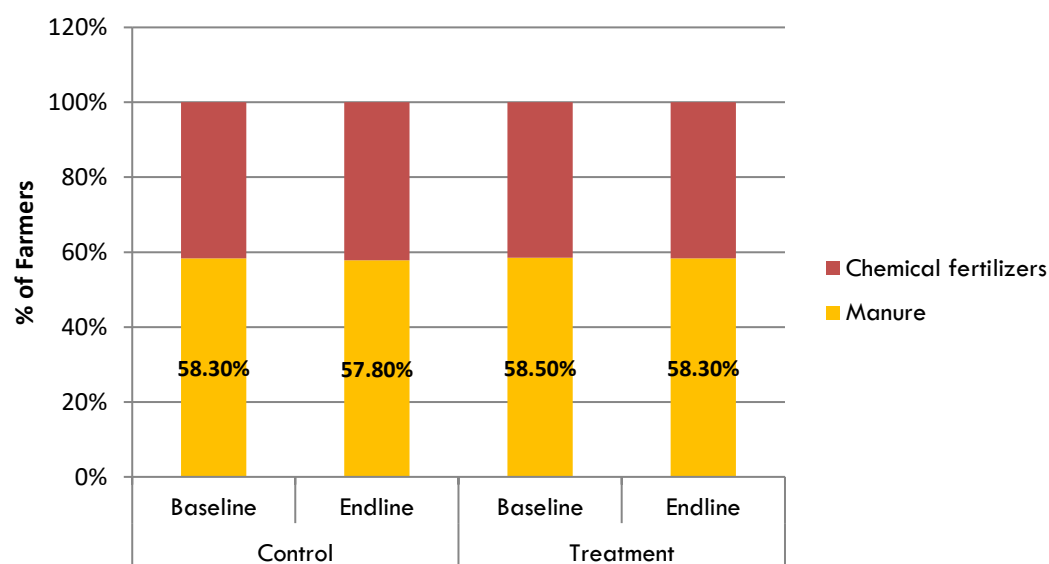


Figure 8 Application of fertilizers among the farmers

4.7.3 Use of External equipment in the Pond

Aerator is the only external device commonly used in the ponds. Less than 16 % farmers in the study have aerators installed in their ponds. The baseline study shows that higher number of Treatment farmers (15.5 %) has aerators than the control farmers (9.1 %). The use of aerators decreased during the study period for both control and treatment group. This drop in use of aerators was slightly less for the treatment group (0.9 %) as compared to the control group (1.4 %).

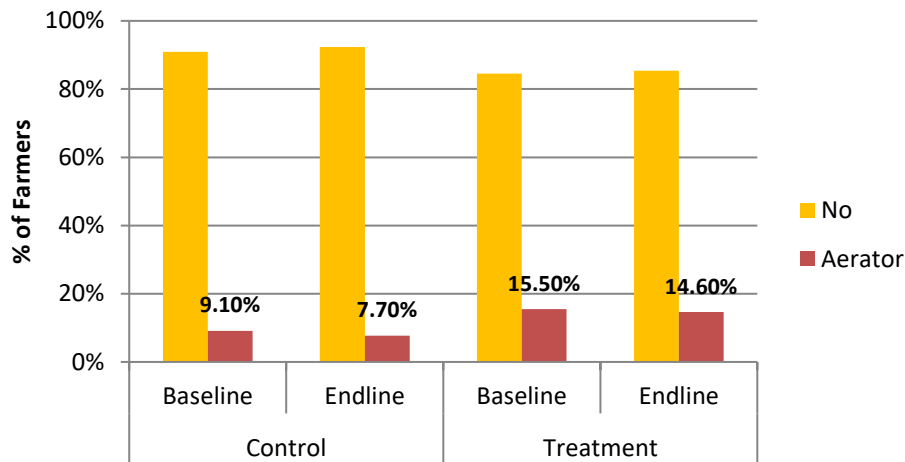


Figure 9 Use of external devices among the farmers

4.7.4 Use of Pesticide

It was observed that Treatment group used slightly higher amount of aqua chemicals than the control group during the baseline study. The endline study shows that the used of aqua chemicals increased during the period of study for both control and treatment group although both in insignificant rates.

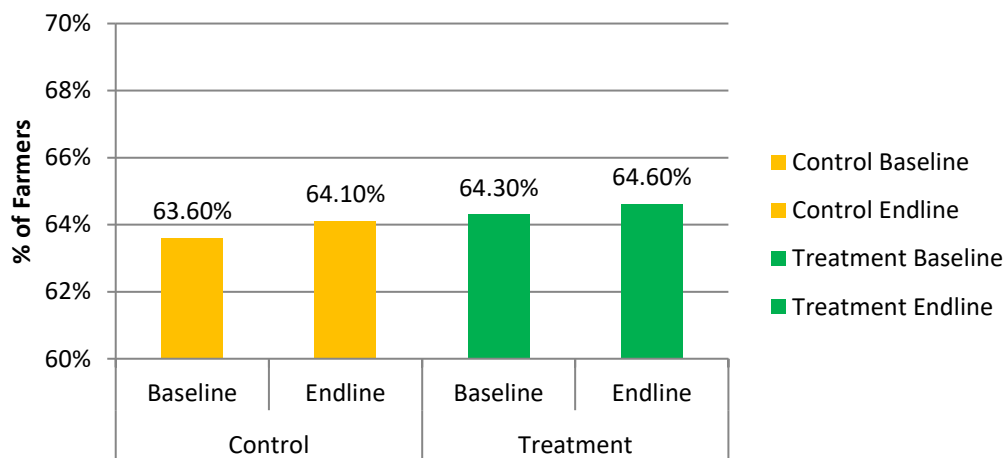


Figure 10 Use of aqua chemicals among the farmers

4.7.5 Frequency of Pond Cleaning

More than 70 % of all fish farmers clean the pond once a year followed by Monthly, fortnightly, 2/3 months and weekly. There is seen a slight increase in number of farmers from both control and treatment following the yearly cleaning of ponds during the endline survey although these changes were in inconsiderable figures.

Cleaning Trend of Ponds

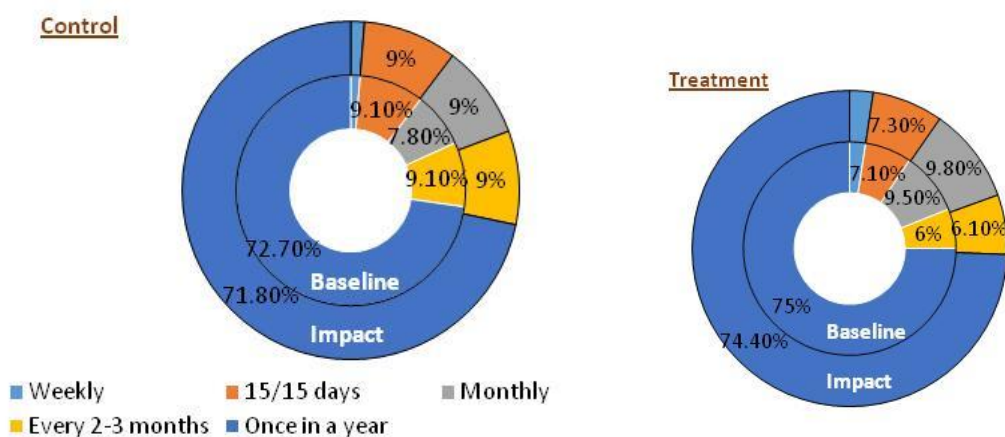


Figure 11 Ratio of Cleaning of ponds by the farmers

4.7.6 Transport of Fingerlings

The baseline as well as endline survey shows that all the farmers used plastic bags for the transportation of fingerlings i.e. no change was observed in the use of plastic bags during the study period.

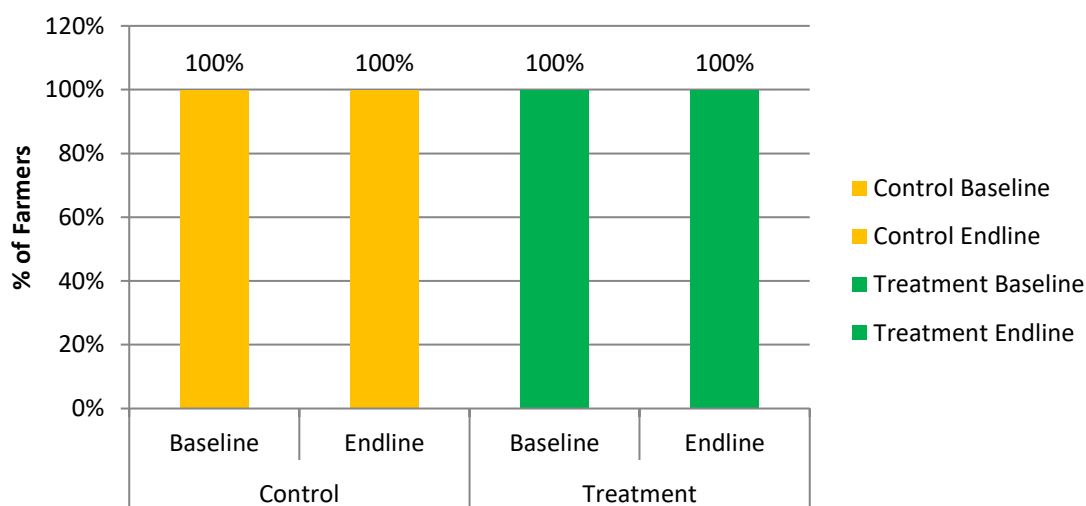


Figure 12 Use of plastic bags for the transportation of fingerlings

4.7.7 Time of day for Fingerlings transportation

Majority of fish farmers (more than 75 %) transport their fingerlings during Morning time. This is because morning temperature is low which reduces the risk of mortality during transportation. Very few farmers transport the fingerlings during evening and day time. More number of control farmers transported fingerlings during morning in comparison to treatment farmers in the baseline study. Minimalistic changes were observed in control and treatment group in the transportation time practices in the endline study with respect to the baseline figures.

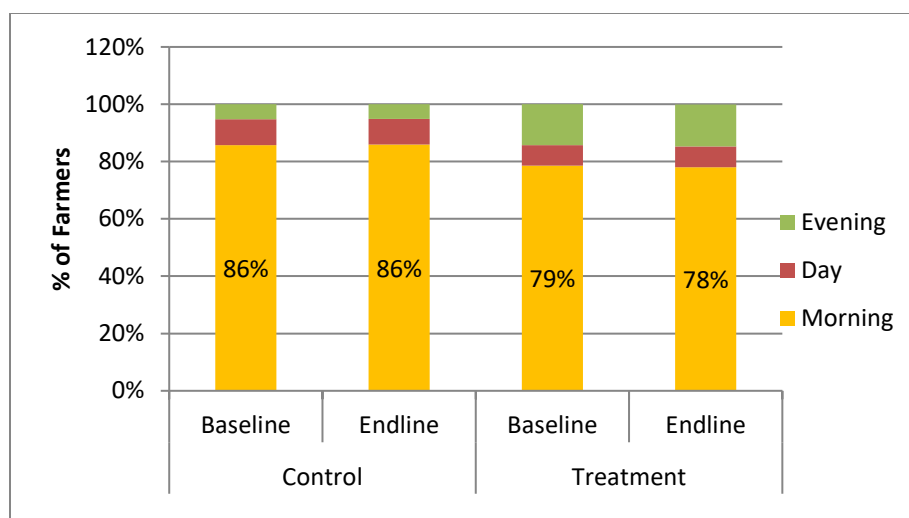


Figure 13 Time of transportation of fingerlings by the farmers

4.7.8 Time Gap (Hrs) between fingerlings procurement and release in Pond

Higher number of Treatment farmers (more than 75 %) maintained a gap of 0-20 minutes between procurement and release of fingerlings while the number of farmers practicing this was very low in case of control group. About half of control farmers practiced procurement and release at the time gap of 20-60 mins while a quarter of them followed the practice at the gap of more than 1 Hr.

Table 12 Gap between procurement and release of fingerlings in the pond

Time gap	Control %		Treatment %	
	Baseline	Endline	Baseline	Endline
0-20 min	18.3	18.2	76.2	75.5
20- 60 min	56.6	57.2	21.5	21.9
More than 1 hr	25	24.7	2.4	2.4

4.7.9 Time of day for releasing fingerlings to Pond

All Farmers usually let fingerlings in the pond during Morning hours followed by day and evening. The practice of letting fingerlings into pond during morning was found somewhat more in control group than in treatment group. Marginal differences in the practice were found during the baseline and endline study.

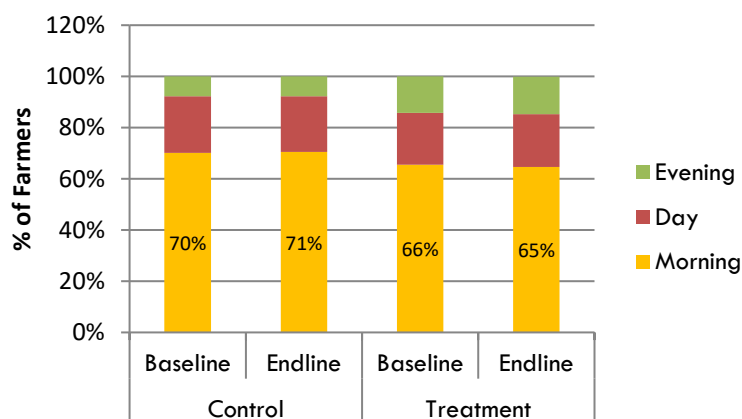


Figure 14. Time of letting fingerlings among the farmers

4.8 Fish Feed supplement use and types

Feed supplement plays an important role in the growth and development of fingerlings and eventually the production of table fish. Quality supplement of feed also helps to reduce the fish mortality.

Use of traditional as well as commercial feed supplement was prevalent among fish farmers in baseline and endline study. As high as 80 % of farmers were using traditional feed for fish farming while around 20 % used commercial feed. No noticeable changes were observed in the trend of feed use during the one year study duration. Among the commercial feed, Floating feed was the most popular feed type, followed by non-floating pellet in both study phases. Mesh feed was the least popular feed used only by few control fish farmers. Some changes were seen in treatment cluster as the inclination of farmers towards modern commercial feed has increased. The use of traditional feed slightly decreased and that of floating pellet increased during the endline study in the treatment cluster. For control on the other hand, traditional feed use marginally increased and likewise floating pellet negligibly decreased in the endline study.

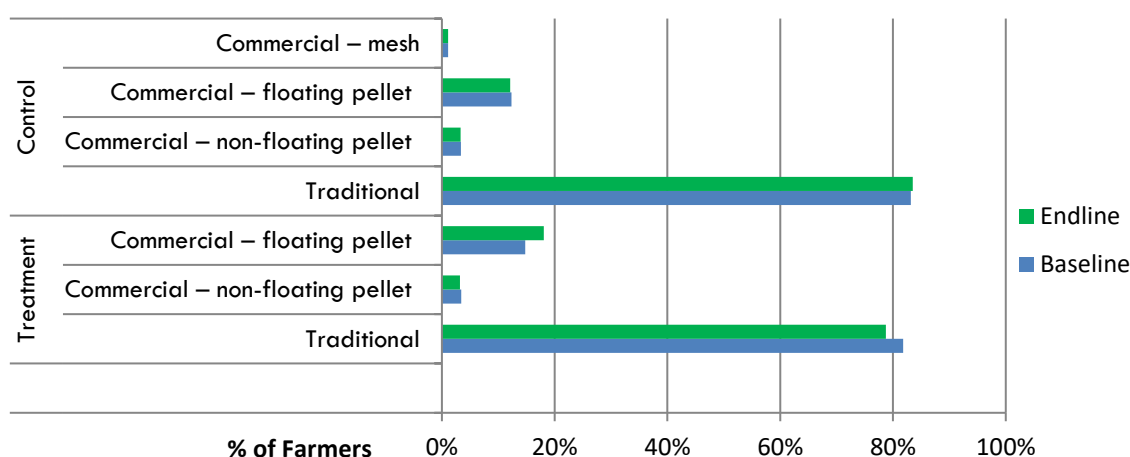


Figure 15 Types of feed supplement used by the farmers

4.8.1 Commercial feed

A variety of feed supplement are available in market specialized for commercial fish rearing. It a well known fact that feed supplement plays a major role in growth & development of fingerlings and reduction in fish mortality. Floating, non-floating and mesh feed were the common commercial feeds used for fish farming in the study domain.

Treatment: The commercial feed use among Treatment farmers reflects that Floating fish feed was the most used commercial feed accounting for a huge portion in terms of feed volume. Its popularity was seen rising in treatment farmers in the endline study. Among the floating pellet, C4 was the most popular feed. Use Buddha dana floating as an alternative feed was seen to be growing during the study phase. The second most popular commercial feed was non floating pellet.

Control: Floating pellet was the most used commercial feed in control group. For, control cluster, Budhha dana floating was the most popular floating feed followed by C4 feed. Non-floating and Mesh were other feeds accounting for a small portion of commercial feed. During endline study, the feed volume for all types of feed increased by a small margin.

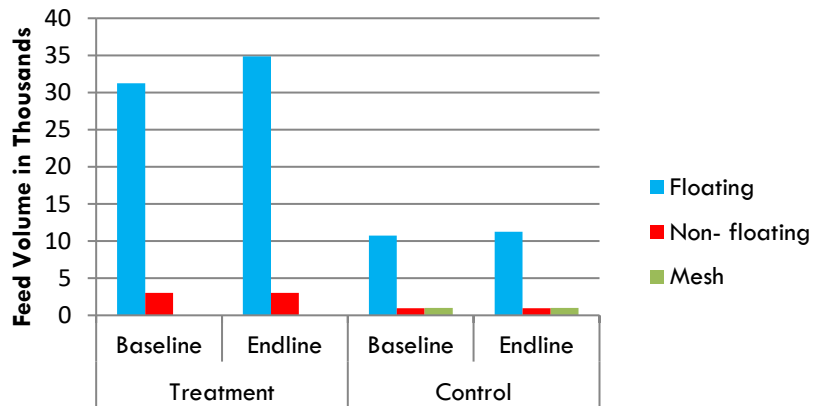


Figure 16 Volume of Commercial feed use(%) in two clusters during the period of study

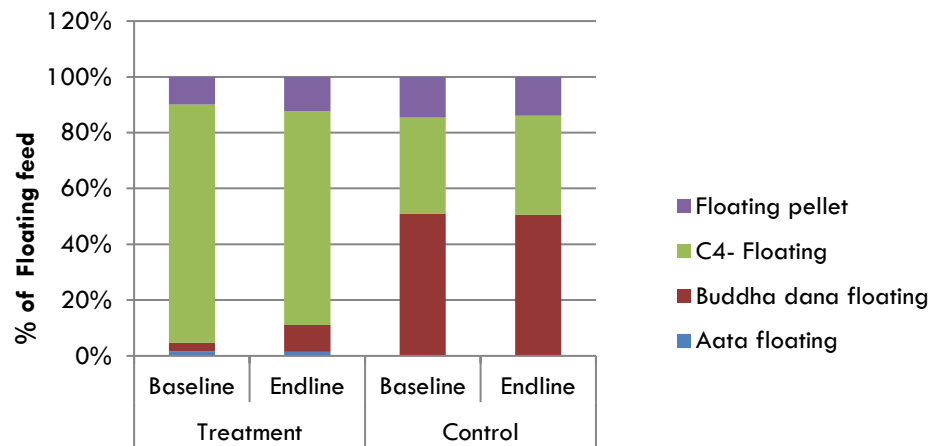


Figure 17 Different types of Floating feed used by farmers in terms of feed volume

4.8.1.1 Source of buying Commercial Feed

Treatment farmers purchased their inputs from three different places via Nursery/ hatchery, agro vets and directly from the feed manufacturers. It was found that Feed Manufacturer was the major supplier of commercial fish feed for both the clusters. Other sources of commercial feed were Nursery/hatchery followed by Agrovet. No variation was observed from baseline to endline study in regards to source of commercial fish feed.

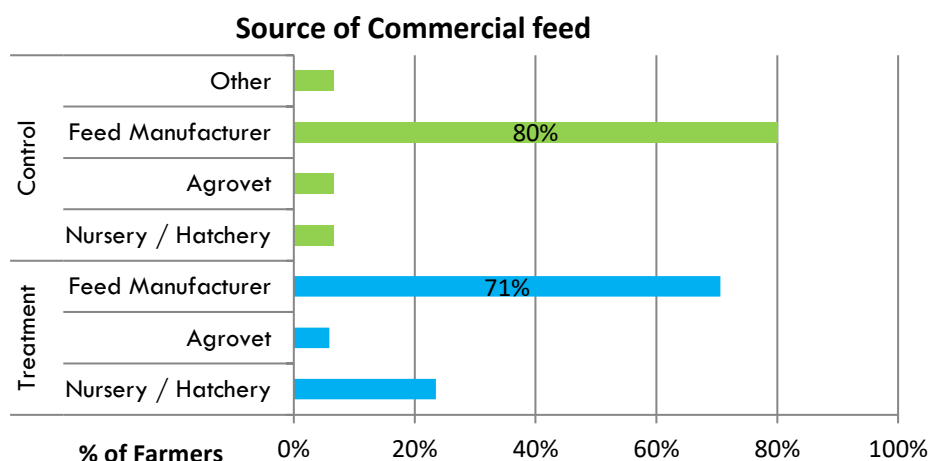


Figure 18 Sources for purchase of feed supplement

4.8.1.2 Variance of Source of commercial feed suppliers as seen in Endline study

Majority of Treatment (More than 50 %) farmers purchased feed from same supplier while majority of control farmers (more than 60 %) purchased commercial feed from different supplier.

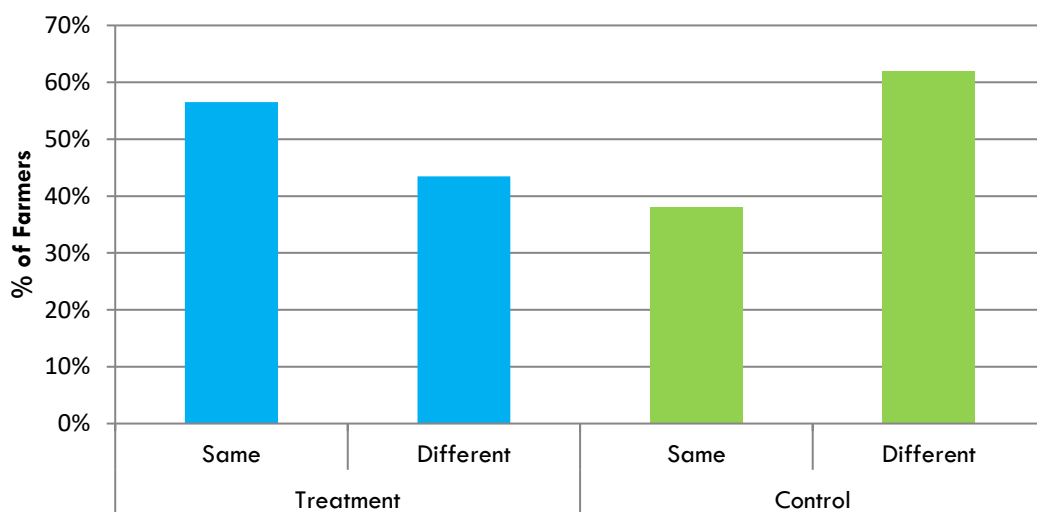


Figure 19 Place of purchase of feed supplement

4.8.2 Traditional feed

Traditional feed is an equally importance feed source for fish farmers which generally include agricultural and industrial byproducts that are easily available and cost effective. According to the survey, use of Rice Bran, mustard cake/sunflower cake, farm yard manures, chicken waste and chowchow waste and maize flour were found as traditional feed. Use of Maize as new fish feed was observed in endline survey for both treatment and control farmers.

Table 13 : Volume Traditional feed use per HH in two clusters during the period of study

Traditional Feed in Kg	Treatment		Control	
	Baseline	Endline	Baseline	Endline
Chapad	80	80		
Chokar	300	300		
Fertilizer	1850	1850	2880	2880
Fish bone	150	100		
Flour	5870	6870	8250	8150
Grass	100	100	2000	2000
Manure	1350	4200	400	400
Mustard cake	28815	31045	35705	38045
Rice bran	51815	55280	46510	54314
Sunflower mills/ bran	2300	1300	5500	4500
Maize		8700		4700
Chicken intestine			100	100
Chowchow Waste			3500	3500
Total	92630	109825	104845	118589

Treatment: Mustard cake was the most popular source of traditional feed during the baseline as well as in endline study used by just over one-third of treatment farmers. Rice Bran was the second most used traditional feed for about 30 % of treatment farmers. Manure, kitchen waste and other also contributed to the traditional fish feed. Little difference was observed in feed use trend among farmers during the study period. In terms of traditional feed volume, Rice bran was the highest used source followed by mustard cake. The other commonly used traditional feed was flour which is seen rising in recent endline study. Some use Manure and fertilizers as feed supplement while very few use Chapad, Choker mad Fishbone.

Control: In the control farmers, the trend of traditional feed supplement is similar as that of treatment farmers with Rice bran and Mustard cake being the most popular traditional feed among farmers. The volume of all types of traditional feed is observed to be higher for control farmers than that of control except for rice bran. Other minor traditional feeds used by control farmers were Maize, Chicken intestine and chowchow waste.

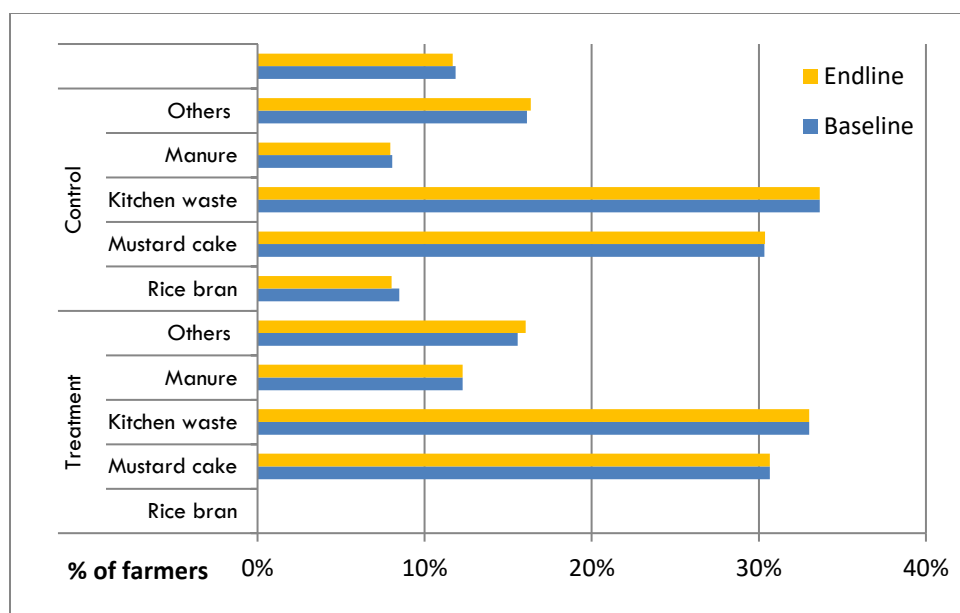


Figure 20 Traditional feed use in two clusters in terms of % of farmers

4.9 Frequency of feeding fish

Fingerlings should be fed properly and timely as they play an important role in the growth and development and mortality of fingerlings. Common feeding frequency of feeding fingerlings is once a day, twice a day, thrice a day and once in two days. During the baseline, it was found that none of the farmers fed once in two days whereas most of the farmers fed once a day which remained constant during the endline assessment as well. Higher % of control farmers(81 %) fed their fish once a day against treatment farmers (75 %).

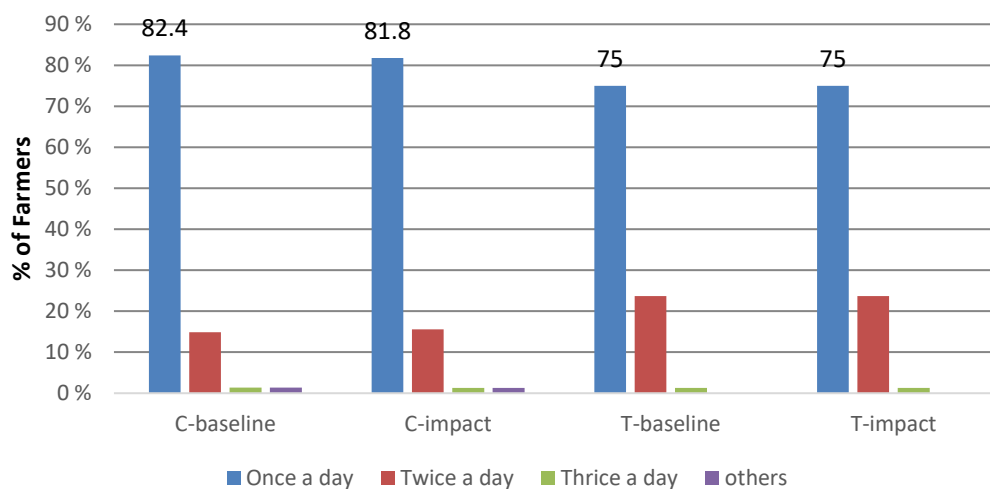


Figure 21 Frequency of feeding fish

CHAPTER 5: KNOWLEDGE MANAGEMENT PRACTICES

5.1 Sources of information for farmers

Fish rearing is a complicated process involving various activities where individual knowledge is not often enough. Interaction with other persons/organizations involved in the sector is crucial for knowledge and skill development. It was found that six sources were actively involved in information dissemination with negligible differences between baseline and endline study. During the baseline, it was found that three best sources of information for treatment farmers were Other fish farmers, Relatives/neighbors/ friends and Government agriculture workers while Media was the least used source of information. The top three sources remained the same while the least used source was agro-vet in the control group.

Table 14 Sources of information for Farmers with priority ranking

RANK	Treatment Sources of Information	Baseline	Endline	RANK	Control Sources of Information	Baseline	Endline
1	Others fish farmer	31.5%	32.0%	1	Relatives / Neighbours / Friends	33.5%	33.1%
2	Relatives / Neighbours / Friends	27.3%	26.6%	2	Others fish farmer	32.9%	33.1%
3	Government agriculture workers	15.2%	14.8%	3	Government agriculture workers	12.3%	12.7%
4	Nursery / Hatchery operators	13.3%	13.0%	4	Nursery / Hatchery operators	12.3%	12.1%
5	Non-government agriculture workers	6.7%	7.1%	5	Non-government agriculture workers	5.8%	5.7%
6	Others	5.5%	5.3%	6	Others	2.6%	2.5%
7	Media – radio / television/newspaper	.6%	1.2%	7	Agro Vets	.6%	.6%

5.2 Source of extension services among farmers

Farmers need various kind of information on different topics which directly or indirectly affect the livelihood. Lack of proper information often lead to huge economic losses. It is common for farmers to visit various extension service providers in order to solve their queries. During baseline it was found that Neighbors, friends and relatives were major source of information for around 28% of farmers followed closely by other fish farmers. Government agriculture workers and Nursery/hatchery operators were others sources where farmers visited to receive consultation regarding fish farming. Same scenario was observed during endline assessment as well. Although, there have been some % change in the dependency of the extension service providers but the rank has remained same in both cases.

Table 15 Ranking of extension service providers

Rank	Treatment - Whom do you Consult in case of problems?	Baseline	Endline	Rank	Control- Whom do you Consult in case of problems?	Baseline	Endline
1	Relatives / Neighbours / Friends	28.0%	27.8%	1	Relatives / Neighbours / Friends	28.8%	28.8%
2	Others fish farmer	26.2%	26.0%	2	Others fish farmer	25.9%	26.5%
3	Government agriculture workers	18.9%	18.9%	3	Nursery / Hatchery operators	18.8%	18.8%
4	Nursery / Hatchery operators	17.7%	17.8%	4	Government agriculture workers	13.5%	13.5%
5	Non-government agriculture workers	4.3%	4.7%	5	Non-government agriculture workers	5.3%	5.3%
6	Do not consult.	3.0%	3.0%	6	Do not consult.	4.7%	4.1%
7	Agro Vets	1.2%	1.2%	7	Agro Vets	1.8%	1.8%
8	Others	.6%	.6%	8	Others	1.2%	1.2%

5.2.1 Frequency of visit to Extension service center

Farmers visit extension services as per their requirement. Sometimes, they have to visit many times while in some cases a single visit could be enough. During the baseline study, it was found that most of the farmers have visited the extension services for one to three times while similar trend has been observed in the endline assessment. This trend remained same for both treatment and control clusters.

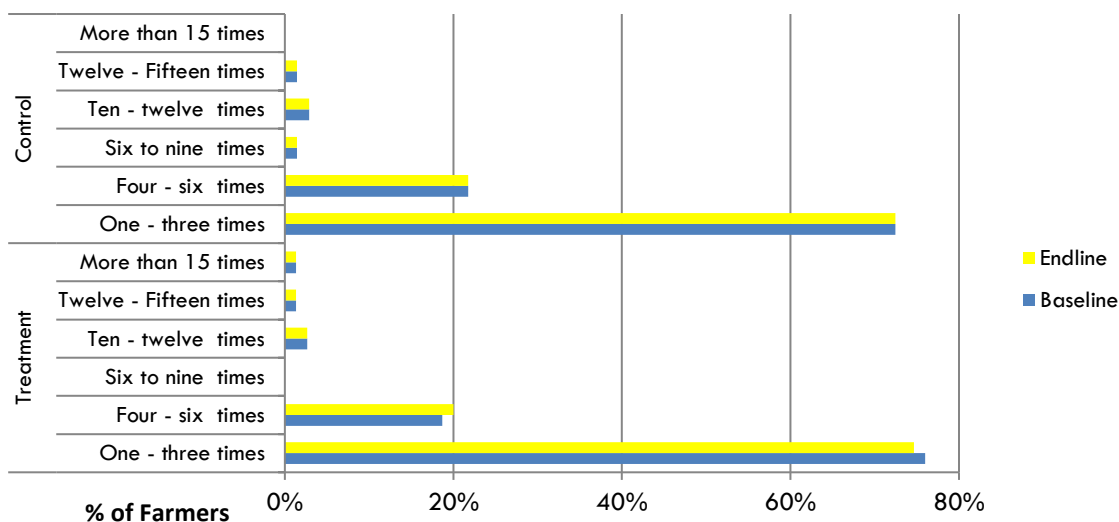


Figure 22 Frequency of accessing the extension services farmers

5.2.2 Reasons for accessing the extension services

Farmers seek services from various extension service centers for information regarding pond management and other issues which may arise during the growing period. For both groups, issues like Fish farming, Fish seed/fingerlings and fish feed were the top most ranked topics of consultation. During the endline study also same kind of preferences were observed, although there have been some changes in the reasons of visit but the ranking for the reason of visit has remained same.

Table 16: Ranking on the basis of reasons for accessing extension services

Rank	Treatment Reason for Consultation	Baseline	Endline	Rank	Control Reason for Consultation	Baseline	Endline
1	To know more about fish farming	23.5%	23.9%	1	To know more about fish farming	26.2%	25.8%
2	To know about fish seeds	21.9%	21.3%	2	To know about fish seeds	23.5%	23.2%
3	To know about fish feeds	18.2%	18.1%	3	To know about fish feeds	15.3%	15.8%
4	To solve issues of fish disease	13.4%	13.3%	4	To know about pond management	12.6%	12.6%
5	To increase productivity	12.8%	13.3%	5	To solve issues of fish disease	11.5%	11.6%
6	To know about pond management	9.1%	9.0%	6	To increase productivity	9.8%	10.0%
7	Others	1.1%	1.1%	7	Others	1.1%	1.1%

5.3 Training on fish farming

During baseline, it was observed that 53 % of treatment farmers and 43 % of control farmers received training regarding fish farming. There was a slight improvement in farmers participation in training events

in the endline study for both clusters. It was found that farmers were engaged in various types of trainings as mentioned in Table below. Highest Farmer's participation was observed in training related to fish farming and production while participation of farmers on mortality related trainings were observed to be the lest.

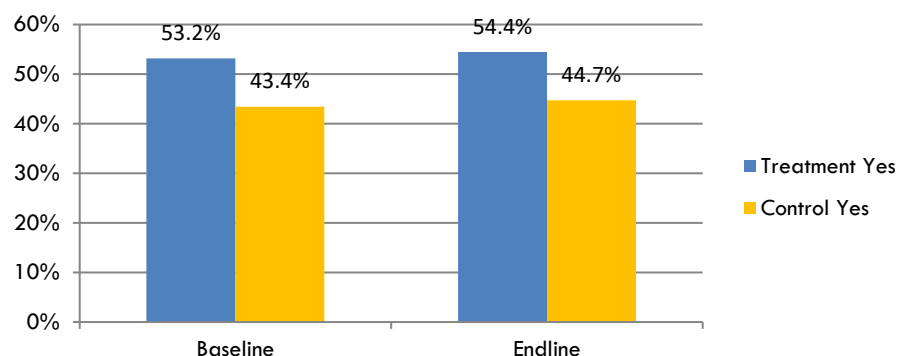


Figure 23 % of farmers receiving Training

Table 17 : Farmer's participation in different types of Trainings in descending order

Endline		Baseline	
Theme of Training	% of farmer participated	Theme of Training	% of farmer participated
No training	42.7	No training	47.6
About Fish farming and production	40.2	About Fish farming and production	40.5
About Nursery management	3.7	About Nursery management	3.6
About fish	2.4	Fishery with dana	2.4
Fishery with dana	2.4	Fish and Pig Farming	1.2
About Production	1.2	Fish mortality related	1.2
Fish and Pig Farming	1.2	Krishak Stariye Sthalgat Ghumti Matsyapalan	1.2
Fish feeding	1.2	Mastae Blkash training	1.2
Fish mortality related	1.2	VDC level Fish Farming	1.2
Krishak Stariye Sthalgat Ghumti Matsyapalan	1.2		
Mastae Blkash training	1.2		
VDC level Fish Farming	1.2		

5.3.1 Source of training

Among the various training that were provided in the area of treatment farmers, it was observed that around 60% trainings were organized and conducted by government agencies which in endline was found increasing INGOs/ NGOs were the second source of fishery training in the area with significant presence. The ranking of the training providers remained same during the study period.

Table 18 : Source of different types of Trainings

Cluster	Rank	Source of Training	Baseline	Endline
Treatment	1	Government agency	64%	67%
	2	I/NGOs	28%	25%
	3	Feed manufacturers	2%	2%
		Nursery/Hatchery	2%	2%
		Private Firm	2%	2%
		Others	2%	2%
Control	1	Government agency	58%	62%
	2	I/NGOs	19%	18%
	3	Private firms	14%	13%
	4	Nursery/Hatchery	6%	5%
	5	Feed manufacturers	3%	3%

CHAPTER 6: PERCEPTION ANALYSIS

6.1 Change in fish yield

It was observed that most farmers in both treatment and control group have similar feeling towards the change in yield. Almost 60 % farmers felt that the yield was in increasing trend while almost half of that (around 30 %) felt that it had remained the same. During the baseline and endline assessment the similar results have been observed towards the change in yield. There has not been addressable change in number of farmers expressing their perception towards change in yield in control. In treatment, it was found that about 59% farmer expressed increase in yield in baseline while during endline same feeling was expressed by 61% of farmers.

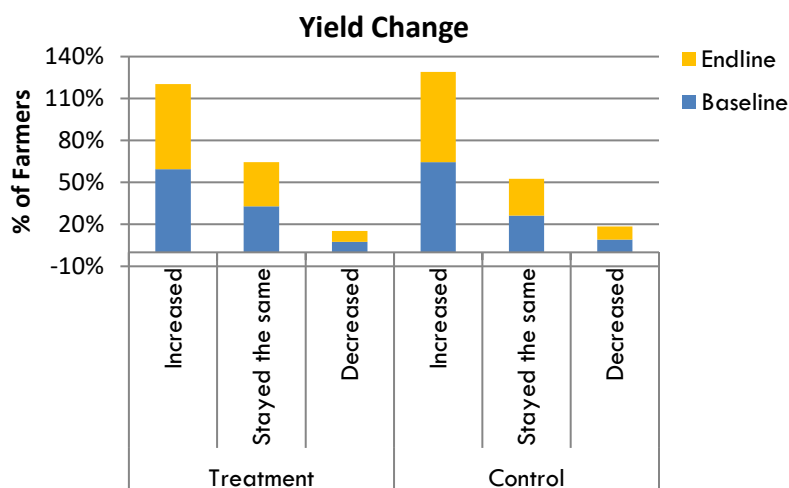


Figure 24 Farmers perception towards the change in fish yield

6.1.1 Reasons for change in yield

The study illustrates four major reasons behind the change in yield: availability of quality feed supplements, quality fingerlings, , water quality management and favorable weather or climate during rearing seasons. During the baseline, 31 % of control farmers believed feed as the major reason behind increase in yield whereas 27% felt the availability of quality fingerlings was the reason and same was seen during endline also. Whereas in treatment 29% farmers supported quality feed as the major reason behind increase in yield whereas 27% believed that fingerlings have major contribution towards the change in yield. Both perceptions were observed similar Baseline and Endline for both clusters.

Table 19 : Farmers perception towards the reason for change in fish yield

Cluster	Reasons for Change in Yield	Baseline	Endline
Treatment	Feed	29.2%	29.0%
	Fingerlings	26.9%	26.7%
	Water	22.2%	22.1%
	Climate/Weather	20.8%	21.2%
	Don't Know	.5%	.5%
	Others	.5%	.5%
Control	Feed	31.0%	31.0%
	Fingerlings	27.0%	27.0%
	Water	22.5%	22.5%
	Climate/Weather	17.5%	17.5%
	Don't Know	1.5%	1.5%
	Others	.5%	.5%

6.2 Change in mortality

Very few treatment farmers (around 20 %) felt that there was significant improvement in the mortality of fish although there a slight decrease has been observed in the mortality of fish compared to previous years. Around 50 % of farmers from both the clusters reported that fish mortality has stayed the same from the time of baseline study to endline assessment period. Although, reporting of positive changes in fish mortality i.e. decrease in mortality was higher than that of negative changes in both groups from baseline to endline study.

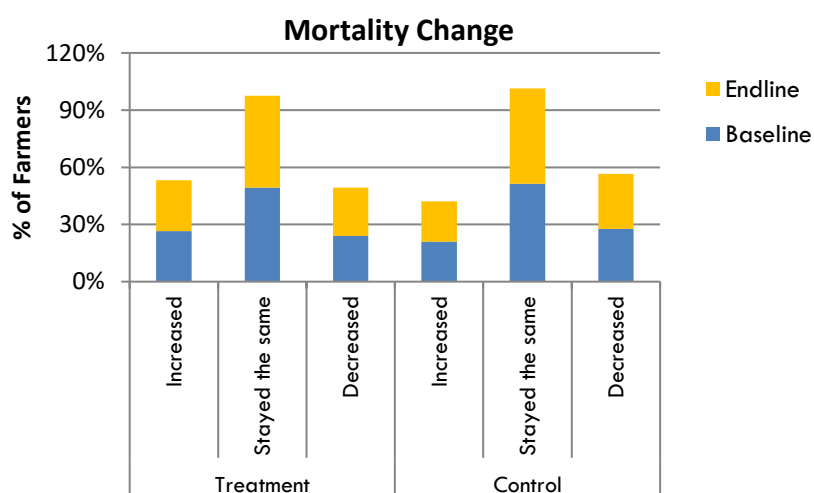


Figure 25 Perception of farmers to the mortality of fingerlings

6.2.1 Reasons for change in fish mortality

The study reveals four major reasons behind the change in fish mortality which is: availability of quality fingerlings, use of quality feed supplement, supply and change in water quality and prevalence and maintenance of suitable climate or weather during the fish rearing period. 28% Farmers from control group reported quality of feed was main reason for change in mortality while 27% of other control farmers felt that quality fingerlings was the major reason behind change in mortality. For treatment farmers, most of them believed quality fingerlings (25%) as major contributor towards change in mortality whereas they ranked the use of quality feed (24%) as the second most contributors to change in mortality and water as the third (23%).

Table 20 : Farmer's perceptions towards the reason for change in fish mortality

Cluster	Reasons for Change in Mortality	Baseline	Endline
Treatment	Fingerlings	24.6%	24.5%
	Feed	24.1%	24.0%
	Climate/Weather	23.6%	24.0%
	Water	22.6%	22.4%
	Others	3.6%	3.6%
	Don't Know	1.5%	1.5%
Control	Feed	28.3%	28.3%
	Fingerlings	26.6%	26.6%
	Water	19.6%	19.6%
	Climate/Weather	19.6%	19.6%
	Don't Know	3.3%	3.3%
	Others	2.7%	2.7%

6.3 Future Business expansion plans among treatment farmers

Growing market and ever increasing demand of table fish coupled with high opportunity of economic return, has increasingly attracted the interest of farmers in this sector. Higher proportion of treatment farmers were positive about business expansion as compared to that of control group. During the baseline study, it was found that 57% of farmers had plans of expanding their business which remained constant during endline study.

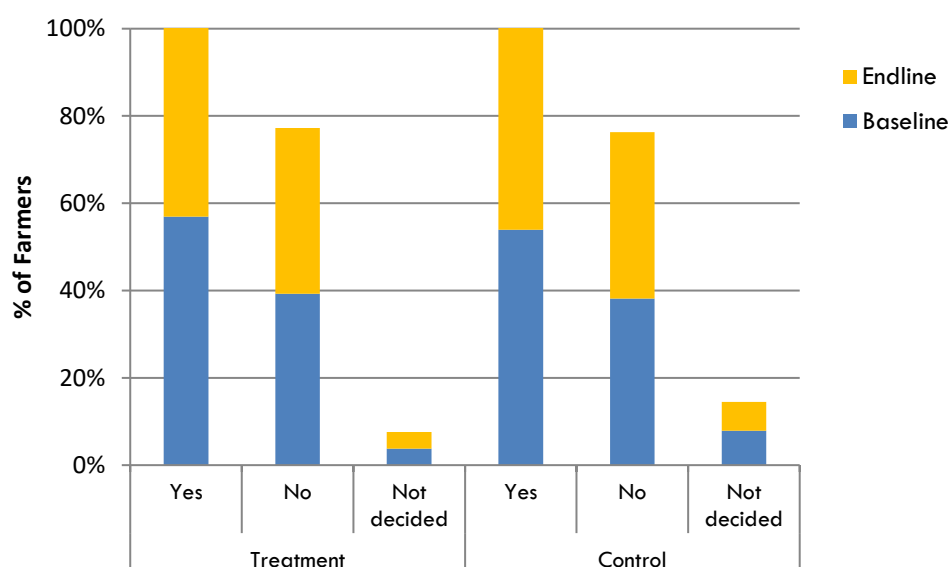


Figure 26 Future business expansion plan among farmers

6.3.1 Reasons for business expansion plan

It was found that there were five major reasons for the positive thinking of treatment farmers towards the expansion of commercial fish rearing in coming years. Among all the possible reasons for expansion, most of the farmers reported chances of getting economic benefits as the major reason for business expansion in both baseline as well as in endline study. The reasons are ranked below in the table.

Table 21 : Reasons for expanding the business

Cluster	Rank	Reasons for Expansion Plan	Baseline	Endline
Treatment	1	Prospect of profit	55.0%	53.6%
	1	Access to good fingerlings	20.0%	19.5%
	3	Increased access to finance	13.8%	13.4%
	4	Access to good feed	10.0%	11.0%
	5	New technical knowledge on pond management	1.3%	2.4%
Control	1	Prospect of profit	57.4%	58.0%
	2	Access to good fingerlings	19.1%	18.8%
	3	Access to good feed	8.8%	8.7%
	4	Increased access to finance	7.4%	7.2%
	4	New technical knowledge on pond management	7.4%	7.2%

Among the farmers who were not planning to expand their business plan in coming years more than 55 % treatment farmers and around 35 % control farmers voted lack of extra land as the major reason behind not having business expansion plans. Lack of access to finance was the second most reported reason.

Table 22 : Reasons for not expanding the business

Cluster	Rank	Reasons for Not Planning business expansion	Baseline	Endline
Treatment	1	Others-Lack of extra land	55.0%	56.4%
	2	Lack of access to finance	27.5%	25.6%
	3	No prospect of profit	10.0%	10.3%
	4	Lack of access to good feed	5.0%	5.1%
	5	Lack of access to good seedlings	2.5%	2.6%
Control	1	Others-Lack of extra land	35.4%	34.0%
	2	Lack of access to finance	33.3%	34.0%
	3	Lack of access to good seedlings	12.5%	12.8%
	4	Lack of access to good feed	8.3%	8.5%
	5	Limited technical knowledge	6.3%	6.4%
	6	No prospect of profit	4.2%	4.3%

6.4 Perception of farmers on Commercial Feed

6.4.1 Benefit of commercial feed for increasing Yield

The study reviewed the perception of farmers on commercial feed, their use and regularity or continuation on their use. According to the survey, 66% of the farmers in treatment group who use of commercial feed believe that commercial feed yields high benefit. The farmers in control group with the same perception this was lower (59 %). 25 % of treatment farmers and 29 % of control farmers were unaware about their use. Very few farmers from both clusters believed that use of commercial fish feed provided less or no benefit at all.

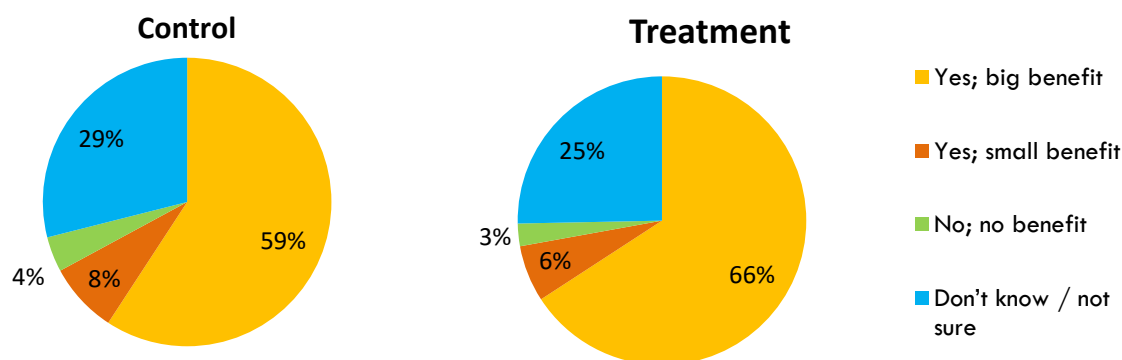


Figure 27 Perception of farmers towards the benefit of commercial feed supplement

6.4.2 Perception of Farmers on Continual use of Commercial feed

33% of treatment farmers and 33% of control farmers were highly optimistic towards regular use of commercial feed for Fish farming in future for better economic return from the Ponds. Around 33-35 %

farmers although optimistic but were doubtful about their use in future while 33-38 % farmers expressed pessimism towards the use of commercial feed on regular basis.

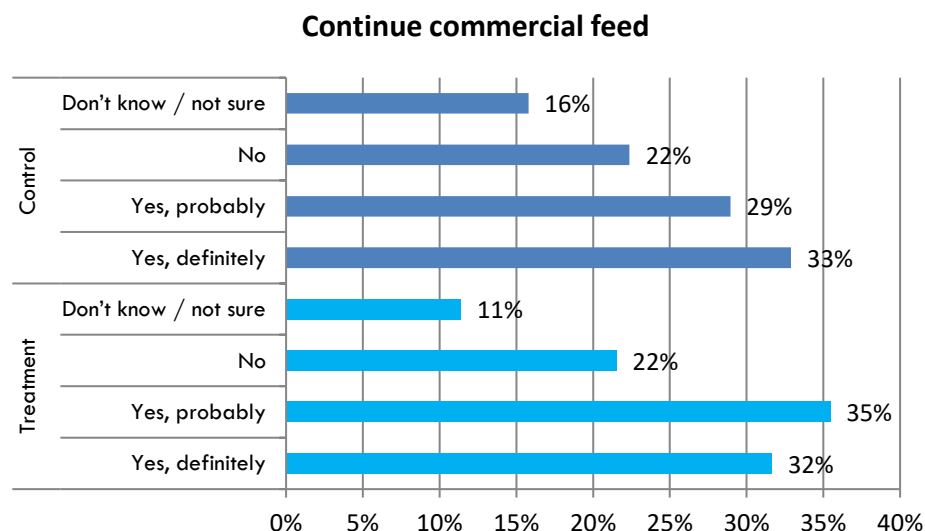


Figure 28 Perception of farmers towards the continuation on use of commercial feed

6.4.3 Perception of farmers on non-usage of commercial feed

Among Farmers with no intention to use the commercial feed, highest proportion of farmers from both clusters reported high cost as the major reason behind it. It was found that around 55-60% farmers in treatment in control farmers feel they were expensive. The other reasons were unclear benefit, inconvenience, others and better alternatives respectively in descending order.

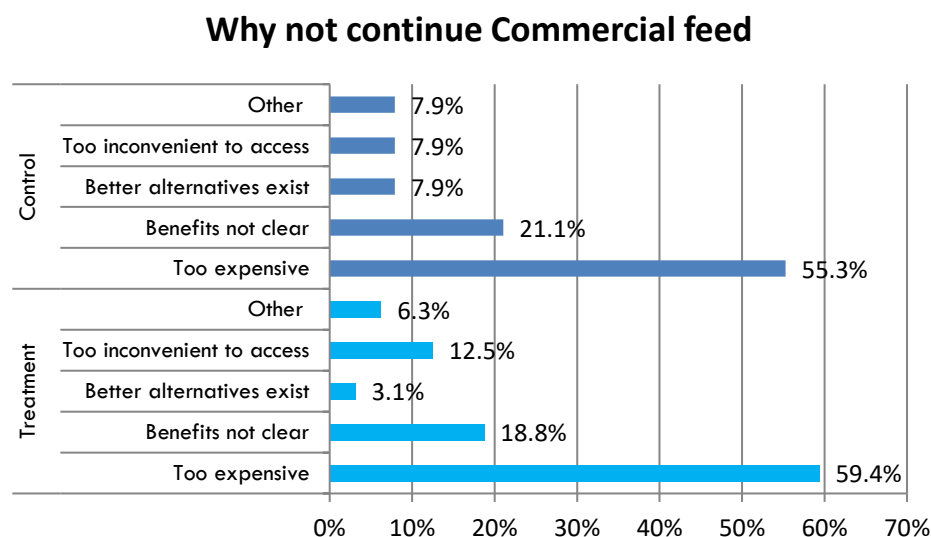


Figure 29 Perception of farmers towards the commercial feeds

6.4.4 Recommendation on usage of commercial feed and reasons behind them

The study depicts that 57 % of treatment farmers and 59 % control farmers would recommend the use of commercial feed to other farmers. Among the others who were pessimistic about recommendation, they felt

that they were more expensive than the regular feed as well as better options were available within the areas so which is why they did not recommend the use of commercial feed to others.

Farmers who would Recommend Commercial feed

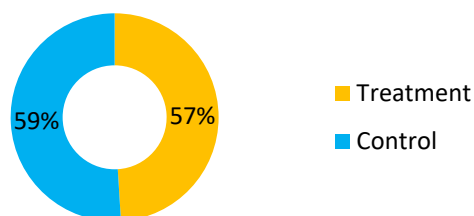


Figure 30. Proportion of Farmers who would recommend commercial feed to other farmers

6.5 Perception of Farmers on Quality Fingerlings/seed

6.5.1 Benefit of Use of Quality Seed/fingerlings on Yield

Farmers irrespective of their location and cluster felt that the use of quality seed is crucial for better economic returns from fish farming. 96 % treatment farmers feel that quality of seed was vital for better yield while 88% of control farmers shared the same feeling.

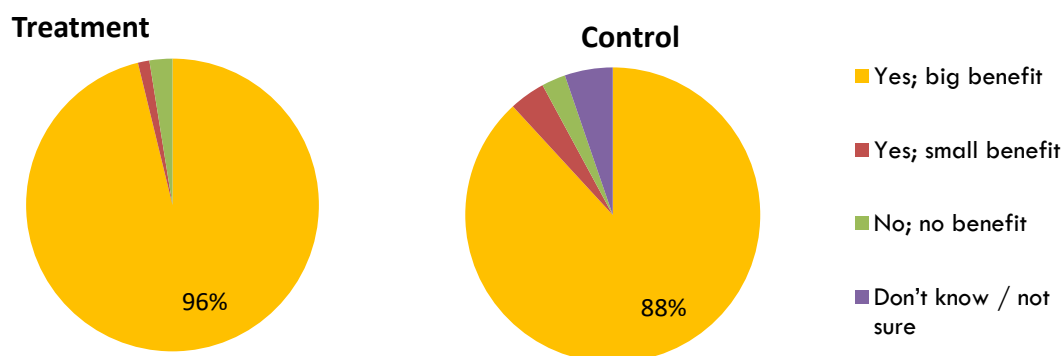


Figure 31 Perception of farmers towards benefits of quality seed

6.5.2 Farmers' perception on Regular use of quality seed

The study illustrates that around 76% of treatment farmers reported that they were willing to use quality seed regularly in future while in control farmers such observations was perceived only among 66% of farmers.

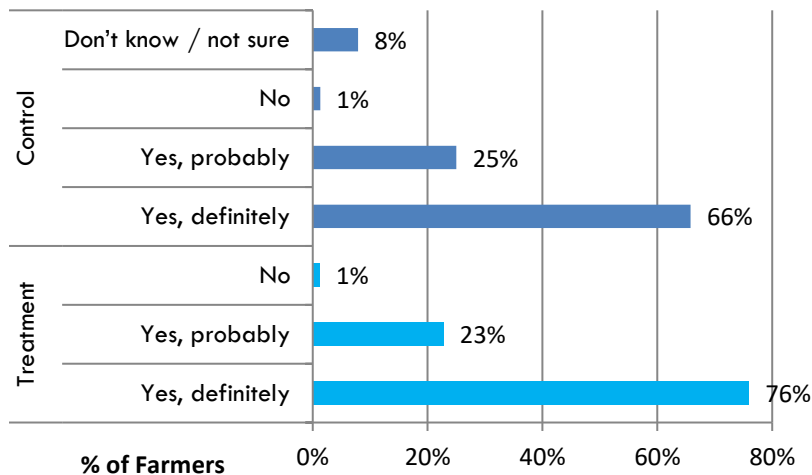
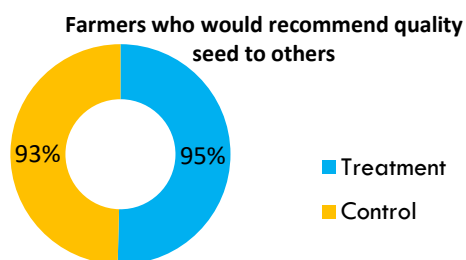


Figure 32 Perceptions of farmers on quality of seed on its regular use

6.5.3 Recommendation to other farmers to adopt quality seed



Sharing of knowledge is very common among the farmers as they intend to adopt the system of farming from those who are very successful. More than 90 % farmers from both clusters reported that they recommended other farmers to adopt quality seed.

Figure 33 Proportion of farmers who would recommend quality seed to other farmers

6.5.4 Farmers who recommended Quality seed to others

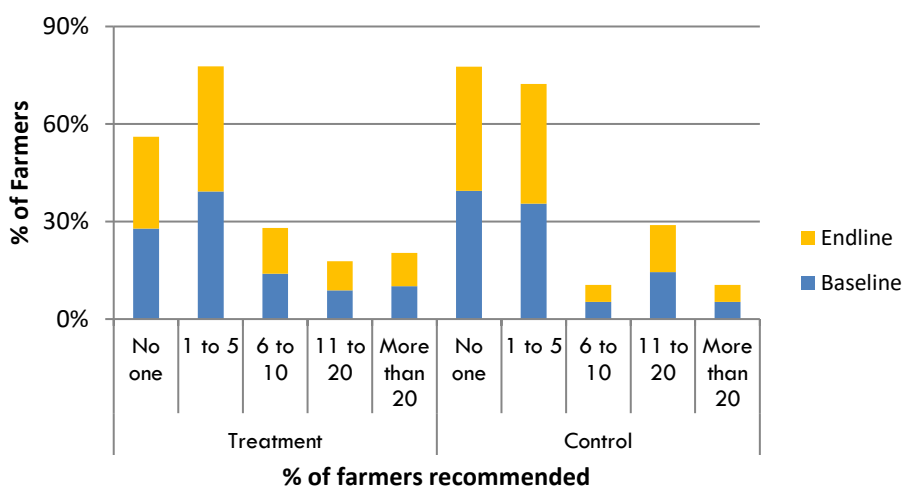


Figure 34. Farmers who recommended quality seed to other farmers

It was observed that around more than 70 % farmers from both groups recommended quality fingerlings to other farmers. Highest proportion from both clusters recommended 1 - 5 farmers to adopt quality seed. Some farmers were found to have recommended higher number of farmers as shown in the figure above.

6.5.5 Farmers who copied the practice of adopting quality fingerlings

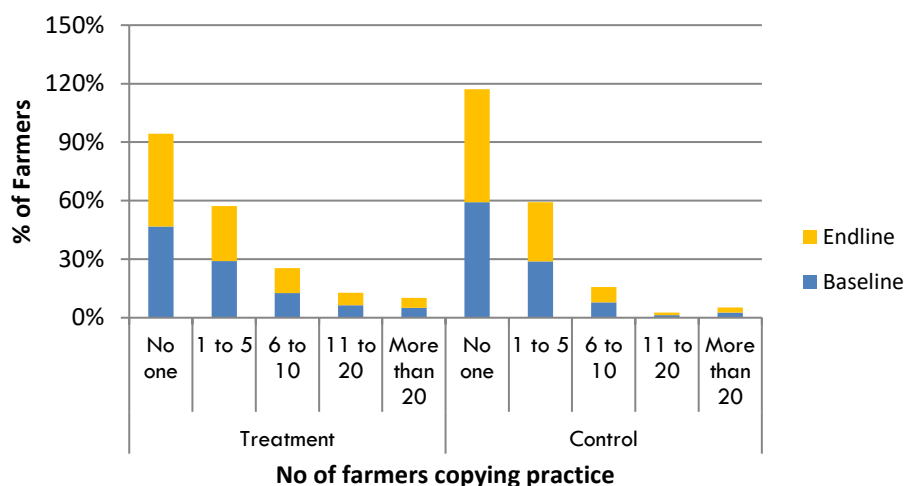


Figure 35. Farmers who copied the practice of using quality fingerlings

Around 50 – 60 % farmers said that none of the farmers copied the practice of using quality fingerlings while about 30 % farmers reported that 1 to 5 farmers had copied the practice. Very few farmers reported large number of farmers replicating the practice in their area.

6.5.6 Farmers' perception on non use of quality seed

Farmers who did not recommend quality seed reported that it was too expensive that is why they were not willing to use quality seed in future. The other reasons are listed below in table in descending order.

Table 23 : Reasons for not recommending adoption of quality seed

Cluster	Reasons for not recommending quality seed to others	Farmers %
Treatment	Too expensive	40%
	Hard to find in the locality	20%
	Lack of knowledge on how to use it	20%
	Others	20%
Control	Lack of knowledge on how to use it	40%
	Too expensive	20%
	Don't know about improved seeds / Fingerlings	20%
	Have never used it at all	20%

CHAPTER 7: PRODUCTION AND SALES

7.1 Table Fish Production and Productivity

Demand of table fish is increasing day by day and so is the production and selling. It was observed that production number as well as production volume (kgs) and sales of Table fish changed in the study period.

The total number of Fish produced increased in treatment group but the numbers dropped in control by about half fold of the increase in treatment. The production (Kg/HH) on the other hand, increased in both control and treatment HHs, although increases for Treatment were almost 3 times the increase in control. The sales of Fish increased for both groups with sales of treatment being higher for treatment HH as compared to control. The Pond productivity was higher for control HH than that of Treatment by a small margin. The increasing productivity of pond in both the clusters in study period is a positive indicator of the improvement in fish farming business.

Table 24 Production and sales of fish/HH

Control				
Phase/Parameters	Table Fish Number/HH	Table Fish Production (Kg/HH)	Table Fish Sales (Kg/HH)	Productivity (MT/Ha)
Baseline	4151	3554.89	3335.24	11.75
Endline	3932	3755.67	3536.39	15.17
Change	-219	200.77	201.15	3.43
Treatment				
Phase/Parameters	Table Fish Number/HH	Table Fish Production (Kg/HH)	Table Fish Sales (Kg/HH)	Productivity (MT/Ha)
Baseline	4003	3672.07	3353.42	11.51
Endline	4531	4284.20	3922.26	14.58
Change	527	612.13	568.84	3.07

7.2 Increase in Sales

Higher number of treatment HHs reported increase in sales of table fish than that of control as shown in table below. The average increment was also higher for treatment than that of control.

Table 25. Sales volume as seen in Baseline and endline study

Sales volume	Baseline		Endline	
	Treatment	Control	Treatment	Control
Sales Volume with consumption (Kg)	3672.07	3554.89	4284.20	3755.67
Sales Volume without consumption(Kg)	3353.42	3335.24	3922.26	3536.39

Table 26. Increase in sales volume as seen in endline study

Increase in Sales volume	Treatment	Control	DID
Number of farmers reporting Sales Volume Increase with consumption	56	51	5
% of farmers reporting Sales Volume Increase with consumption	71%	67%	4%
Average of Sales Volume Increase with consumption (Kg)	1352.1	1216.3	135.8
Number of farmers reporting Sales Volume Increase without consumption	57	52	5
% of farmers reporting Sales Volume Increase without consumption	72%	68%	4%
Average of Sales Volume Increase without consumption (Kg)	1375.7	1105.3	270.4

7.3 Production and Sales according to species

Seven major species of fishes were reared by farmers under our study. If we observed the species trend, popularity as well as performance of Silver carp species seems promising in the study domain.

The baseline study reveals that Common carp was the top ranked species in terms of number, production as well as sales for control group. This however changed and Silver carp led in all three categories during the endline survey. On the contrary for Treatment Rahu was the top species in terms of number while Silver was leading in terms of production and sales in the baseline study. During endline, Rahu was replaced by Common carp while Silver carp maintained its ranking. The species of fishes reared have been ranked in descending order below.

Table 27: Production and Sale volume according to fish species

Rank	Control											
	Number				Production				Sales			
	Baseline		Endline		Baseline		Endline		Baseline		Endline	
1	Common	3194	Silver	683	Common	3177	Silver	726	Common	2852	Silver	662
2	Naini	712	Rahu	651	Silver	725	Grass	642	Silver	672	Common	538
3	Rahu	680	Naini	650	Grass	632	Common	590	Naini	553	Grass	522
4	Silver	629	Common	593	Naini	589	Naini	557	Grass	513	Naini	514
5	Grass	482	Grass	489	Rahu	561	Rahu	531	Rahu	491	Rahu	493
6	Bighead	416	Bighead	430	Bighead	451	Bighead	479	Bighead	422	Bighead	444
7	Bhyakur	50	Bhyakur	50	Bhyakur	50	Bhyakur	50	Bhyakur	50	Bhyakur	54
Rank	Treatment											
	Number				Production				Sales			
	Baseline		Endline		Baseline		Endline		Baseline		Endline	
1	Rahu	765	Common	754	Silver	745	Silver	745	Silver	679	Silver	675
2	Common	728	Silver	714	Common	630	Common	688	Common	560	Common	621
3	Silver	705	Rahu	690	Grass	619	Grass	601	Grass	557	Grass	553
4	Naini	696	Naini	637	Rahu	608	Rahu	587	Rahu	549	Rahu	539
5	Grass	559	Grass	580	Naini	523	Naini	515	Naini	483	Naini	482
6	Bighead	492	Bighead	528	Bighead	460	Bighead	510	Bighead	425	Bighead	469
7	Bhyakur	64	Bhyakur	64	Bhyakur	64	Bhyakur	64	Bhyakur	62	Bhyakur	62

CHAPTER 8: ECONOMIC ANALYSIS

8.1 Financial Investment

Fish rearing is an expensive business requiring the investment on various sectors including Feed, seed and many other pond management activities. The study depicts that a huge amount of farmer's investment were incurred in Fish Feed, followed by pond management and seed. The cumulative amount of total investment of the treatment group was around NRs 7.5 million while in control the amount was only NRs 6.2 million. Similarly, investments per HH were NRs 94974 for treatment and NRs 81747 for control. Both the investments values increased by around 3 % on the baseline values during the endline survey.

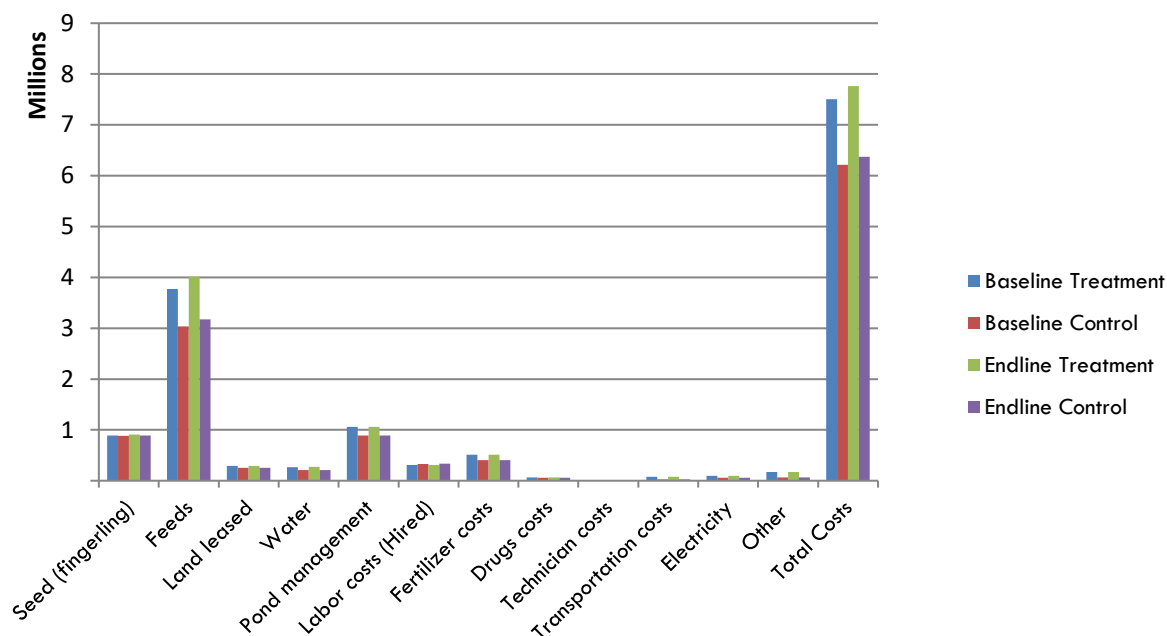


Figure 36 Investment on activities related to Fish farming

Table 28: Average Expenses/HH among farmers in Baseline and Endline study

Expenses(NRs)	Phase\Cluster	Treatment	Control
	Baseline	94974	81747
	Endline	98276	83799

Almost all the economic parameters for Treatment HHs like expenses, sales volume, gross income and net income exceed over those of Control Group. The net income change from the baseline to end line depicts that treatment farmers gained substantially high profit from fish farming as compared to profit change in control group.

8.2 Net Attributable Income Change

Number of farmers as well as average net attributable income from table fish production was greater for treatment HH than that of control HHs. 56 farmers from treatment and 51 farmers from control reported increase in net attributable income which is the income inclusive of HH consumption. The treatment HH income earned about NRs 25000-50000 more than the control HH as seen in the DID.

Table 29. Farmers reporting net attributable income increase in endline study

NET ATTRIBUTABLE INCOME CHANGE	Treatment	Control	DID
Average Sales volume/HH of farmers reporting increase in sales(Kg)	1352.1	1216.3	135.8
Selling price per kg(Nrs)	186	186	
Number of farmers reporting net attributable Income Increase with consumption	56	51	5
% of farmers reporting net attributable Income Change with consumption	71%	67%	4%
Average net attributable Income increase with consumption (NRs)	251485	226226	25259
Number of farmers reporting net attributable Income increase without consumption	57	52	5
% of farmers reporting net attributable Income change without consumption	72%	68%	4%
Average net attributable Income increase without consumption (NRs)	255877	205588	50289

CHAPTER 9: GENDER ANALYSIS

9.1 Number of HH members involved in fish farming

On an average 3 members (2 male and 1 female) from Treatment HH and 2 members (1 male and 1 female) from control HH were found to be engaged in Fish farming during both the study periods. Both male and female were observed to be actively engaged in fish farming and 1 to 2 male and female members were common practices. 3/4th households were observed engaging 1 to 2 male during baseline and endline survey among both the treatment and control groups. This practice was even higher in control group with about 80 % HH engaging 1 to 2 male/female members in fish farming. Also involvement of 5 or more members in fish farming was either absent or negligible fractions were present during both the baseline and endline survey among both groups.

Table 30 Involvement of HH members in fish farming

Cluster	No. of HH member involved in fish farming	Male		Female	
		Baseline	Endline	Baseline	Endline
Treatment	No	6%	5%	14%	13%
	1 to 2	77%	78%	80%	81%
	3 to 4	16%	16%	5%	5%
	5 or more	0%	0%	1%	1%
Control	No	9%	8%	13%	12%
	1 to 2	80%	82%	80%	82%
	3 to 4	8%	8%	7%	7%
	5 or more	3%	3%	0%	0%

9.2 HH members involved in fish farming segregated by gender

Male members of the household were observed leading the overall process from pond preparation to harvesting and selling of the products among both the control and treatment groups. Female member on the other hand showed no or limited involvement in other fish farming activities except the application of fertilizers after stocking among both groups. Other prominent activities with high involvement of female was application of fertilizer after drying the pond among the treatment group and application of fertilizer after filling the pond in control group.

Table 31. Activity wise gender involvement in fish farming activities

Gender involvement in activities	Male		Female	
	Treatment	Control	Treatment	Control
Pond preparation	High	High	No	Low
Drying	High	High	Low	Low
Application of chemical/fertilizer after drying	High	High	High	No
Filling the pond	High	High	No	No
Application of fertilizer after filling the pond	High	High	No	High
Buying fingerling	High	High	No	No
Pond Stocking	High	High	No	No
Feed preparation and feed buying	High	High	No	Low
Application of fertilizer after stocking	High	High	High	High
Occasional netting to see the weight of fish	High	High	No	Low
Use of external devices (such as Aerator)	High	High	No	No
Harvesting	High	High	No	No
Selling	High	High	Low	Low

9.3 Decision making in Financial Investments

In both the treatment and control group decision making in financial investment was dominated by male member of the family and the dominance is higher in the control group (more than 2/3rd HHs) in comparison to control group (less than 2/3rd HH). Lesser fraction of HHs in treatment group involved combined decision from both male and female compared to control group. However, the female led decision in financial investments was 2% higher in the treatment group compared to control group. No notable differences were observed in baseline and endline study.

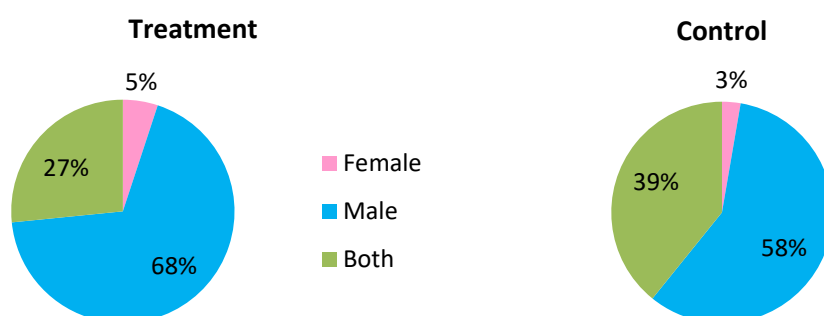


Figure 37 Decision maker for financial activities

9.4 Control of Income generated from fish farming

Male member of the family was found have higher control over the income generated from fish farming in both the control and treatment group. More than 80% of HHs had high control of males in their income in both groups. However the more than 60% of HHs showed medium control of female over their income and the fraction is observed more in control groups than in treatment groups. Household where male had no control over the revenue was very rare or even null while there were around 20-25 % households where female had low or almost no control over revenue generated from fish farming.

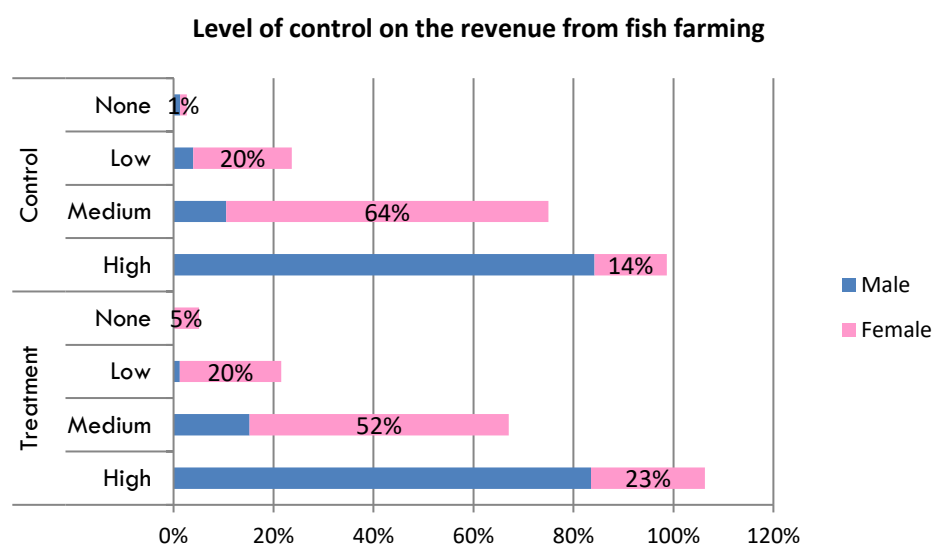


Figure 38 Gender wise control of income generated from fish farming among Treatment farmers

9.5 Ease of Access over income generated from fish farming

Ease of access over the income also observed to be similar with the control of income generated from fish farming. Males from both groups had high ease of access to revenue while only 1/5th of HHs have high access of female and 3/5th of HHs have medium access of . In terms of accessibility to revenue, higher proportion of HH from treatment granted high access to revenue to females. The scenario was similar in the one year study duration.

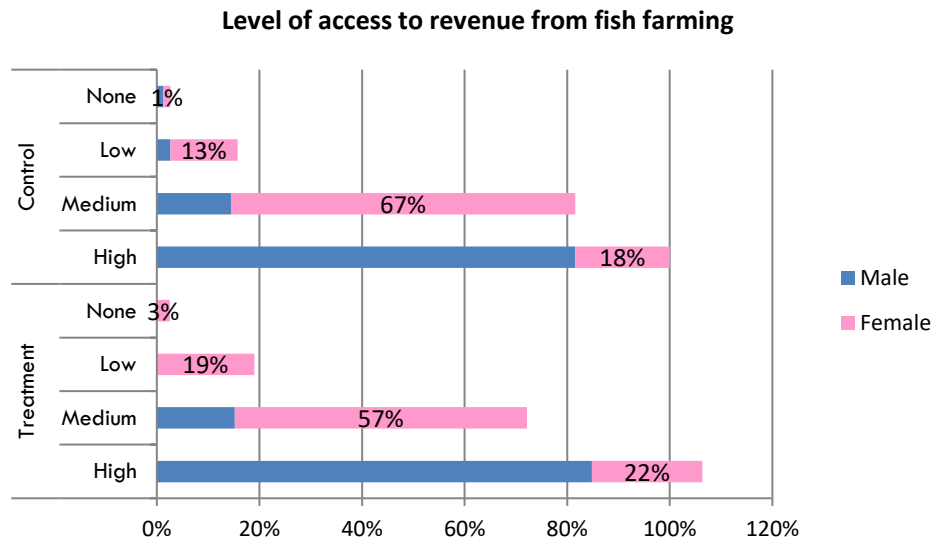


Figure 39 Gender wise access to income from fish farming among Treatment farmers

CHAPTER 10: HOUSEHOLD POVERTY AND PROSPERITY

PPI score is a commonly used index for measuring poverty. According to different International scales of PPI, an average of 17.5 % of Control HH are living below \$ 1.24 per day, almost half 50. 1% are living below \$2.00 per day and 65.4% were living below \$2.50 per day. Similarly, for Treatment HH the scenario was seen better with only 4.8 % living below \$1.24 per day, 29.3% living below \$2.00 per day and 47.1 % living below \$2.50 per day. This shows that Control HH were comparatively poor than Treatment HH.

Table 32: PPI score Table

Control					Treatment				
PPI SCORE	HH NUMBERS	POVERTY LIKELIHOOD NO			PPI SCORE	HH NUMBERS	POVERTY LIKELIHOOD NO		
		\$ 1.24 2005 PPP %	\$ 2.00 2005 PPP %	\$ 2.50 2005 PPP %			\$ 1.24 2005 PPP %	\$ 2.00 2005 PPP %	\$ 2.50 2005 PPP %
10 to 14	1	82.1	100	100	25-29	0	58.4	90.9	98.1
15-19	0	67.5	95.2	100	30-34	0	45.1	84.6	96.9
20-24	2	64.8	95	99.6	35-39	1	31.2	77.9	92.8
25-29	2	58.4	90.9	98.1	40-44	2	21.6	69.8	86.9
30-34	3	45.1	84.6	96.9	45-49	7	12.7	58.6	80.4
35-39	17	31.2	77.9	92.8	50-54	14	6.4	44.5	65.5
40-44	11	21.6	69.8	86.9	55-59	21	4.6	36.4	57.7
45-49	3	12.7	58.6	80.4	60-64	12	2.3	17.7	42.3
50-54	14	6.4	44.5	65.5	65-69	4	0.8	14	34
55-59	6	4.6	36.4	57.7	70-74	3	0.4	7.7	19.4
60-64	4	2.3	17.7	42.3	75-79	8	0.3	4.5	9.6
65-69	2	0.8	14	34	80-84	2	0.2	1.5	7.2
70-74	3	0.4	7.7	19.4	85-89	5	0	0	3.2
75-79	12	0.3	4.5	9.6	90-94	1	0	0	0
Average %		17.5	50.1	65.4	Average %		4.8	29.3	47.1

CHAPTER 11: CONCLUSION

Commercial fish farming is a growing business of the area which provides for the livelihood of farmers. As seen in the study, it is a major source of income for over 45 % of farmers. The fish farmers in the study were smallholder farmers owning an average of 1 - 1.5 ha of agricultural land per HH and around 0.3 ha for fish farming. Treatment farmers own slightly larger lands and pond as compared to the control. Marginal increments in land and pond holding have been noted in the endline study.

Seven major species of fishes were reared for table fish production as well as nursery production, among which Common carp, Rahu and Silver were reared and produced in high numbers. Treatment farmers purchased more fingerlings than the control farmers in the study area. The average mortality of fishes was 10- 13 %. Except for 1 – 2 % decrease, no significant changes were recorded in fish mortality either between clusters or between the two study phases. FAO has also identified quality of fish seed, especially carp seed as the number one constraint for sustainable aquaculture development in Nepal. The reasons for this being poor brood stock and inbreeding depression(FAO, 2011). In relation to management practices, higher proportion of treatment farmers were found to have adopted better management practices than control farmers like increased drainage facility, improved technology, water sanitation etc. Traditional although the dominant feed for fish farming, inclination towards commercial feed is appreciable. Use of commercial feed is common for treatment than it is for control with floating pellet being the most popular commercial feed. Most of the farmers are positive about its use and benefits in future. Treatment farmers were also found to have better exposure to external sources of information like Government agencies, Agricultural personnel, Nursery/hatchery and INGOs.

Regarding the perception of farmers, farmers from both clusters held optimistic views towards increase in yield and decrease in mortality both associated with quality feed and quality fingerlings. In overall study, about 50 % farmers would recommend commercial feed while about 90 % said they would recommend quality fingerlings to other farmers. 20 – 30 % farmers reported having expectations of better fingerlings with respect to reduced mortality while more than 90 % reported having expectation of better fingerlings with respect to improved yield. This is seen true in practice as well, where no significant reduction in mortality was observed but yield increases were sizeable. As high as 71 % of treatment and 67 % of control HH reported increments in sales volume and net attributable income.

Fish farming is a potential business activity attracting incremental investments. There is seen a gradual shift of Farmers have from subsistence farming practices to intensive farming. For any biological entity like fish, input optimization is the ultimate focal point for obtaining better results. It was observed that the treatment farmer's assets and investments superseded that of control farmers for most of the cases like pond holding size, input purchase and management activities. Similarly, the production volume, sales as well as profit gains were higher for treatment fish farmers who were using quality seed and feed for fish farming. Higher progressive changes in treatment in terms of production and sales as seen in the endline study hence indicates that the treatment returns are expected to multiply in the following years.

From the perspective of Gender, Fish farming in the area is per-dominantly male operated with Males having high decisive power and control or access over the revenue generated from fish farming.

Hence, we can conclude that quality seed and feed has direct contribution to higher economic yield and can be a potential business for smallholders farmers. Since no significant achievements were made in relation to fry mortality in either of the two clusters, the gains may be attributed to the commercial feed and other management practices among farmers. This indicates that the seed quality has yet to meet the desired standard to achieve the project goal.

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ANNEXES

ANNEX I : MISCELLANEOUS TABLES

Table 33: Summary of HH Pond characteristic and production

Attributes	Baseline		Endline	
	Average for Treatment	Average for control	Average for Treatment	Average for control
Total Volume(cubic meters) of Fish ponds	7255.56	6040.89	7298.59	6044.72
Pond area excluding Nursery(m. sq)	3685.16	3293.13	3845.53	3310.26
Pond Area ecluding nursery (Ha)	0.37	0.33	0.38	0.33
Number of Live fish production excluding nursery	4003	4151	4531	3932
Mortality %	13.29	11.07	12.17	9.97
Average Weight of Table fish	0.84	0.81	0.97	0.94
Total HH Table Fish Production (Kg)	3672.07	3554.89	4284.20	3755.67
Total Table Fish Production (MT)	3.67	3.55	4.28	3.76
HH Pond Productivity(MT/ha)	11.51	11.75	14.58	15.17

Table 34: Pond management system among the farmers

Treatment			Control		
Use of Aqua chemicals			Use of Aqua chemicals		
	Baseline	Endline		Baseline	Endline
Yes	64	65	Yes	64	64
No	36	35	No	36	36
Cleaning of ponds			Cleaning of ponds		
Weekly	2	2	Weekly	1	1
15/15 days	7	7	15/15 days	9	9
Monthly	10	10	Monthly	8	8
Every 2-3 months	6	6	Every 2-3 months	8	9
Once in a year	75	75	Once in a year	73	72
Transport of fingerlings			Transport of fingerlings		
Plastic packing	100	100	Plastic packing	100	100
Time of transport			Time of transport		
Morning	79	78	Morning	86	86
Day	7	7	Day	9	9
Evening	14	15	Evening	5	5
Time of Putting fingerlings in pond			Time of Putting fingerlings in pond		
Morning	65	65	Morning	71	71
Day	20	20	Day	22	22
Evening	14	14	Evening	8	8

Table 35: PPI Score for Individual HH (Note: The non highlighted farmers are the ones reporting increase in NAIC)

S.N	Treatment					Control				
	Farmers	PPI Score	\$1.25 2005 PPP (%)	\$2.00 2005 PPP (%)	\$2.50 2005 PPP (%)	Farmers	PPI Score	\$1.25 2005 PPP (%)	\$2.00 2005 PPP (%)	\$2.50 2005 PPP (%)
1	Aagnidhar Regmi	64	2.3	17.7	42.3	Aasis Chaudhary	65	0.8	14	34
2	Aanu Banjade	83	0.2	1.5	7.2	Ajay Kumar Chaudhary	46	12.7	58.6	80.4
3	Asima Devi Chaudhary	57	4.6	36.4	57.7	Babu Ram Paudel	57	4.6	36.4	57.7
4	Badri Chaudhary	56	4.6	36.4	57.7	Baijanath Paswan	78	0.3	4.5	9.6
5	Bijaya Bahadur Chaudhary	56	4.6	36.4	57.7	Bedu Thapa	75	0.3	4.5	9.6
6	Bijaya Baral	75	0.3	4.5	9.6	Bhagu Jaisawal	93	0	0	0
7	Bijaya Pratap Singh	49	12.7	58.6	80.4	Bholaram Chaudhary	29	58.4	90.9	98.1
8	Birendra Kumar Chaudhary	59	4.6	36.4	57.7	Bikram Paswan	49	12.7	58.6	80.4
9	Birendra Prd Chaudhary	56	4.6	36.4	57.7	Binod Kumar Chaudhary	52	6.4	44.5	64.5
10	Bishnu Bhattari	68	0.8	14	34	Bir Bahadur Thapa	69	0.8	14	34
11	Chet Narayan Bsyal	72	0.4	7.7	19.4	Bishnu Tiwari	65	0.8	14	34
12	Chhotkai Chaudhary	48	12.7	58.6	80.4	Bishownath Sahani	62	2.3	17.7	42.3
13	Dambar Neupane	83	0.2	1.5	7.2	Chandra Kumari Puri	70	0.4	7.7	19.4
14	Deba Churighar	34	45.1	84.6	96.9	Chhabilal Pandey	58	4.6	36.4	57.7
15	Dhirendra Pd Chaudhary	56	4.6	36.4	57.7	Chinak Tharu	57	4.6	36.4	57.7
16	Dil Bdr. Baral	46	12.7	58.6	80.4	Chudamani Acharya	50	6.4	44.5	64.5
17	Dilaram Poudel	58	4.6	36.4	57.7	Dashrath Yadav	51	6.4	44.5	64.5
18	Durga Devi Yadav	66	0.8	14	34	Deepa Chaudhary	53	6.4	44.5	64.5
19	Durga Prasad Tharu	38	31.2	77.9	92.8	Dev Bdr Sunuwar	71	0.4	7.7	19.4
20	Ganesh Chaudhary	45	12.7	58.6	80.4	Devisaran Lod	54	6.4	44.5	64.5
21	Geharaj Acharya	62	2.3	17.7	42.3	Devraj Parajuli	66	0.8	14	34
22	Goma Dahal	63	2.3	17.7	42.3	Dhani Ram Tharu	57	4.6	36.4	57.7
23	Gopal Pandey	42	21.6	69.8	86.9	Dharma Bir Chauodari	59	4.6	36.4	57.7

24	Govida Prd Chaidari	60	2.3	17.7	42.3	Dharmaraj Poudel	89	0	0	3.2
25	Govinda Chapagani	56	4.6	36.4	57.7	Dil Bahadur Kunwar	71	0.4	7.7	19.4
26	Gyanu Karki	67	0.8	14	34	Gopal Gyawali	63	2.3	17.7	42.3
27	Hari Prasad Pokhrel	72	0.4	7.7	19.4	Govinda P. Chaudhary	82	0.2	1.5	7.2
28	Hariram Yadav	50	6.4	44.5	65.5	Gyanendra Kumar Chaudhary	49	12.7	58.6	80.4
29	Hum Bdr Dhahal	86	0	0	3.2	Hari prasad Pokheral	65	0.8	14	34
30	Huseni Chaudhary	58	4.6	36.4	57.7	Hem Raj Dawadi	75	0.3	4.5	9.6
31	Ishwori Poudel	81	0.2	1.5	7.2	Hom Bdr Thapa	61	2.3	17.7	42.3
32	Ishwori Prasad Chaudhary	70	0.4	7.7	19.4	Indal Kumar Chaudhary	66	0.8	14	34
33	Jhokhan Yadav	59	4.6	36.4	57.7	Indra Bdr Kuwar	87	0	0	3.2
34	Jitendra Kubar	69	0.8	14	34	Indramani Bhushal	66	0.8	14	34
35	Khimananda Bhandari	70	0.4	7.7	19.4	Jadurai Prasad Sahani	53	6.4	44.5	64.5
36	Khimananda Vhupal	75	0.3	4.5	9.6	Jibnath Poudel	54	6.4	44.5	64.5
37	Kishor Kumar Chaudhary	45	12.7	58.6	80.4	Jiv Nath Bhattarai	78	0.3	4.5	9.6
38	Kisun Baniya	64	2.3	17.7	42.3	Jokhu Prasad Bhuj	68	0.8	14	34
39	krishna Ariwal	56	4.6	36.4	57.7	Juthehari jan	41	21.6	69.8	86.9
40	Krishna Prasad Chaudhary	50	6.4	44.5	65.5	Kailash Bhandapur	76	0.3	4.5	9.6
41	Laxman Tharu	50	6.4	44.5	65.5	Kamal Paudel	44	21.6	69.8	86.9
42	Laxmi Bhushal	72	0.4	7.7	19.4	Khadga Bdr Pathak	56	4.6	36.4	57.7
43	Laxmi Narayan Chaudhary	59	4.6	36.4	57.7	Khemnarayan Tharu	58	4.6	36.4	57.7
44	Lilaram Khanal	71	0.4	7.7	19.4	Koheli Sahani	53	6.4	44.5	64.5
45	Madhu Pokhrel	55	4.6	36.4	57.7	Krishna Bdr. Thapa	56	4.6	36.4	57.7
46	Mahendra Shrestha	71	0.4	7.7	19.4	Krishna P. Acharya	79	0.3	4.5	9.6
47	Manoj Kumar Chettri	62	2.3	17.7	42.3	Krishna raj Pandey	56	4.6	36.4	57.7
48	Min Prasad Lamsal	92	0	0	0	Laxman Bhattra	63	2.3	17.7	42.3
49	Mira Devi Chaudhary	57	4.6	36.4	57.7	Lekhnath Vhusal	53	6.4	44.5	64.5
50	Moti Kharel	56	4.6	36.4	57.7	Madhab Poudel	60	2.3	17.7	42.3
51	Mukesh Chhettri	68	0.8	14	34	Min Bahadur Sahani	50	6.4	44.5	64.5
52	Mukti Prasad Sahani	46	12.7	58.6	80.4	Mitralal Ghimire	52	6.4	44.5	64.5
53	Narayan Bdr Malla	63	2.3	17.7	42.3	Moti Lal Kowar	33	45.1	84.6	96.9

54	Narayan Paudel	64	2.3	17.7	42.3	Nandalal Bishwokarma	73	0.4	7.7	19.4
55	Netra Bdr. Ghimire	91	0	0	0	Nar Bdr. Malla	91	0	0	0
56	Nirmal Chaudhary	51	6.4	44.5	65.5	Nirma Rajbhar	48	12.7	58.6	80.4
57	Pabitra Devi Chaudhary	69	0.8	14	34	Pabitra Paudel	48	12.7	58.6	80.4
58	Padma Thapa	71	0.4	7.7	19.4	Parambasi Yadav	42	21.6	69.8	86.9
59	Pashupati Subedi	65	0.8	14	34	Parbati Kebat	54	6.4	44.5	64.5
60	Pradip Yadav	75	0.3	4.5	9.6	Phatta Bdr. Sarki	82	0.2	1.5	7.2
61	Prajwal Aaryal	67	0.8	14	34	Prakash Pokherel	81	0.2	1.5	7.2
62	Raja ram Var	61	2.3	17.7	42.3	Pratap Pasi	76	0.3	4.5	9.6
63	Rakesh Chaudhri	74	0.4	7.7	19.4	Prem kumari Karki	91	0	0	0
64	Ram Chandra Thapa	61	2.3	17.7	42.3	Prem Panthi	64	2.3	17.7	42.3
65	Ram Kumar Tharu	44	21.6	69.8	86.9	Purna Ashi Pashi	47	12.7	58.6	80.4
66	Ramahu Kebat	45	12.7	58.6	80.4	Ram Kumar Chaudhary	62	2.3	17.7	42.3
67	Ramnibas Chaudhary	70	0.4	7.7	19.4	Ram Kumar Yadav	38	31.2	77.9	92.8
68	Resham Loniya	61	2.3	17.7	42.3	Ramayan Barai	49	12.7	58.6	80.4
69	Sandip Yadav	53	6.4	44.5	65.5	Resham Bdr Khatri	56	4.6	36.4	57.7
70	Sanjay Sahani	62	2.3	17.7	42.3	Resham Lal Bhandari	46	12.7	58.6	80.4
71	Shree Ram Yadav	76	0.3	4.5	9.6	Samiyulla Musalman	69	0.8	14	34
72	Sunil Chaudhary	62	2.3	17.7	42.3	Shugrom Bhuj	61	2.3	17.7	42.3
73	Sunil Parajuli	70	0.4	7.7	19.4	Tank Prashad Gyawali	63	2.3	17.7	42.3
74	Surbarna Laxmi Shrestha	55	4.6	36.4	57.7	Tika Bdr Thapa	60	2.3	17.7	42.3
75	Tas Bikram Chaudhary	53	6.4	44.5	65.5	Umesh Chaudhary	58	4.6	36.4	57.7
76	Than Bdr Thapa	68	0.8	14	34	Vuwal Tharu	46	12.7	58.6	80.4
77	Thule Bhudhathoki Magar	54	6.4	44.5	65.5					
78	Umashankar Chaudhary	57	4.6	36.4	57.7					
79	Vim Bahadur Chaudhary	58	4.6	36.4	57.7					

ANNEX II: QUESTIONNAIRE

Fish Farmer's Baseline/Endline Survey – 2014/15

माछापालक किसान आधारभुत सर्वेक्षण - २०१४/१५

फारम विवरण:

सुपरिवेक्षक जिल्ला घरको प्रकार घरधुरी नं. फारम नं.

घरधुरी पहिचान नं. फोन नं.

जनसंख्या सम्बन्धि जानकारी:

मूला ठेगाना	जिल्ला	
	गा.वि.स	
	वार्ड नं.	१ २ ३ ४ ५ ६ ७ ८ ९
	गाउँ	
	टोल	

D2. किसानको विवरण	किसानको नाम			
	उमेर			
	लिंग	पुरुष 2. महिला	शिक्षा	
	मुख्य पेशा	कृषि: ☐ बाली ☐ पशुपालन (वस्तु र जिवीतजनावर) ☐ तरकारी उत्पादन ☐ ज्यालादारी/श्रम		
		माछा पालन	व्यापार	ज्यालादारी/श्रम
		जागीर/सेवा	अन्य स्रोतहरु.....	
	जाति	दलित	जनजाति	मधेशी
		ब्राहमण/क्षेत्री/ठकुरी/सन्यासी		
	अन्य			

यदि किसान आफै उत्तरदाता हुन् भने छाड्नुहोस्

D3. उत्तरदाताको विवरण	नाम			
	लिंग	पुरुष 2. महिला	उमेर	

	शिक्षा	
--	--------	--

यदि किसान/उत्तरदाता घरमुली हो भने छाड्नुहोस्

D4. किसानको नाम (घरमुली):	पुरुष 2. महिला
---------------------------	----------------

D5. तपाईंको परीवारमा कति सदस्यहरु हुनुहुन्छ ?

उमेर समुह	पुरुष			महिला		
	0-14	15-59	60 / माथि	0-14	15-59	60 / माथि
संख्या						

आम्दानी

11. गतवर्ष तपाईले कति जग्गामा खेती सञ्चालन गर्नु भएको थियो <

स्वामीत्व (Tenure)	क्षेत्रफल [टिपोट: 1 विघा = 20 कठ्ठा 1 कठ्ठा = 20 धुर]	टिप्पणी
आफ्नै	_____ कठ्ठा _____ धुर	
भाडामा लिइएको	_____ कठ्ठा _____ धुर	
भाडा दिइएको	_____ कठ्ठा _____ धुर	
जम्मा	_____ कठ्ठा _____ धुर	

12. गत वर्ष तपाईंको घरको आम्दानीका स्रोतहरू के-के थिए?

क्र.सं	स्रोतहरू	प्राथमिकता (Ranking)
1.	माछा पालन	
2.	वाली खेती (धान, गहुँ, मकै)	
3.	तरकारी उत्पादन	
4.	पशुपालन (वस्तु र जिवीतजनावर)	
5.	जागीर/सेवा	
6.	ज्यालादारी/श्रम	
7.	विप्रेषण (remittance)	
8.	ब्यापार	
9.	अन्य स्रोतहरू	

माछा उत्पादन

F1. तपाईंले माछापालन कहिलेबाट सुरु गर्नुभयो ?	_____ वर्ष _____ महिना
F2. गतवर्ष तपाईंले कति वटा पोखरीमा माछापालन गर्नुभएको थियो ?	_____ संख्या

F3. तपाईंको माछापालन पोखरीको जम्मा आयतन कति हो र गतवर्ष माछाका भुराहरु कतिवटा किन्नुभयो र राख्नुभयो ?

क्र.सं.			पोखरीको प्रकार(चिन्ह लगाउनुहोस्)				आयतन (m ³)	प्रजाति	किनेको भुराको संख्या	पहिलो महिना भित्रको मृत्युदर (संख्या)
			उत्पादन	नर्सरी	पालन	अन्य				
1	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								
	उचाइ	____ मिटर								
2	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								
	उचाइ	____ मिटर								
3	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								
	उचाइ	____ मिटर								
4	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								
	उचाइ	____ मिटर								
5	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								
	उचाइ	____ मिटर								
6	क्षेत्रफल	____ वीघा ____ कठ्ठा ____ धुर								

	उचाई	_____ मिटर								
7	क्षेत्रफल	_____ बीघा _____ कट्ठा _____ धुर								
	उचाई	_____ मिटर								
8	क्षेत्रफल	_____ बीघा _____ कट्ठा _____ धुर								
	उचाई	_____ मिटर								
9	क्षेत्रफल	_____ बीघा _____ कट्ठा _____ धुर								
	उचाई	_____ मिटर								

F4. गतवर्ष माछाका भुराहरु कहाँबाट किनेर ल्याउनुभयो ?		नम	स्थान
	नर्सरी, ह्याचरी,		
	अन्य, (उल्लेख गर्नुहोस्)		

F5. के भुराहरु सजिलै सँग समयमै पाईएका थिए ?	थिए	थिएनन्
	यदि थिएनन् भने कारण खुलाउनुहोस्:.....	

F6. माछापालनको सुचनाको स्रोतहरु के के थिए ? (बहुउत्तर सम्भव छ)	नर्सरी सञ्चालकहरु एग्रोभेट अरु माछापालकहरु सरकारी कृषि कार्यकर्ता गैर सरकारी कृषि कार्यकर्ता आफन्त छिमेकी साथीहरु मिडिया रेडियो टेलिभिजन पत्रपत्रिका अरु कुनै (सूचि)
F7. तपाईंले माछापालनको समस्याहरु बारे को को सँग परामर्स लिनुहुन्छ ? (बहुउत्तर सम्भव छ)	नर्सरी सञ्चालकहरु एग्रोभेट

	अरु माछापालकहरु सरकारी कृषि कार्यकर्ता गैर सरकारी कृषि कार्यकर्ता आफन्त छिमेकी साथीहरु मिडिया रेडियो टेलिभिजन पत्रपत्रिका अरु कुनै (सूचि) परामर्स लिन्त	
यदि परामर्स लिदैँन भने F 8.1 र F 8.2 छाड्नुहोस् ।		
F8.1. गतवर्ष कति पटक सल्लाह लिनुभयो ?	1 – 3 पटक 4 - 6 पटक 6 – 9 पटक	10 - 12 पटक 12 – 15 पटक 6. 15 पटक भन्दा बढि
F8.2.सल्लाहका कारणहरु (बहुउत्तर सम्भव छ)	माछापालनको बारेमा धेरै कुराहरु जान्न माछाको दानाको बारेमा जान्न भुराको बारेमा जान्न रोगको समस्याको समाधान गर्न पोखरी व्यवस्थापन बारे ज्ञान हासिल गर्न उत्पादकत्व बढाउन अरु कुनै (सूचि)	
F9. के तपाईंले माछापालनबारेमा कुनै तालिम लिनुभएको छ ?	छ	2. छैन

F10. यदी छ भने,

तालिमको नाम	कहिले (महिना, साल)	तालिमदिने निकाय
1.		दानाउत्पादक समुह नर्सरी, ट्याचरी सरकारी प्रसार कार्यकर्ता अन्य निजीव्यवसाय

2.		गैर सरकारी संस्था अन्य
		दानाउत्पादक समुह सरकारी प्रसार कार्यकर्ता निजीव्यवसाय सरकारी/गैर सरकारी संस्था अन्य
3.		दानाउत्पादक समुह सरकारी प्रसार कार्यकर्ता निजीव्यवसाय सरकारी/गैर सरकारी संस्था अन्य

F11. तपाईंले आउँदो वर्ष उत्पादन विस्तार गर्ने कुनै योजना बनाउनु भएको छ ?	छ	2. छैन	3. निश्चित छैन
F11.1 यदि छ भने कारण खुलाउनुहोस् (बहुउत्तर सम्भव छ)	गुणस्तरिय भुरामा पहुँच भएर गुणस्तरिय दानामा पहुँच भएर वित्तियमा पहुँच भएर पोखरी व्यवस्थापन सम्बन्धि प्राविधिक ज्ञान भएर नाफाको सम्भावना भएर अरु कुनै (सूचि)		
F11.2 यदि छैन भने कारण खुलाउनुहोस् (बहुउत्तर सम्भव छ)	गुणस्तरिय भुरामा पहुँच नभएर गुणस्तरिय दानामा पहुँच नभएर वित्तियमा पहुँच नभएर पोखरी व्यवस्थापन सम्बन्धि प्राविधिक ज्ञान नभएर नाफाको सम्भावना नभएर अरु कुनै (सूचि)		
F12. गतवर्षका अनुभवमा के माछाको भुराको मृत्युदर बढिराछ, उस्तै छ वा घटिराछ?	बढिराछ	उस्तै छ	घटिराछ

F13. तपाईंको विचारमा माछाको भुरा को मृत्युदरमा बढन , घटनमाके के ले प्रभाव पार्छ जस्तो लाग्छ ? (बहुउत्तर सम्भव छ)	भुरा दाना पानी	मौसम, जलवायु थाहा छैन अन्य, (उल्लेख गर्नुहोस्)
F14. गतवर्षका अनुभवमा के माछाको उत्पादकत्व बढिराछ ,उस्तै छ वा घटिराछ?	बढिराछ	उस्तै छ घटिराछ
F15. तपाईंको विचारमा माछाको उत्पादकत्वमा के ले प्रभाव पार्छ जस्तो लाग्छ ? (बहुउत्तर सम्भव छ)	भुरा दाना पानी	मौसम, जलवायु थाहा छैन अन्य, (उल्लेख गर्नुहोस्)

पोखरी व्यवस्थापन अभ्यास

M1. के तपाईंको पोखरीमा निकास छ?	छ	छैन
M2. के तपाईंले पोखरीमा मल प्रयोग गर्नुहुन्छ?	प्रयोग गर्दिन	प्राङ्गणारिक मल अप्राङ्गणारिक मल
M3. के तपाईं बाह्य साधन प्रयोग गर्नुहुन्छ?	प्रयोग गर्दिन	जलवाहक अन्य
M4. के तपाईं रसायन प्रयोग गर्नुहुन्छ?	गर्छु	गर्दिन
M5. पोखरीको सरसफाई	हप्तामा	१५/१५ दिनमा महिना दिनमा,,
	प्रत्येक २/३ महिनामा	अन्य, (उल्लेख गर्नुहोस्)
M6. माछाका भुरा कसरी ढुवानी गर्नुहुन्छ?		
M7. माछाका भुरा सामान्यतया कुन समयमा ढुवानी गर्नुहुन्छ?	बिहान	दिउसो बेलुका
M8. भुरा किनले र पोखरीमा राख्ने बिचको समय अन्तर कति हुन्छ?	 घण्टा	
M9. माछाका भुरा सामान्यतया कुन समयमा पोखरीमा राख्नुहुन्छ?	बिहान	दिउसो बेलुका

दानाप्रयोग पद्धति

FP1. के तपाईंले गतवर्ष, माछाका निम्ती दानाप्रयोग गर्नुभयो ?	छ	छैन
FP2. यदी छ भने, कस्तो दानाप्रयोग गर्नुभयो ?(बहुउत्तर सम्भव छ)	परम्परागत	व्यवसायीक (Mesh)
	व्यवसायीक (non-floating pellet)	
	व्यवसायीक (floating pellet)	
	अन्य, (उल्लेख गर्नुहोस्)	

यदि व्यवसायीक (mesh, floating and non-floating pellet), हो भने		
FP3. कति समय अघी देखी व्यवसायीक दानाप्रयोग गर्दै हुनुहुन्छ ?	वर्षमहिना	
FP4. तपाईंले व्यवसायीक दाना कहाँबाट किन्नुहुन्छ ?	नर्सरी, ह्याचरी	एग्रोभेट
	दानाउत्पादक समुह	अरु कुनै (सूचि)
FP5. तपाईंले दानाहरु एउटै अथवा भिन्न ठाँउबाट खरिद गर्नुहुन्छौ ?	एउटै 2. भिन्न	

FP6. गतवर्ष यदि तपाईंले परम्परागत दाना खुवाउनुहुन्थ्यो भने ति के के थिए ? (बहुउत्तर सम्भव छ)	धानको ढुटो	पिना		
	भान्साको फोहोर	मल		
	अन्य, (उल्लेख गर्नुहोस्)			
FP7. गतवर्ष भुरालाइ दिनमा कति पटक दाना दिनुभयो?	दिनमा १ पटक	दिनमा २ पटक		
	दिनमा ३ पटक	२ दिनमा १पटक		
	अन्य, (उल्लेख गर्नुहोस्).....			
गतवर्ष तपाईंले कति दाना प्रयोग गर्नुभयो ? (के.जि)	दाना	मात्रा (के.जी)	मूल्य प्रति के.जि	
	FP8. व्यवसायीक			
	FP9. परम्परागत			
FP10. के तपाईं कुनै आधुनिक दाना प्रयोग गर्ने पोखरीमा भ्रमण गर्नु भएको छ ?		छ	छैन	

उत्पादन, आम्दानी र लागत

P1. गतवर्षको माछाको उत्पादन र बिक्रि विवरण (भिन्नाएको बेला)

प्रजाति	औषत तौल के.जि.	माछाको संख्या	जम्मा उत्पादन के.जि.	जम्मा बिक्रि के.जि.	मूल्य प्रति के.जि.

जम्मा					

P2. माछा भित्र्याउने समय (Duration) के थियो ?

प्रजाति			
एकल भित्र्याइ	महिना	बहु भित्र्याई	महिना

P3. रत वर्ष माछा पालनमा जम्मा कति श्रम लाग्यो ।

श्रम	लागत दिन	दर	जम्मा
महिला			
पुरुष			

P3. कृपया गतवर्षको आर्थिक लगानीको सुचि बनाउनुहोस् ।

विवरण	लागत रु.
भुरा	
दाना	
जग्गा भाडा	
पानी	
पोखरी व्यवस्थापन	

श्रमिक लागत (hired)	
मलको लागत	
औषधिको लागत	
प्राविधिकको लागत	
हुवानी लागत	
बिजुली	
अन्य, (उल्लेख गर्नुहोस्)	

मूल्य प्रस्ताव जाँच - दाना

VF1. व्यवसायीक दाना माछाको उत्पादकत्व बढाउनको लागि फाइदा जनक हुन्छ ? यसमा तपाईंको राय के छ ?		धेरै फाइदा हुन्छ थोरै फाइदा हुन्छ फाइदा छैन थाहा छैन /निश्चित छैन	
VF2 व्यावसायीक दाना प्रयोगको निरन्तरता गर्ने वारेमा तपाईंको धारणा के छ ?		पक्कै गर्छु गर्न सक्दछु गर्दिन थाहा छैन	
VF2.1 गर्नुहुन्नभने, किन? (जुनउपयुक्त लाग्छन्, सही चिन्हलगाउनु होला)		धेरै महँगो भएकोहुनाले फाइदा स्पष्ट नभएकोहुनाले अन्य राम्राविकल्पहरु देखिएकोले पहुँचमा असुविधा भएकाले अन्य (उल्लेख गर्नुहोला).....	
VF3. के तपाईंले अन्य किसानलाई व्यवसायीक दानाप्रयोग गर्ने सुझाव दिनुहुन्छ ?		दिन्छु	दिन्न
VF3.1. यदि दिनुहुन्नभने किन?	धेरै महँगो भएका हुनाले	समुदायमा दाना पाउन गाह्रो भएकाहुनाले	
	व्यवसायीक दानाका बारेमाथाहा छैन	यो प्रयोग गरेकै छैन	
	प्रयोगका सम्बन्धमा ज्ञान नभएकाहुनाले	घरायसी उपज र अन्यदानाको उपलब्धताभएकाले	
	अन्य.....		

मूल्य प्रस्ताव जाँच - भुरा

VS1. गुणस्तरिय माछाको भुरा उत्पादकत्व बढाउनको लागि फाइदा जनक हुन्छ ? यसमा तपाईंको राय के छ ?	धेरै फाइदा हुन्छ	थोरै फाइदा हुन्छ
	फाइदा छैन	थाहा छैन/निश्चित छैन

VS2. गुणस्तरिय भुरा प्रयोगको निरन्तरता गर्ने बारेमा तपाईंको धारणा के छ ?		पक्कै गर्छु	गर्न सक्दछु
		गर्दिन	थाहा छैन
VS2.1. यदि दिनुहुन्नभने किन?	धेरै महँगो भएका हुनाले	समुदायमा दाना पाउन गारो भएकाहुनाले	
	व्यवसायीक दानाका बारेमाथाहा छैन	यो प्रयोग गरेकै छैन	
	प्रयोगका सम्बन्धमा ज्ञान नभएकाहुनाले	घरायसी उपज र अन्यदानाको उपलब्धत भएकाले	
	अन्य		
VS3. के तपाईंले अन्य किसानलाई गुणस्तरिय भुरा गर्ने सुझाव दिनुहुन्छ ?		दिन्छु	२ दिन
VS3.1. यदि दिनुहुन्नभने किन?	धेरै महँगो भएका हुनाले	समुदायमा पाउन गारो भएकाहुनाले	
	गुणस्तरिय भुरा बारेमा थाहा छैन	यो प्रयोग गरेकै छैन	
	प्रयोगका सम्बन्धमा ज्ञान नभएकाहुनाले	अन्य.....	

अवलम्बन सम्बन्धि (नक्कल सम्बन्धि)

C1. तपाईंले कतिजना किसानलाई गुणस्तरिय भुरा प्रयोग सम्बन्धि सल्लाह दिनु भयो ?	
C2. गुणस्तरिय भुरा प्रयोग सम्बन्धि तपाईंको तरिका कतिजना किसानले अवलम्बन गरेका छन् ?	

लिङ्ग

G1. तपाईंको घरमा माछापालनमा कति जना सदस्यहरु संलग्न छन् ?	पुरुष	 महिला
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G2. लिङ्ग सहभागिताका	गतिविधिहरु	सहभागिताको स्तर (0 = छैन ; 1= कम; 2= उच्च)	
		पुरुष	महिला
	पोखरी निर्माणमा		
	सुकाउन		
	सुकाएपछि मल,रसायन हाल्न		
	पोखरी भर्न		
	भरेपछि मल राख्न		
	भुरा किन्न		
	भुरा राख्न		
	दाना बनाउन र किन्न		

	भुरा राखेपछि मल दिन					
	कहिले काही जालि थापी तौल हेर्न					
	वाह्य साधन प्रयोग गर्न जस्तै जल बाहक					
	माछा भित्र्याउन					
	बेचबिखन गर्न					
G3. लगानी सम्बन्धि निर्णय कसले गर्नुहुन्छ		महिला	पुरुष	दुवै		
G4. माछाको आम्दानीमा नियन्त्रणको स्तर कस्को कस्तो छ ?		नियन्त्रणको स्तर				
		उच्च	मध्यम	कम	छैन	
		पुरुष				
		महिला				
G5. माछाको आम्दानीमा पहुँचको स्तर कस्तो छ ।		पहुँचको स्तर				
		उच्च	मध्यम	कम	छैन	
		पुरुष				
		महिला				

गरिवीको प्रगति सुचाइमा

K1. घरमा कति जना सदस्य हुनुहुन्छ?	८ वा ८ भन्दा बढि ७ ६ ५ ४ ३ १ वा २
K2. गतसाता पुरुष घरमुलिले धेरै जसो कस्तो प्रकारको काम गर्नुभयो ?	पुरुष घरमुलि छैन खासैकाम गर्नुभएन/ दिनहुँ ज्याला दारी मात्र/ सम्भौताको आधारमा कृषिमा सम्भौताको आधारमा गैरकृषिमा स्वरोजगार कृषिमा स्वरोजगार गैरकृषिमा

	दिर्घकालिन ज्यालादारी कृषि र गैरकृषिमा
K3. तपाईंको निवासमा कतिवटा सुत्ने कोठा छन् ?	छैन १ २ ३ वा बढी
K4. घरको बाहिरी भित्ताको निर्माण सामग्री मुख्य रूपमा के के हुन ?	बाँस / पात नपाकेको इटा काठ माटोले जोडेको इटा वा ढुङ्गा भित्तानै छैन सिमेन्टले जोडेको इटा/ ढुङ्गा अरु सामग्रीहरु
K5. घरको छानाको मुख्य सामग्री	छयाली/ पराल माटो टाइल/स्लेट काठ अथवा फ्याक अथवा जस्ता वा ढलान
K6. तपाईंको घरमा भान्सा छ ?	1.छ 2.छैन
K7. तपाईंको घरमा खाना पकाउने चुलो कस्तो प्रकारको छ ?	खुल्ला चिमनी वाला माटोको मटितेलाको ग्यास स्टोभ धुँवा रहित चुलो
K8. तपाईंको घरमा सौचालय कस्तो प्रकारको छ ?	छैन फ्लस नहुने फ्लस हुने
K9. तपाईंको घरमा कति ओटा टेलिफोन वा मोवाईल सेट छन् ?	छैन १ २ वा २ भन्दा बढी

K10. के तपाईको घरमा आफ्नै, साभेदारी वा बन्दकी कृषि भूमि छ ? यदि छ भने सिचाई कस्तो छ ?	छैन जग्गा छ तर सिचाई छैन जग्गा छ तर केहि मात्र सिचाई छ
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ANNEX III: Some Glimpes from the Visit to Project Area





