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Integrated Duck cum Fish Farming Management for Socio Economic Ufliftment and Poverty Alleviation of Rural People in Purulia District, West Bengal

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ABSTRACT

Integrated fish farming offers great efficiency in resource utilization, as waste or byproduct from one system is effectively recycled. The economic benefit of integrated fish farming cannot be over-emphasized since the integration is varied and diversified in nature. It is one of the most viable, reliable and profitable of any farming enterprise. It contributes immensely to the economic empowerment of many families especially in the rural communities. It enables the farmer to be productive all the year round and fully maximize its production. Its contribution in the enhancement of food security and self-sufficiency is highlighted in this study. This study is based on primary data and conducted during the months of October 2016 to November 2016. To study the socio-economic status of the rural integrated duck cum farmers, a sample of 20 respondents was carved out randomly from the four villages in Purulia-I Block of district Purulia in West Bengal. The generated data were computed and analyzed through statistical tools and overall economic return in terms of productivity of the fishery and duckery practices, their gross return, net return and ultimate B:C ratio. Integrated duck-fish farming has become popular for household nutritional security and women empowerment in the remote villages of Purulia district. Additionally, the consumption of eggs/fish and meat adds to food quality and livelihood security of the resource-poor family. The study has concluded that the integrated duck-fish system could address issues of sustainability, women empowerment and livelihood security effectively.

Key word: *Integrated Farming, Duck cum Fish, Poverty alleviation, Rural People, Socio Economic Upliftment.*

INTRODUCTION

Integrated fish farming is based on the concept that 'there is no waste', and waste is only a misplaced resource which can become a valuable material for another product. The principle of integrated fish farming involves farming of fish along with livestock or/and agricultural crops. This type of farming offers great efficiency in resource utilization, as waste or byproduct from one system is effectively recycled.

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It also enables effective utilization of available farming space for maximizing production. The rising cost of protein rich fish food and chemical fertilizers as well as the general concern for energy conservation have created awareness in the utilization of rice and other crop fields and livestock wastes for fish culture. Integrated fish farming combines livestock production with fish farming. Animal manure is shed directly into a fish pond as fertilizer and supports the growth of photosynthetic organisms. The livestock, mainly duck, chickens and pigs, is often fed feed containing growth promoters. The farming systems are relatively confined units with little exchange of water. Manure from livestock production is administered to fish ponds; the manure is directly consumed by fish, and the release of nutrients supports the growth of mainly photosynthetic organisms. This integrated fish farming system produces high yields with low input, with the fish receiving limited, if any, supplementary feed. In contrast, the livestock on the integrated farms, which includes duck, chickens and pigs, is reared intensively, and antimicrobial agents are used as growth promoters and for prophylactic and therapeutic treatment. Within integrated fish farming systems, antimicrobials, their residues, and antimicrobial-resistant bacteria may enter the fish ponds through animal manure and/or excess feeding and are potential sources of antimicrobial-resistant bacteria.

Fish utilizes the feed spilled by ducks and eat their droppings directly by some fishes. Ducks increases the pond productivity by releasing the nutrients from the pond bottom soil through dabbling the pond bottom mud. From the same places at the same time duck meat & eggs and also the fish can be produced. Duck get 50- 75% of their total feed requirement from the pond itself in the form of aquatic weeds, insects, mollusks, etc. which do not form the food of the fish. Duck dropping contains 81% water, 0.91% nitrogen and 0.38% phosphorous. Dicks are given free range from 9 a.m. to 5 p.m. in the pond and the excreta released during this period are easily mixed with pond water and fertilize it. Again duck droppings voided during night at the duck house are collected and applied to the fish pond in the morning hours to fertilize the pond water. Dick dropping act as a good fertilizer which helps in producing fish feed i.e. phytoplankton & zooplankton in fish pond. So application of extra fertilizer and feed to fish pond for raising fish is not needed. This cuts the cost of fish production by 60%. One duck voided about 125- 150 gms. excreta in a day. Therefore by stocking 250- 300 ducklings/ ha (30- 40 ducklings/ bigha) water spread area the required quantity of duck excreta, i.e. 10000- 15000 kg/ year / ha (1300-2000kg/ year/ bigha water spread area) can be received. When phytoplanktonic bloom is seen over the surface water of fish pond then application of duck droppings to the pond should immediately be suspended. The adoption of integrated duck cum fish farming can offer opportunities for livelihood and food security to the households of the Purulia district. Keeping this in view, the present study has been conducted to assess the economics of prevailing duck production systems and their role in ensuring rural livelihood security and sustainability in the Purulia district of west Bengal.

MATERIAL AND METHODS

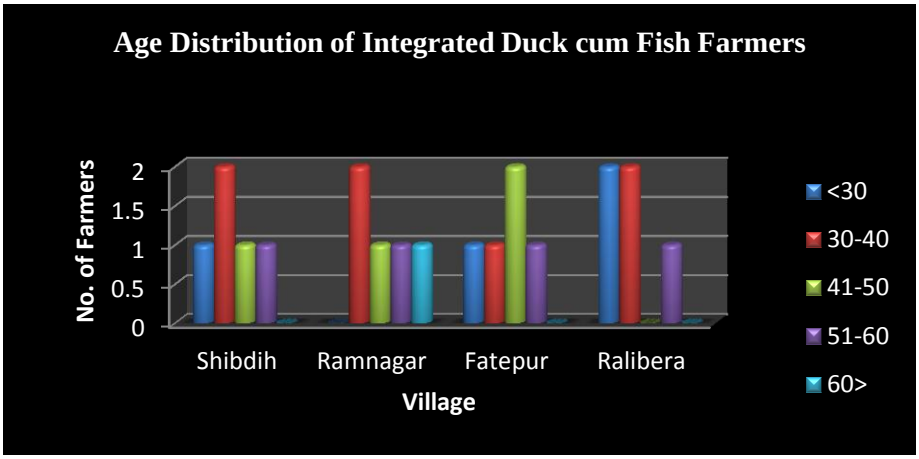
The present study is based on an intensive fieldwork conducted in Purulia-I Block of Purulia district, West Bengal during the months of October 2016 to November 2016. Before the commencement of fieldwork, a pilot study was conducted during the month of September 2016. Based on that pilot study, Purulia-I Block of Purulia district were selected for final study. Purposive sampling method was used while selecting the study area. Physiographically, Purulia, the westernmost district of West Bengal, is well known as a drought prone district and falls within the semi-arid region of the state. Cultivation of this district is predominantly mono-cropped. Out of total geographical land 52.47 % are used for agriculture. 29.69 % are under forest coverage (including social

forestry) and 10.15 % are identified as Wasteland. Soil erosion is the most prominent phenomenon of the district resulting huge deposition of fertile soil in the valley region. Vast areas of land remained uncultivable wasteland. Out of the total agricultural holding about 73 % belongs to small and marginal farmers having scattered and fragmented smallholding. About 90 % of the population lives in villages and about 44 % of the rural population is below poverty line. Using random sampling method around 20 Rural Integrated Duck cum Fish Farmer were selected for final study.

RESULT AND DISCUSSION

Table-1: Age Distribution of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

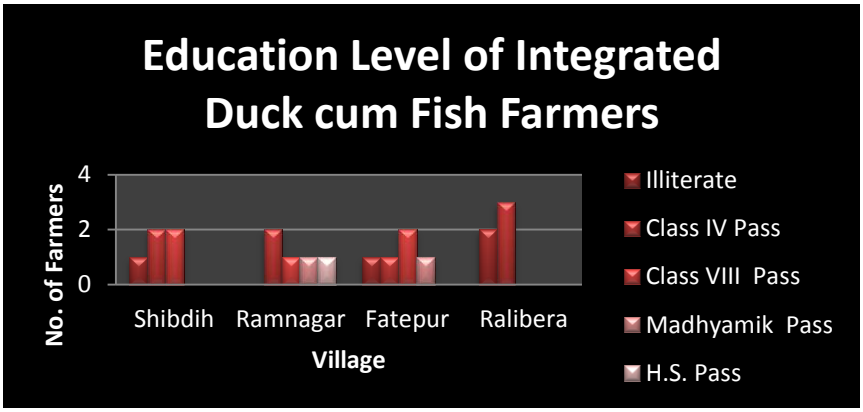
Age (Years) / Villages	<30	30-40	41-50	51-60	60>	Total
Shibdih	1	2	1	1	0	5
Ramnagar	0	2	1	1	1	5
Fatepur	1	1	2	1	0	5
Ralibera	2	2	0	1	0	5
Total with % Involved	4(20%)	7(35%)	4(20%)	4 (20%)	1 (5%)	20 (100%)



From (Table-1), it clearly indicates that the maximum percentage of Integrated Duck cum Fish Farmers in Purulia-I block were within medium age group (i.e. between the age group 30 to 40 years), while 20% Farmers age were below 30 years only, followed by 20% were 41-50 age group, 20% were 51-60 age group and only 5% Farmers were above 60 years age group. From the ensuing results it can therefore be concluded that the majority of the workforce participating in the study is fairly young.

Table 2: Distribution of the Education Qualification level of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

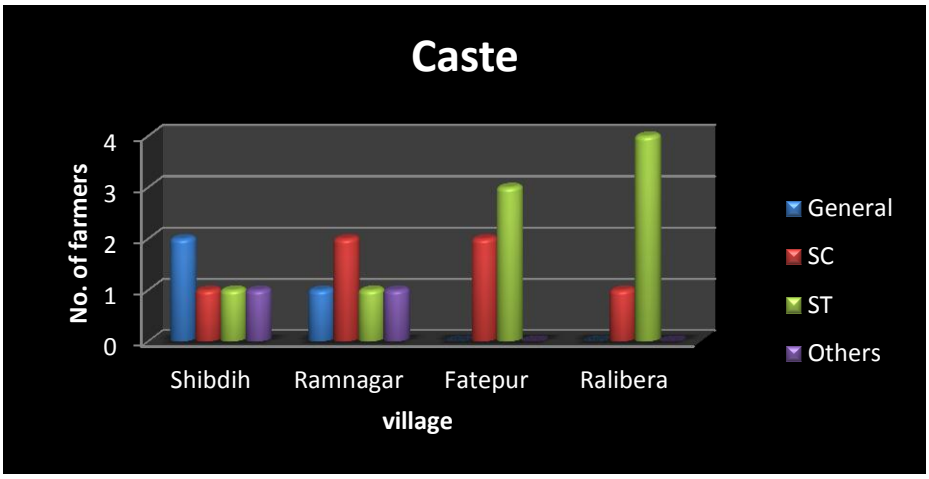
Edu. Level / Villages	Illiterate	Class IV Pass	Class VIII Pass	Madhyamik Pass	H.S. Pass	Total
Shibdih	1	2	2	0	0	5
Ramnagar	0	2	1	1	1	5
Fatepur	1	1	2	1	0	5
Ralibera	2	3	0	0	0	5
Total with % Involved	4(20%)	8(40%)	5(25%)	2 (10%)	1 (5%)	20 (100%)



In the present study area it was evident that the literacy level of Integrated Farmers are very poor. From (table-2) it clearly indicates the major percentage (40%) farmers are educated upto primary level, while 20% farmers are Illiterate, followed by 25% are educated upto upper primary level. Whereas a considerable numbers of Integrated Farmers having education upto madhyamik (10%) and higher secondary level (5%). This clearly shows that the literacy rate of this area are really poor and miserable.

Table 3: Caste of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

Caste / Villages	General	SC	ST	Others	Total
Shibdih	2	1	1	1	5
Ramnagar	1	2	1	1	5
Fatepur	0	2	3	0	5
Ralibera	0	1	4	0	5
Total with % Involved	3(15%)	6(30%)	9(45%)	2(10%)	20 (100%)



In the present study Caste category of the respondent shown in table 3, which depict the majority (50 percent) of Integrated duck cum fish farmers belonging to Schedule Tribe category , remaining 30 % famers belonging to Schedule Caste category whereas 15% farmers were General caste and only 10% were Other caste.

Table 4: Gender of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

Gender / Villages	Male	Female	Total
Shibdih	5	0	5
Ramnagar	5	0	5
Fatepur	5	0	5
Ralibera	5	0	5
Total with % Involved	20(100%)	00(00%)	20 (100%)

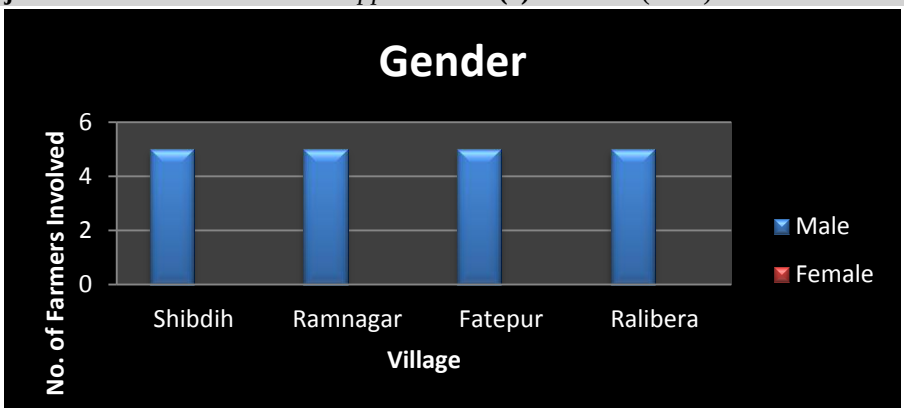


Table:- 4 present the percentage of gender distribution of the sample. The sample was representative of a larger number of male respondents to that of female respondents. Male respondents comprised of 100% compared to 00% female respondents. From the ensuing results it can therefore be concluded that the male responds are more interested in this job than female responds.

Table 5: Marital Status of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

Marital Status / Villages	Married	Unmarried	Total
Shibdih	4	1	5
Ramnagar	5	0	5
Fatepur	4	1	5
Ralibera	5	0	5
Total with % Involved	18(90%)	2(10%)	20 (100%)

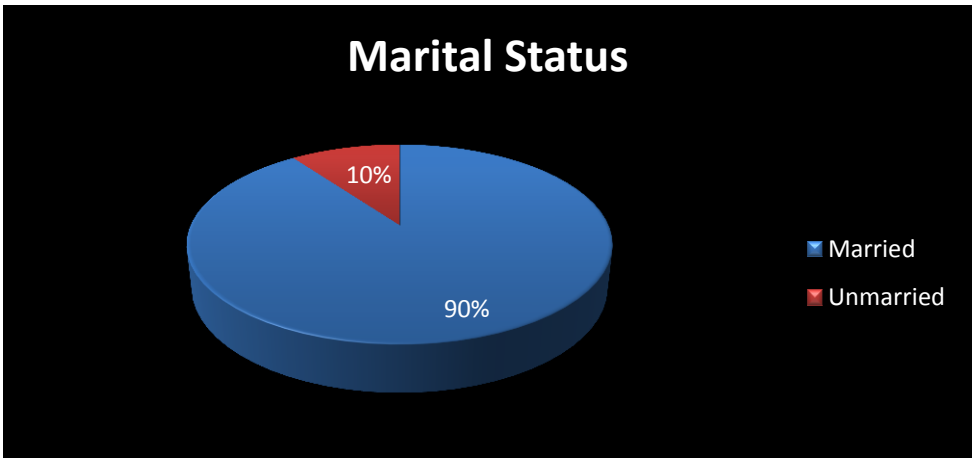
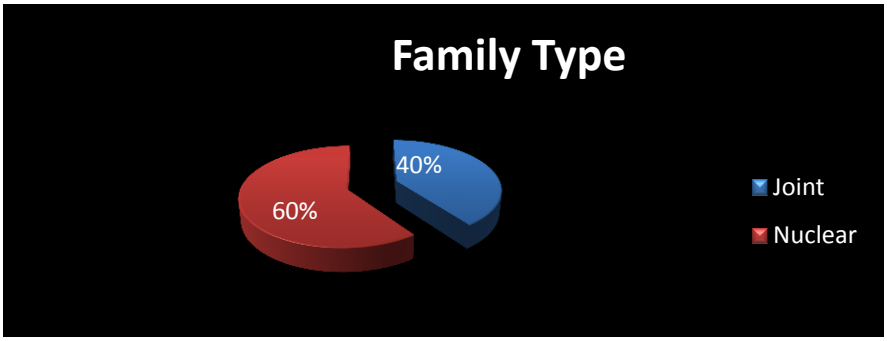


Table: 5 present the percentage of marital status of the respond. The sample was representative of a larger number of married respondents to that of unmarried respondents. Married respondents comprised of 90% compared to 10% unmarried respondents.

Table 6: Distribution of Integrated Duck cum Fish Farmers according to family type of Purulia-I block in Purulia District

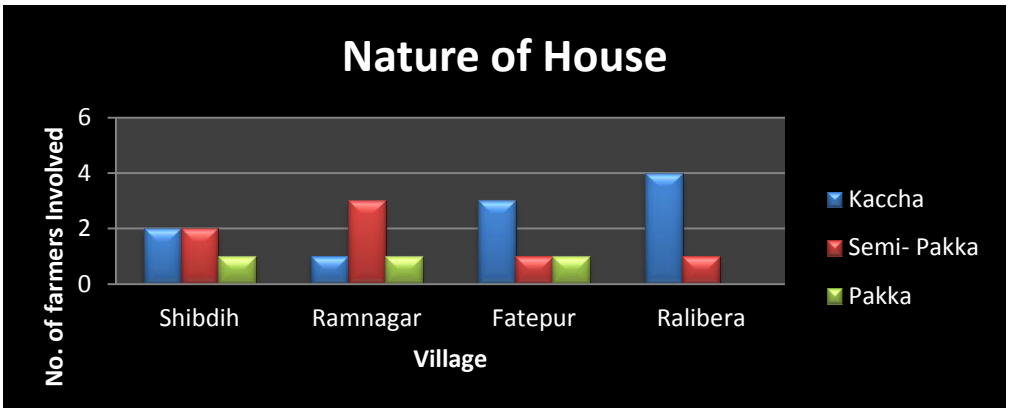
Family Type / Villages	Joint	Nuclear	Total
Shibdih	2	3	5
Ramnagar	0	5	5
Fatepur	2	3	5
Ralibera	4	1	5
Total with % Involved	8(40%)	12(60%)	20 (100%)



This study illustrates that the maximum percentage (60%) of Integrated Duck cum Fish Farmers in Purulia-I block having Nuclear family type whereas 40% Integrated Duck cum Fish Farmers having Joint family type.

Table 7: Nature of House of the Integrated Duck cum Fish Farmers of Purulia-I block in Purulia District

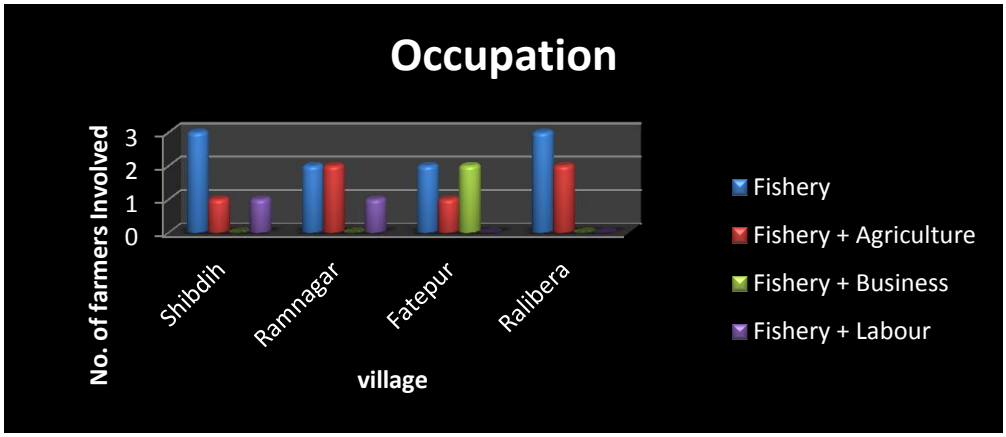
Nature of House / Villages	Kaccha	Semi- Pakka	Pakka	Total
Shibdih	2	2	1	5
Ramnagar	1	3	1	5
Fatepur	3	1	1	5
Ralibera	4	1	0	5
Total with % Involved	10(50%)	7(35%)	3(15%)	20 (100%)



From the above table it is very clear that 50% respondents have pure kaccha houses to dwell in, whereas 35% respondents do have semi-pakka houses, while only 15% respondents have pakka houses. Since they live in most of the villages have been situated in the remote, rural, and forest areas, so the people are forced to live in the kaccha houses. To construct a pakka house, there are plenty of problems.

Table 8: Distribution of Integrated Duck cum Fish Farmers according to different occupation of Purulia-I block in Purulia District.

Occupation / Villages	Fishery	Fishery + Agriculture	Fishery + Business	Fishery + Labour	Total
Shibdih	3	1	0	1	5
Ramnagar	2	2	0	1	5
Fatepur	2	1	2	0	5
Ralibera	3	2	0	0	5
Total with % Involved	10(50%)	6(30%)	2(10%)	2 (10%)	20 (100%)



All farmers are distributed in accordance with the subsidiary and a casual occupation since Pisciculture is main occupation. In every household, some of the members are involved full time in Pisciculture whereas others expense part time by practicing subsidiary and casual occupations as shown in the below table:

The data exhibited that majority of Integrated Duck cum Fish Farmers in Purulia-I block are engaged in Pisciculture activities (50 percent), followed by Pisciculture and Agriculture (30 percent), Pisciculture and Business (10 percent), Pisciculture and Labour (10 percent) as a subsidiary occupation.

Table 9: Average Economics of all Traditional Culture and Integrated Duck cum Fish Farming at Purulia-I Block, Purulia: Schedule Depicted on Average Pond Size of 1 Bigha (1,333.33 m^2)

	Traditional Pisciculture			Integrated Duck cum Fish farming		
Farmers No.	**Investment (Approx) (Rs/Yr.)**	**Income (Approx) (Rs/Yr.)**	**Profit (Approx) (Rs/Yr.)**	**Investment (Approx) (Rs/Yr.)**	**Income (Approx) (Rs/Yr.)**	**Profit (Approx) (Rs/Yr.)**
Farmer 1	33500	52000	18500	53200	81500	28300
Farmer 2	35700	58000	22300	55000	85000	30000
Farmer 3	30000	51000	21000	53000	82000	29000
Farmer 4	32000	50000	18000	54000	88000	34000
Farmer 5	32500	52000	19500	51000	80000	29000
Farmer 6	37500	55000	17500	56000	82000	26000
Farmer 7	30000	51000	21000	54000	85000	31000
Farmer 8	36000	59000	23000	49000	80000	31000
Farmer 9	31500	53000	21500	60000	88000	28000
Farmer 10	35000	53500	18500	52000	80000	28000
Farmer 11	40000	60000	20000	55000	82000	27000
Farmer 12	38500	58000	19500	51000	81500	30500
Farmer 13	36000	57000	21000	57000	85000	28000
Farmer 14	31000	53000	22000	53000	82000	29000
Farmer 15	35000	54000	19000	52000	80000	28000
Farmer 16	37000	51000	14000	58000	85000	27000
Farmer 17	30000	56000	26000	51000	82000	29000
Farmer 18	35000	54000	19000	50000	86000	36000
Farmer 19	32000	49000	17000	52000	81000	29000
Farmer 20	38000	60000	22000	55000	83000	28000
Average value	**34310**	**54325**	**20015**	**53560**	**82950**	**29290**

Integrated farming is a sustainable and effective tool for improving rural economy due to its cumulative cost effectiveness, low investment and higher profitability. To achieve optimum production with cost effective low investment recycling of wastes and residues from one farming to other system with due environmental consideration is very much necessary.

From table 9, it clearly indicate that in case of Traditional Pisciculture the average Investment, Income and Profit were Rupees 34210/-, Rupees 54325/- and Rupees 20015/- respectively. On the other hand in case of Integrated Duck cum Fish Farming the average Investment, Income and Profit were Rupees 53560/-, Rupees 82950/- and Rupees 29290/- respectively.

CONCLUSION

The economic benefit of integrated fish farming cannot be over-emphasized since the integration is varied and diversified in nature. It is one of the most viable, reliable and profitable of any farming enterprise. It contributes immensely to the economic empowerment of many families especially in the rural communities. It enables the farmer to be productive all the year round and fully maximize its production. Its contribution in the enhancement of food security and self sufficiency is highlighted in this study. Integrated fish farming provides the farmer with a steady source of income all year round; this comes from various farm products. Integrated fish farming is the blending of various compatible agricultural enterprises into a functional or unified farming system for the purpose of sustainability and it varies from one area to another in terms of production combination, rates and sizes. Women/youth being the most vibrant group of people are involves in this system. It plays very important role in many aspects of women/youth development and empowerment and more profitable than unitary system of farming as it ensures a spread of financial risk for its varied diversified nature in rearing fish, animals and crops; it has a capacity of making more food available thus enhancing food security. Besides, it provide employment, thus alleviating poverty and enhancing the economic status of the rural populace in India and reduce to the barest minimum the level of violence from disenchanted youth that is characteristic of the country in recent times. From the research work carried in the block of Purulia-I, it clearly shows a positive impact upon the culture and subsequently to the farmers. To be more specific the following schemes are mainly emphasized *viz,* economic upliftment of rural people through operation of integrated pisciculture development, socio-economic upliftment of fishefolk through operation of pisciculture development scheme etc. are in operation. Study also reveals that, fisheries represent a vital sector in the thrust Programme of West Bengal Government for rural development through production of fish and other ancillary activities thereby generating rural employment and improvement of socio-economic status of the fishers who are the prime contributors of fisheries production. Fisheries sector embraces a large population of scheduled castes and scheduled tribes. Rehabilitation of scheduled castes and scheduled tribes families through fishery activities has become a major boon for upliftment of their economic status above poverty line.

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