



Study the Status of Fish Farming in Shiktahan VDC of Rupandehi District of Nepal

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Abstract

A research was conducted in 30 households to study the status of fish farming in Shiktahan VDC of Rupandehi district in 2014. It was found that 26.67% of respondent have pond area between 0.25-0.5 kattha, where as 43.33%, 16.67% and 13.3% have 0.51-0.75, 0.76-1 and above 1 kattha respectively. Common carp, Grass carp, Big head carp, Rohu and Naini was cultivated in 86.6%, 93.3%, 40%, 63.33% and 6.7% household respectively. Among the total stock of fingerlings, 39.62% was of Silver carp, 17.76% of Common carp, 16.39% of grass carp, 9.72% of big head carp, 13.84% of Rohu, 2.67% of Naini were found. Comparing the total harvest, 44.78% was obtained from Silver carp, 18.87% from common carp, 14.17% from grass carp, 11.3% from Rohu, 8.53% from Bighead carp and 2.32% from Naini. Similarly, in case of total income, 36.29% was found from Silver carp, 20.1% from Common carp, 19.54% from grass carp, 12.2% from Bighead carp, 10.08% from Rohu, 1.79% from Naini. The study concluded that fish farming has helped to uplift economic development of rural VDC member.

Keywords: Integrated Agriculture and Aquaculture (IAA), Carp polyculture, Inputs, Economic analysis, Village Development Committee (VDC)

1 Introduction

1.1 Background Information

Fish is identified as a nutritionally beneficial food source around the world. Fish provides high quality protein and important micronutrients such as vitamin A, vitamin D and iodine, and they can also be a source of phosphorus, fluoride, and calcium if bones are consumed (Speedy, 2003). In addition to that, the benefits of consuming fish rich in omega-3 fatty acids has been widely documented in recent years (Oken and Belfort, 2010). While certain fishes can provide all of these health benefits, there currently exists a difference in the perceived nutritional gains in developed versus developing countries: in the former health researchers primarily concerned with omega-3 fatty acids and the protection that they provide against cardiovascular disease (Domingo et al., 2007; Oken and Belfort, 2010), while latter primary concern is healthy development augmented by protein and micronutrients (Aiga et al., 2009; Parajuli et al., 2012). In Nepal, the benefits of fish consumption is linked with such outcomes as improving protein intake (Bhujel et al., 2008) and increasing vitamin A and zinc ingestion (Parajuli et al., 2012). Little current data exists in relation to total fish production in Nepal (including cultured and capture fish), but approximately half of all fish produced in 1994/1995 was raised in aquaculture systems (Pradhan, 2013). Additionally, the Nepali aquaculture sector has seen a tremendous increase in production over the last 40 years (Pradhan, 2013). No doubt, Aquaculture is the fastest growing food producing sector in the world, and it is responsible for approximately 50% of all human consumed fish (Diana, 2009). Demand for seafood is forecasted to grow in the future (Diana, 2009), while harvest from natural fish resources are expected to decline or remain at current levels (Diana, 2009; FAO, 2010). Although aquaculture has been practiced in Asia since thousands of years (Pradhan, 2013), it is fairly new industry in Nepal. It was not until the fish, and an additional 40 years passed before any significant progress was made in the field (Pradhan, 2013).

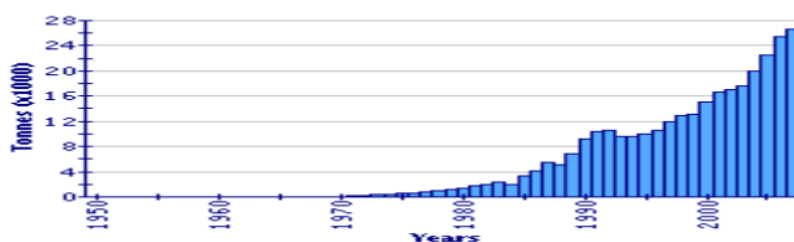


Figure 1. Food and Agriculture Organization reported aquaculture production in Nepal (Pradhan, 2013).

Actually aquaculture has been practiced in Asia for thousands of years (Pradhan, 2013). Upto 1940s our country began raising fish, and an additional 40 years passed before any significant progress was made in the field (Pradhan, 2013).

Clearly more joint efforts are needed for sustainable management of fisheries resources. The importance of farming fish termed as Aquaculture has been increasingly realized recently with a view to compensating for the decline in wild fish catch. Aquaculture has been growing at an average rate of 9% annually over the past 10 years. Globally farmed-fish production was about 45 million metric tons last year, about half of the fish we consume but it has to be doubled by 2030 to meet the ever growing demand for fish (FAO, 2006). Based on this, animal protein supply has to be increased by three times. Similarly, a recent survey showed that about 60% fish consumed in Nepal come from India. Consumption of fish is rapidly increasing but catches from rivers and lakes are declining. Annual per capita consumption of fish (1.7 kg) is still far below as compared to other Asian countries. Even in India where about half of the people are said to be vegetarian, per capita consumption is still over 5 kg. Bangladesh, known as fish loving country in South Asia has about 15 kg while most Southeast Asian countries have well over 30 kg (FAO, 2006). These facts show that Nepal is far behind and needs more efforts in promoting aquaculture by establishing immediate and long term objectives for the fulfillment towards achieving the goal of improving people's livelihoods.

2 Introduction of Study Area

In Rupandehi, fish farming is done on 865 hectares. The government has been conducting a fishery campaign in the district for the last five years. Now the district produces 3,510 tons of fish valued at Rs 650 million annually (Ministry of Agriculture and Cooperatives (MOAC), 2004). Various cooperatives have been formed in the district. Around 1,900 fish farmers at Dayanagar village are involved in farmers groups that operate 390 ponds. There are around 56 ponds in Shikatan area of which is made by the help of CEAPRED. Most of the people around the village have other side jobs but others are totally depended upon the pond and its output such as vegetables around the dike of the pond.

3 Materials and Methods

3.1 Selection of the study area

The Study was carried in the Shiktahan VDC.



Figure no. 8 Google map of Shiktahan VDC. of farmers

3.2 Selection of farmers

The list of farmers was obtained from related I/NGO's such as CEAPRED and world fish center.

3.3 Data Collection

Monthly visit to research site was done throughout the study period and the data for, stocking number, size and weight of fingerlings, culture period, yield and water quality along with inputs and their respective was recorded in the pre-tested interview schedule. The farmer's growers were provided with the information on seed source; frequency, time and method of feedings, growth check up and grading of fish, water replacement, harvesting methods etc. The inputs used in the calculation of production cost included electric motor and pumping

sets, shallow tube-well, rickshaw, cycle, plastic can, buckets, balance, feed, seed, chemicals, wages, electricity, communication, fuel and transportation and their interest.

3.3.1 Primary data collection

Data collection was made through questionnaire survey among the fish farmers of Shiktahan VDC of Rupandehi district ongoing marketing channel, processing technology adoption. The fish farm situated at Shiktahan, the local farmers had the equal contribution on primary data collection.

3.3.2 Secondary data collection

Data was also collected as a secondary data from journal, publications, internet search; NGO's operating on the site such as CEAPRED and WFC, NARC, etc.

3.4 Dissemination

After the completion of the study final report was prepared. It will be sent for publication on national and international journal, to the policy maker. Similarly leaflets and booklets will be published for the local farmers.

3.5 Data Analysis

3.5.1 Production aspect

The complete harvesting of fish stock from each farm was observed and assessment of fish culture period, survival rate, harvesting size, growth rate, yield, FCR was calculated by the using the following formulae. Data analyzed by Ms- Excel and Stat graph computer software packages.

3.5.2 Economic aspects

Total annual cost (TACm-2) was calculated by multiplying the quantities of inputs (land rent, pond construction cost, fence, electric motor and pumping sets, shallow tube well, Rickshaw, cycle with feed, seeds etc). Similarly, the total annual value product (TAVP) obtained by multiplying the quantity of fish harvested in different production cycle with the respective prices. The mean profit (B) will be obtained by deducting the TAC from the TAVP. The marketing margins (retailer's price- farm gate price) of the farmers calculated by deducting all the cost including losses due to handling at all stages of marketing from the prices paid by the final consumers. The major cost items included will be transportation cost and labor charge.

3.5.3 Economic analysis

Gross margin = Gross return (Rs.) – variable cost (Rs.)

4 Results and Discussions

4.1 Ethnicity of Surveyed Household

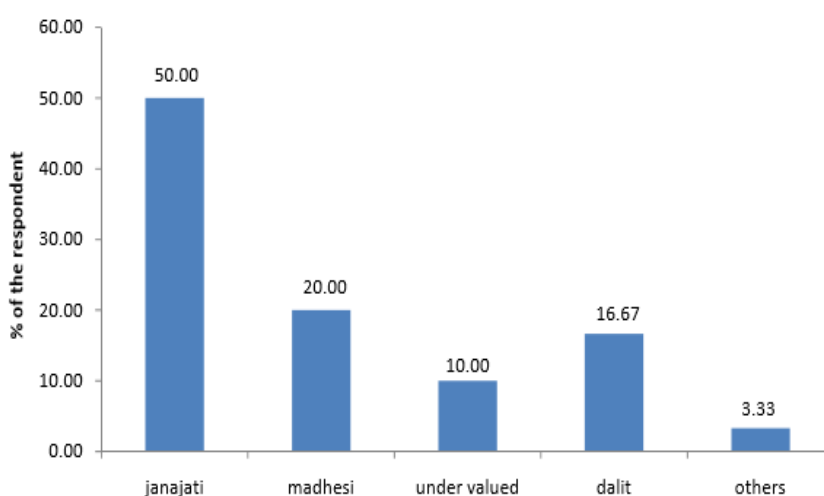


Figure 9. Ethnicity of Surveyed Household

Among the 30 surveyed houses, 50.0% respondents were janajati which includes Tharu and Khawas, 20.0% respondents were madhesi which includes Nishad and Kewat, 10.0% respondents were undervalued which includes Mallah and Chhedi, 16.67% respondents were dalits which include Pasi and 3.33% include other ethnic respondent such as Brahmins.

4.2 Source of Pond Water

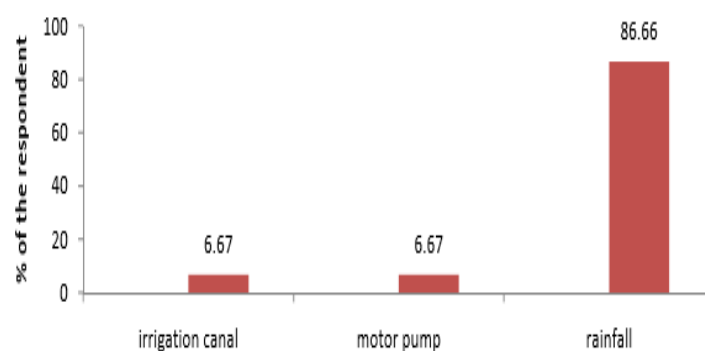


Figure 10. Source of Pond Water

4.3 Pond Area of Respondents in Kattha

Among the 30 houses surveyed, 6.67% used irrigation canal, 6.67% used motor pump and 86.66% were depended upon rainfall for the source of the water in the pond. (1 kattha=333.33m²)

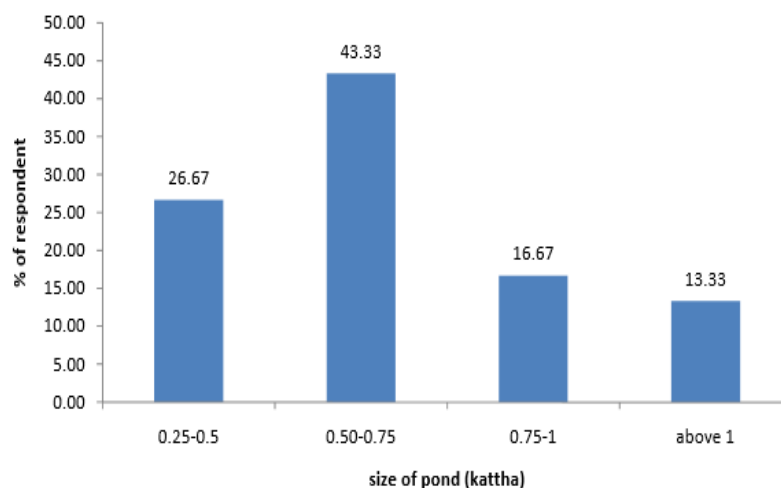


Figure 11. Pond Area of Respondents in Kattha

Among the 30 respondents, 26.67% have pond area between 0.25-0.5 kattha, 43.33% have between 0.5-0.75kattha, 16.67% have between 0.75-1 kattha and 13.33% have above 1 kattha. (1 kattha=333.33 m²)

4.4 Mean, minimum and maximum amount and price of the rice bran owned

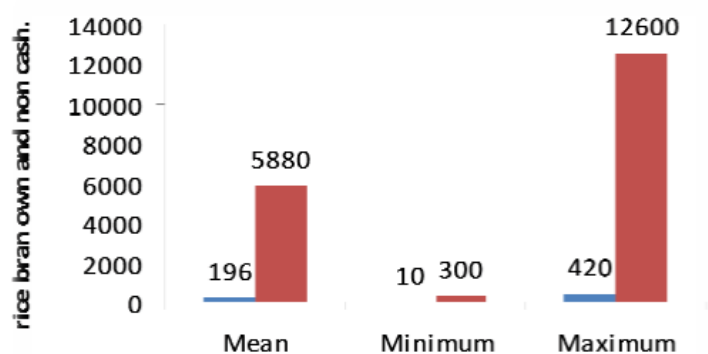


Fig 12. Mean, minimum and maximum amount and price of the rice bran owned.

Among the total rice bran of rice bran worth Rs. 5880, minimum people have 10 kg of worth Rs. 300 and maximum have 420 kg of worth Rs. 12600.

4.5 Mean, Minimum and Maximum amount and price of urea purchased

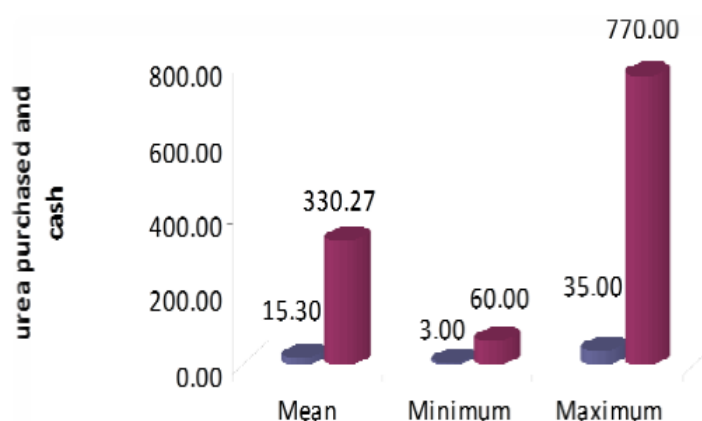


Fig 13. Mean, Minimum and Maximum amount and price of urea purchased.

Among the total urea purchased by respondents, mean average people have purchased 15.30 kg urea worth Rs. 330.27, minimum amount purchased was 3 kg of worth Rs. 60 and maximum amount purchased is 35 kg worth Rs 760.

4.6 Mean, Minimum, Maximum amount and price of the DAP purchased

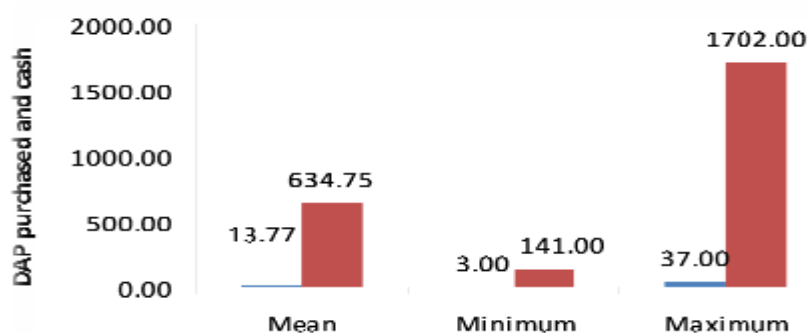


Fig 14. Mean, Minimum, Maximum amount and price of the DAP purchased

Among the total DAP purchased by the respondents, average mean people purchased 13.77 kg DAP worth of Ra. 634.75, minimum amount purchased was 3 kg worth of Rs. 141 kg and maximum amount purchased was 37 kg worth of Rs. 1702.

4.7 Analysis of lime purchased and its cash.

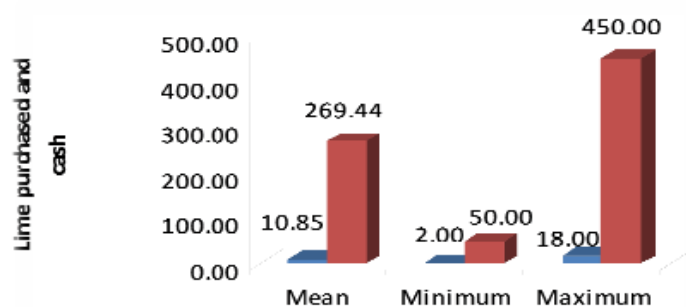


Fig 15. Mean, Minimum, Maximum amount and price of the Lime purchased

Among the total urea purchased by respondents, mean average people have purchased 15.30 kg urea worth Rs. 330.27, minimum amount purchased was 3 kg of worth Rs. 60 and maximum amount purchased is 35 kg worth Rs. 770.

4.6 Mean, Minimum, Maximum amount and price of the DAP purchased

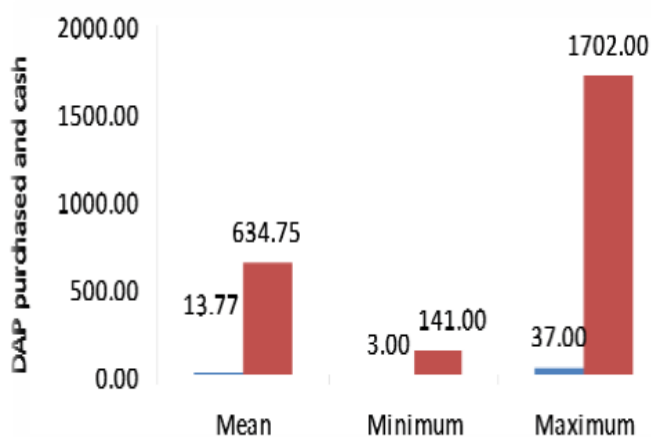


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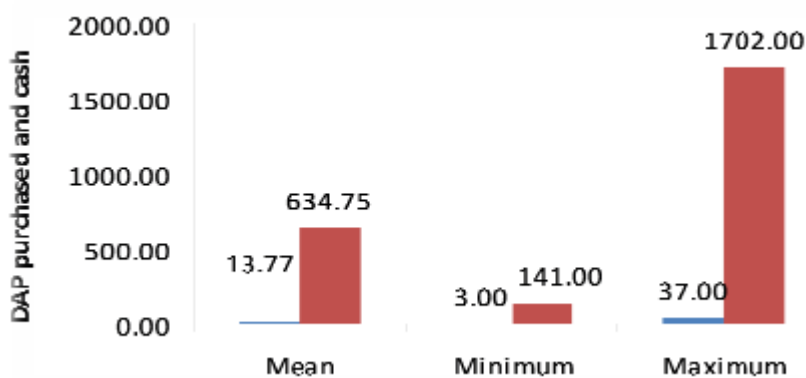


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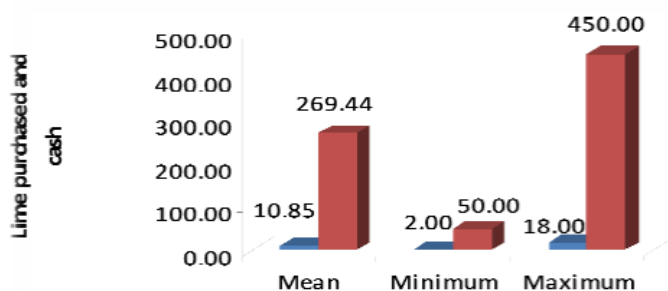


Fig 15. Mean, Minimum, Maximum amount and price of the Lime purchased

Among the total Lime purchased by the respondents, average mean people purchased 10.85 kg Lime worth of Rs. 269.44, minimum amount purchased was 2 kg worth of Rs. 50 and maximum amount purchased was 18 kg worth of Rs.450.

4.8 Analysis of amount and cash of cow dung owned

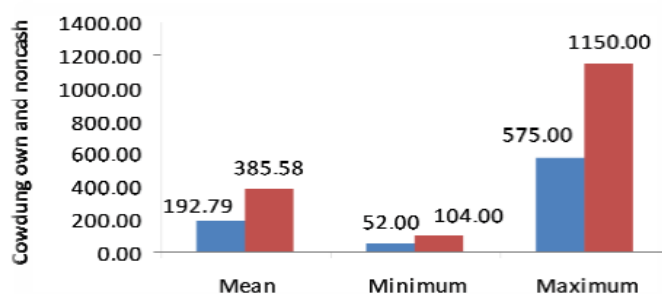


Fig 16. Mean, minimum and maximum amount and price of the cow dung owned.

Among the total cow dung owned by respondents, mean average people have 192.79 kg of cow dung worth Rs. 385.58; minimum people have 52 kg of worth Rs. 104 and maximum have 575 kg of worth Rs. 1150.

4.9 Analysis of amount and price of cow dung purchased.

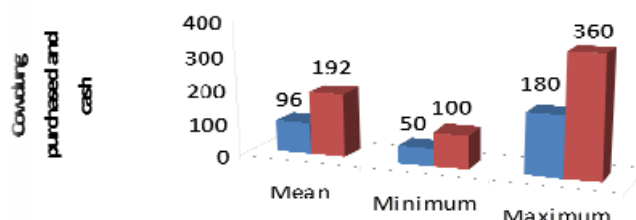


Fig 17. Mean, Minimum, Maximum amount and price of the cow dung purchased

Among the total cow dung purchased by the respondents, average mean people purchased 96 kg cow dung worth of Rs. 192, minimum amount purchased was 50 kg worth of Rs.100 and maximum amount purchased was 180 kg worth of Rs.360.

4.10 Analysis of amount and price of male labour used.

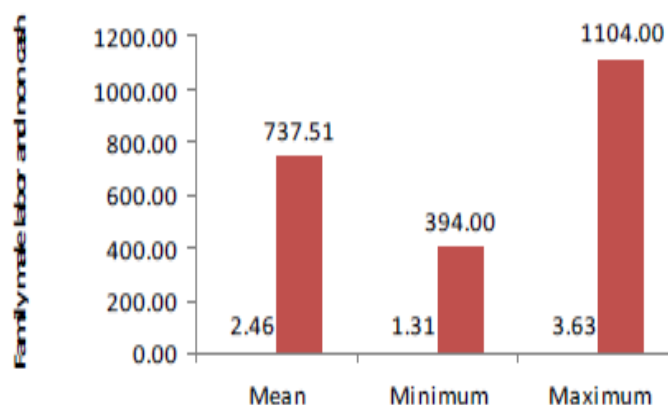


Fig 18. Mean, minimum and maximum amount and price of the Family male labour

Among the total family member of the respondents, mean average family have 2.46 family male labors worth Rs. 737.51; minimum family labor was 1.31 worth Rs. 394 and maximum was 3.63 worth Rs. 1104.

4.11 Analysis of female family labour used and its value

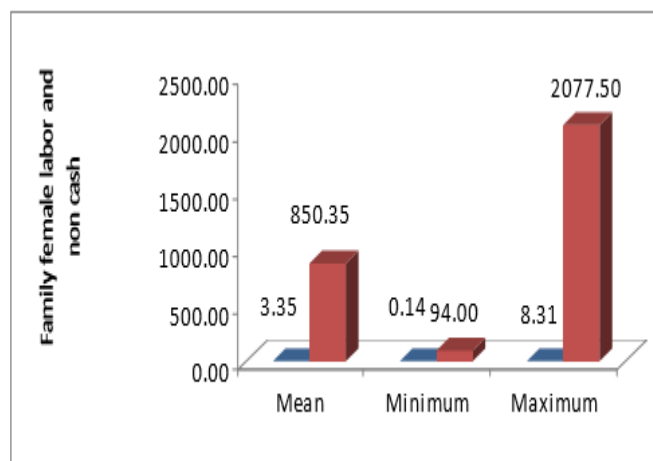


Fig 19. Mean, minimum and maximum amount and price of the Family female labor.

4.12 Analysis of fish species cultivated in Shiktan VDC

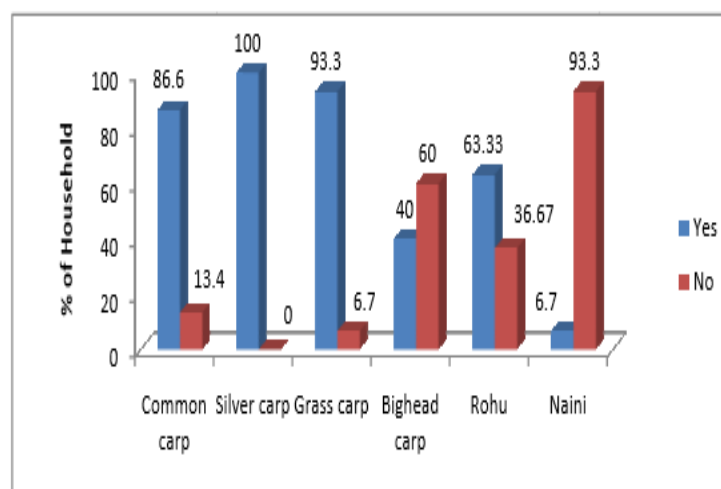


Figure. 20 Percentage of Household cultivating different fish species in shiktahan VDC

4.13 Percentage of different fish stocked.

Among 30 houses, 86.67% cultivated common carp, 100% cultivated silver carp and 93.33% cultivated grass carp, 40% reared bighead carp, 63.33% reared rohu and 6.67% reared naini.

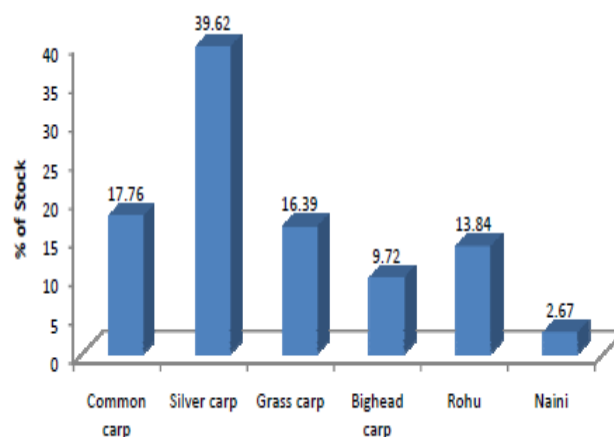


Figure 21. Percentage of stocking of different fish species in Shiktahan VDC

Shiktahan VDC among 30 houses, 17.76% were using stocking of common carp, 39.62% were using silver carp, 16.39% were using grass carp, 9.72% were using bighead carp, 13.84% were using rohu and 2.67% were using naini.

4.14 Computation total value of stocking used by farmer of different fish species.

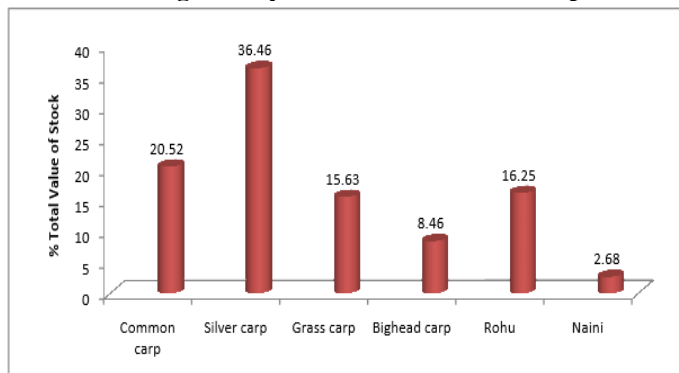


Figure 22. Total value of stocking used by farmer of different fish species

Among the total value of the stock of the 30 houses, 20.52% comprises of common carp, 36.46% comprises of silver carp, 15.63% comprises of grass carp, 8.46% comprises of bighead carp, 16.25% comprises of rohu and 2.68% comprises of naini.

4.15 Comparison of harvest percentage of different fish species.

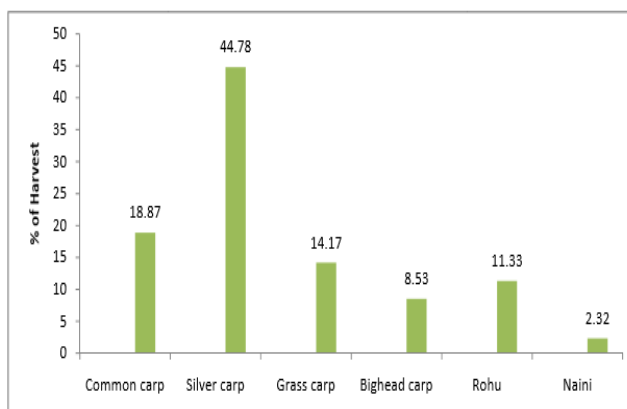


Figure 23. Total no. of Harvest of different species of fish.

Among total number of harvest were silver carp, 14.17% were grass carp, 8.53% were bighead carp, 11.33% were rohu and 2.32% were naini.

4.16 Computation of total value of harvest of different fish species.

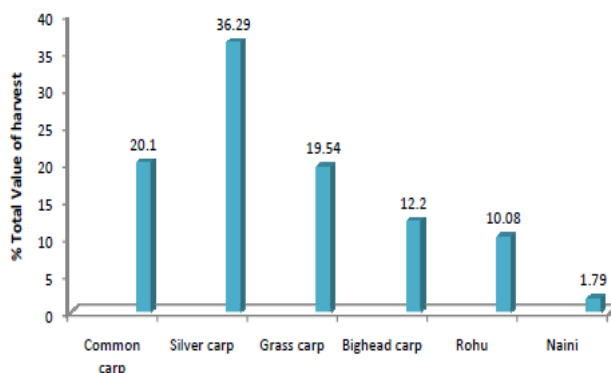


Figure 24. Total value of harvest of different fish species

Among total value of harvested fish of 30 houses, 20.5% were of common carp, 36.29% were of silver carp, 19.54% were of grass carp, 12.2% were of bighead carp, 10.08% were of rohu and 1.79 were of naini.

4.17 Percentage of total stock weight of common carp.

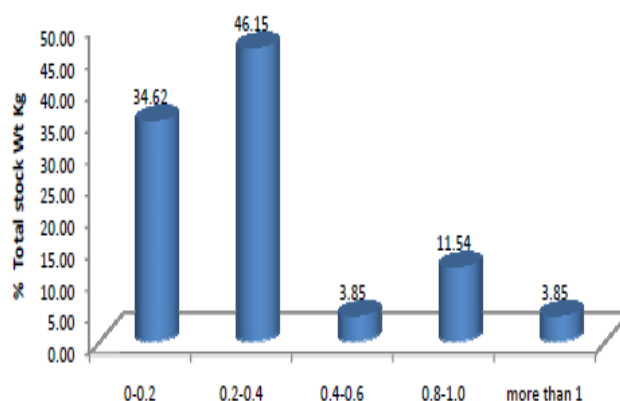


Figure 25. Percentage of total stock weight of common carp.

Among total stock weight of common carp, 34.6% were of between 0-0.2 kg, 46.15% of 0.2-0.4 kg, 3.85% of 0.4-0.6 kg, 11.54% of 0.8-1.0 kg and 3.85% of more 1 kg.

4.18 Percentage of average size of fingerlings of common carp.

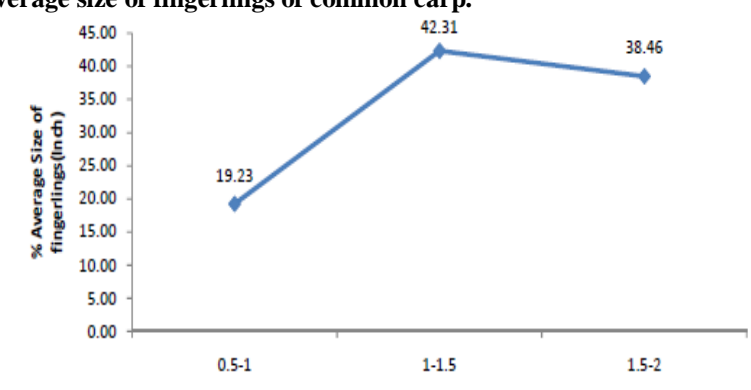


Figure 26. Percentage of average size of fingerlings of common carp.

Among average size of fingerlings of common carp, 19.23% were of 0.5-1 inch, 42.31% of 1-1.5 inch and 38.46% of 1.5-2 inch.

4.19 Percentage of total stock weight of silver carp.

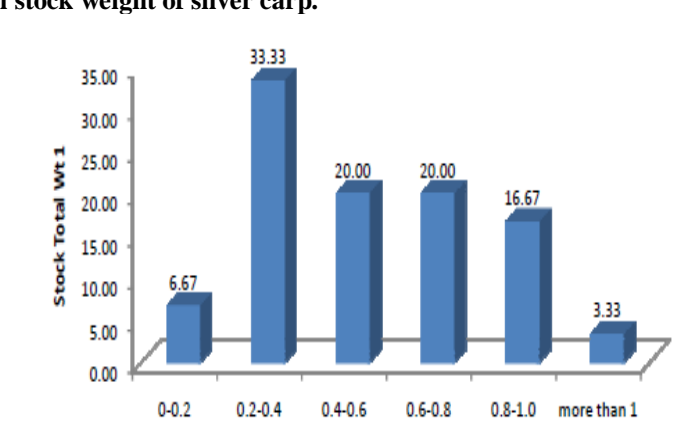


Figure 27. Percentage of total stock weight of silver carp.

Among total stock weight of silver carp, 6.67% were of between 0-0.2 kg, 33.33%, of 0.2-0.4 kg, 20.00% of 0.4-0.6 kg, 20.00% of 0.6-0.8, 16.67% of 0.8-1.0 kg and 3.33% of more than 1 kg.

4.20 Percentage of average size of fingerlings of silver carp.

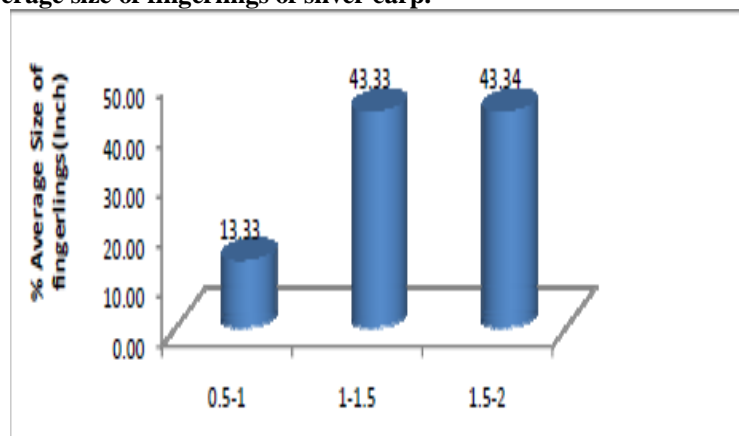


Figure 28. Percentage of average size of fingerlings of silver carp.

4.21 Percentage of total stock weight of Grass carp.

Among average size of fingerlings of silver carp, 13.33% were of 0.5-1 inch, 43.33% of 1-1.5 inch and 43.34% of 1.5 -2 inch.

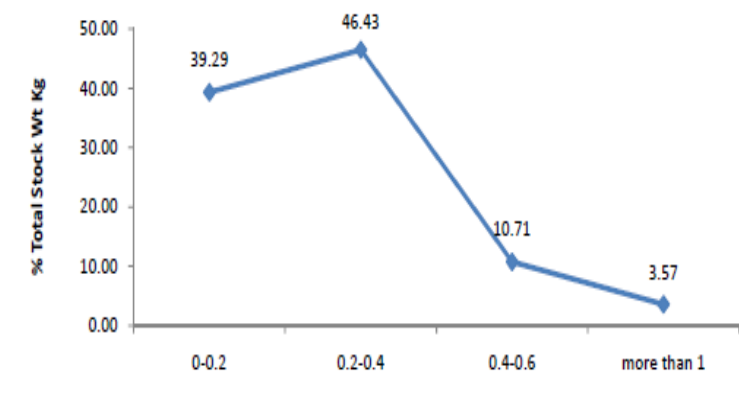


Figure 29. Percentage of total stock weight of Grass carp.

Among total stock weight of grass carp, 39.29% were of between 0-0.2 kg, 46.43% of 0.2-0.4 kg, 10.71% of 0.4 -0.6 kg, and 3.57% of more than 1 kg.

4.22 Percentage of average size of fingerlings of Grass carp

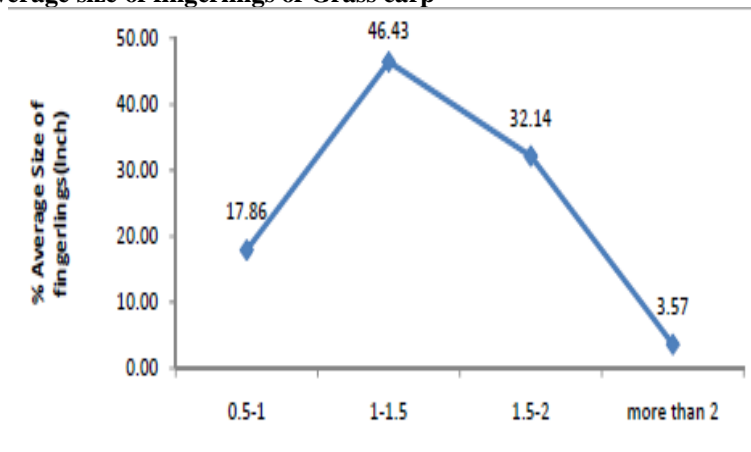


Figure 30. Percentage of average size of fingerlings of Grass carp

4.23 Percentage of total stock weight of Bighead carp.

Among average size of fingerlings of grass carp, 17.86% were of 0.5-1 inch, 46.43% of 1-1.5 inch 32.14% of 1.5-2 inch and 3.57% of more than 2 inch.

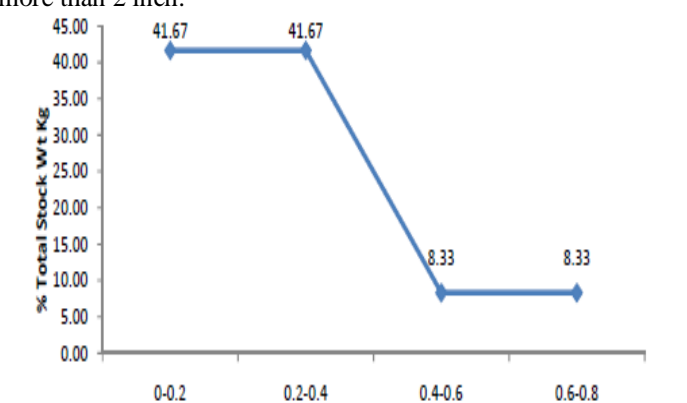


Figure 31. Percentage of total stock weight of Bighead carp

Among total stock weight of bighead carp, 41.67% were of between 0-0.2 kg, 41.67% of 0.2-0.4 kg, 8.33% of 0.4-0.6 kg, and 8.33% of more than 1 kg.

4.24 Percentage of average size of fingerlings of Bighead carp.

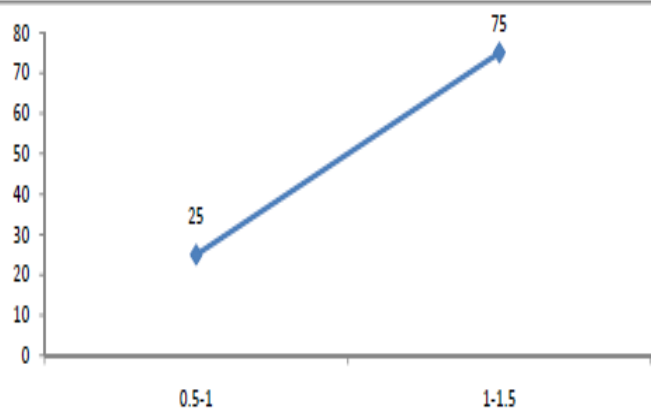


Figure 32. Percentage of average size of fingerlings of Bighead carp.

Among average size of fingerlings of bighead carp, 25% were of 0.5-1 inch and 75% of 1-1.5 inch.

4.25 Percentage of total stock weight of Rohu.

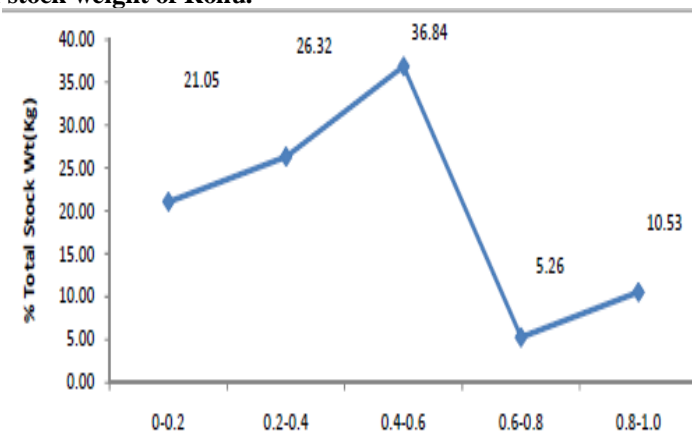


Figure 33. Percentage of total stock weight of Rohu.

Among total stock weight of rohu, 21.05% were of between 0-0.2 kg, 26.32% of 0.2-0.4 kg, 36.84% of 0.4-0.6 kg, 5.26% of 0.6 -0.8 and 10.53% of 0.8-1.0 kg.

4.26 Percentage of average size of fingerlings of Rohu

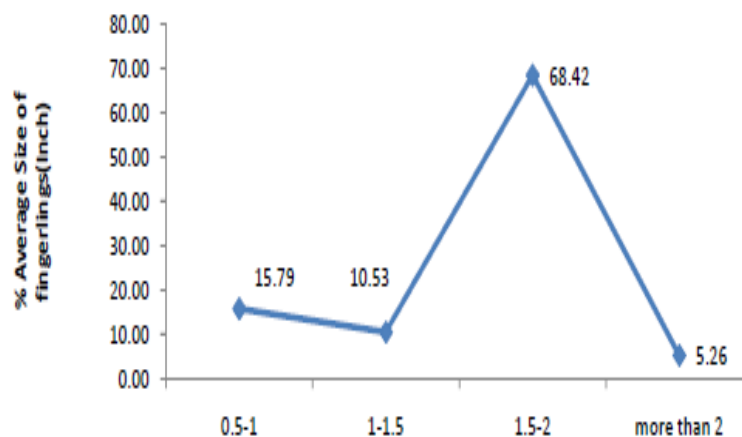


Figure 34. Percentage of average size of fingerlings of Rohu.

Among average size of fingerlings of rohu, 15.79% were of 0.5-1 inch, 10.53% of 1-1.5 inch, 68.42% of 1.5 -2 inch and 5.26% of more than 2 inch.

4.27 Percentage of total stock weight of Naini

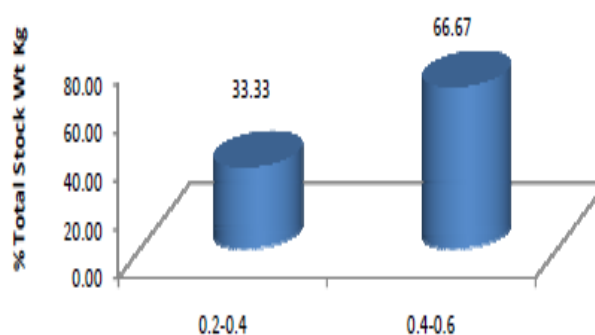


Figure 35. Percentage of total stock weight of Naini

Among total stock weight of naini, 33.33% were of between 0. 2-0.4 kg and 66.67% of 0.4- 0.6 kg

4.28 Percentage of average size of fingerlings of Naini.

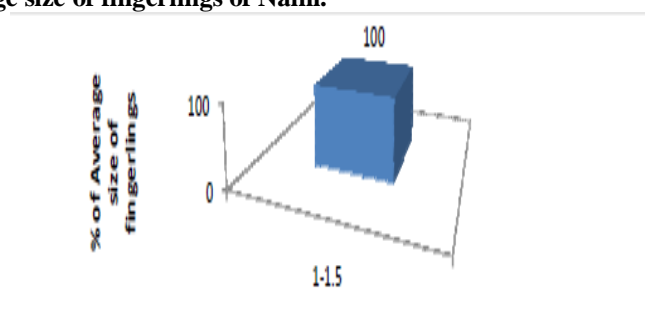


Fig 36 Percentage of average size of fingerlings of Naini.

Among average size of fingerlings of naini, 100% were of 1 -1.5 inch.

4.29 Technology used for fish farming

Almost 100% of the farmers used IAA based carp polyculture technology for fish farming. This technology is incorporation of agriculture in aquaculture. In this technology different vegetables like pumpkin, cucumber, sponge gourd, pond dikes. This helps to generate the secondary income and also minimizes the risk of fish farming as vegetable production compensates the loss of fish farming.

5. Summary and Conclusion

The study on status of fish farming was analysed in Shiktahan VDC of Rupandehi district of Nepal. Aquaculture has a great positive impact on the livelihood of the people of Rupandehi district. Poverty is one of the causes of the food insecurity and lower adaption to the modern world. Rural Nepalese people heavily rely on the cereals crop to sustain their livelihood in Shiktahan VDC. In addition to it, subsistence farming due to poverty for their livelihood has been greatly affected by the changing climate and market facilities. A sample of 30 houses from Shiktahan VDC were randomly selected, thus a total of 30 respondents were interviewed. Primary data were collected from site visit and face to face interview and secondary data about different fish species, stocking size, no. of harvest, total value, total inputs such as feeding materials like rice bran, MOC, urea, DAP etc were collected from CEAPRED, WFC, journals and publications. Socio-demographic showed that most of the populations in the study area were dominated by ethnic communities in which Tharu and Khawas (Janjati) and Nishad and Kewat (Madhesi) were 50.00% and 20.00% respectively. The major source of livelihood of the people of the VDC was agriculture, construction worker, wage labor, etc. Most of the farmers were illiterate. There was the trend that most of the farmer are leaving their farming occupation and are attracted towards occupation in the abroad country. Among the surveyed sample households, 86.66% of the total households were depended upon rainfall for the source of the water in the pond, followed by the irrigation canal (6.67%) and 6.67% used motor pump. Many respondents (43.33%) have pond area between 0.5-0.75 kattha followed a little bit, clearly and more clearly by 26.67%, who have 0.25-0.5 kattha, 16.67% have between 0.75-1 kattha and 13.33% have above 1 kattha. Among the total household surveyed, 86.67% cultivated common carp, 100% cultivated silver carp, and 93.33% cultivated grass carp, 40% reared bighead carp, 63.33% reared rohu and 6.67% reared Naini/Mrigal. In Shiktahan, majority of the respondents (39.62%) were rearing the stocking of the Silver carp followed by Common carp (17.76%), Grass carp (16.39%), Rohu (13.84%), Bighead carp (9.72%) and Naini/Mrigal (2.67%). Silver carp is mainly preferred in that area due to the fact that they were more preferred in the market as they are cheap than other fish species, they have good rearing capacity and highly nutritious with higher adaptability to the local situation. Among the total value of the stock of the surveyed household, 36.46% comprises of Silver carp followed by Common carp (20.52%) Grasscarp (15.63%), Bighead carp (8.46%), Rohu (16.25%) and Naini/Mrigal (2.68%). Among the total house surveyed, the result shows that the total harvests of stocking were higher in Silver carp (44.78%) followed by Common carp (18.87%), Grass carp (14.17%), Bighead carp (8.53%), Rohu (11.33%) and Naini/Mrigal (2.32%). Among the total houses surveyed, the total value of harvest of Silver carp (36.29%) is higher as in total it has more number of the stocking and the number of harvest followed by the Common carp (20.5%), Grass carp (19.54%), Bighead carp (12.2%), Rohu (10.08%) and 1.79 Naini/Mrigal.

The result shows that among total stock weight of common carp in all respondent households, the highest number of stock wt. was between 0.2-0.4 kg (46.15%) followed by 0-0.2 kg (34.6%) , 0.8-1.0 kg (11.54%) and more than 1 kg (3.85%). Similarly, among average size of fingerlings of common carp of the total respondents households, maximum no. of fishes were of 1-1.5 inch (42.31%) followed by 1.5-2 inch (38.46%) and 19.23% were of 0.5-1 inch. Likewise from research of total stock weight of silver carp from all respondents surveyed, maximum no. of fishes were of between 0.2-0.4 kg (33.33%) followed by 0.4-0.6 kg (20.00%), 0.6-0.8 kg (20.00%), 0.8-1.0 kg (16.67%), 0-0.2 kg (6.67%), and more than 1 kg (3.33%). Similarly, among average size of fingerlings of silver carp, More no. of fish were of 1.5-2 inch (43.34%) followed very nearly by 1-1.5 inch (43.33%) and remaining were of 0.5-1 inch (13.33%). Likewise again from survey of total stock weight of Grass carp from all respondents surveyed, maximum no. of fishes were of between 0.2-0.4 kg (46.43%) followed by 0-0.2 kg (39.29%), 0.4-0.6 kg (10.71%) and more than 1 kg (3.57%). Similarly, among average size of fingerlings of Grass carp, more no. of fish were of 1-1.5 inches (46.43%) followed very nearly by 1.5-2 inches (32.14%), 0.5-1 (17.86%) and remaining was of more than 2 inches (3.57%). From the study of total stock weight of Bighead carp from all respondents surveyed, highest no. of fishes were between 0.2-0.4 kg and 0-0.2 kg (41.67%) followed by 0.4-0.6 kg (8.33%) and 0.6-0.8 (8.33%). Total stock weight of more than 1 kg was not found in Bighead carp in surveyed households. Similarly, among average size of fingerlings of Bighead carp, more no. of fish were of 1- 1.5 inches (75%) followed by 0.5-1 inches (25%). Others categories were not found in Bighead carp in the respondents of the surveyed households. Likewise from the study of total stock weight of Rohu from all respondents surveyed, maximum no. of fishes were of between 0.4-0.6 kg (36.84%) followed by 0.2-0.4 kg (26.32%), 0-0.2 kg (10.71%), more than 1 kg (10.53%) and 0.6-0.8 (5.26%). Similarly, study shows that among average size of fingerlings of Rohu, more no. of fish were of 1.5-2 inches (68.42%) followed a little bit, clearly and more clearly by 0.5-1 inch (15.79%), 1-1.5 inch (10.53%) and remaining was of more than 2 inches (5.26%). From the study of total stock weight of Indian carp Naini/Mrigal from all respondents surveyed, highest no. of fishes were 0.4-0.6 kg (66.67%) followed by 0.2-0.4 kg (33.33%). Total stock weight of 0-0.2, 0.6-0.8 and more than 1 kg was not found in Naini/Mrigal in surveyed households. Similarly, survey among average size of fingerlings of Naini/Mrigal, all of the fishes was of 1-1.5 inch. Others categories were not found in Naini/Mrigal in the respondents of the surveyed households.

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