RESEARCH ARTICLE

SOCIO ECONOMIC ASPECTS ON PADDY ALTERNATE FISH CULTURE AT MOYNA BLOCK, PURBA MEDINIPUR DISTRICT, WEST BENGAL, INDIA

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ARTICLE INFO	**ABSTRACT**

In the study on different sites the economics of paddy-fish farming system was conducted in the block of Moyna under East Midnapore district of West Bengal. The study was carried out among 100 farmers. Paddy alternate fish culture at Moyna Block utilizes a range of production systems and practices, but all contribute to eco friendly environmental benefits and sustainable development. Many factors have contributed to these developments, but equally and still, there are challenges that need to be addressed for up-scaling these production systems and practices. The production rate of fish is much higher than in other traditional system of culture. We have seen fish production at culture area in between 4200 Kg – 4900 Kg/hectare within six month. The growth rate of culture fishes at paddy alternate fish culture is higher than paddy with fish culture. The study revealed that farmers of this Moyna block followed paddy alternate fish farming by simultaneous and rotation techniques. About 47% farmers were under the age group of 31 to 40 and their education level was below matriculation. The study also pointed out the surplus labours of the local area had better employment opportunity through this farming system. Besides in this system the farmers get production of paddy from the same field at the rate of 5000 kg to 5200 kg per hectare, after fish culture the expenditure of paddy production at the culture areas is less. So, it clearly establishes the superiority of this system of fish alternate paddy cultivation. The study reveal that expenditure of winter paddy cultivation is less on culture sites because during fish culture the soil fertility is higher due to application of inorganic and organic manure. The result of this investigation exhibit the sustainability of this culture system as this system does not pollute the water and soil by use of fertilizers and pesticides to an alarming level. The investigation also brings to light clearly that this system is a very good instrument for socio-economic development of the fish farmers in a better way than any other system of culture. It is evident from the economics of this system for the fishermen.

INTRODUCTION

Fish culture and fish marketing is an important branch of many nations of the world from the standpoint of income and employment generation. Fisheries sector plays an important role in the Indian economy by contributing to the national and international income, employment and foreign exchange. Moyna Block under Purba Medinipur is one of the backward area in West Bengal where the inhabitants are the mixed caste communities with patches of concentration either SC or ST or Minority community as the case may be. Major portion of the population are still poor and needy. The important factors that have induced the utilization and development of rice alternate fish farming of the State are the socio-economic conditions of the rural community.

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Agriculture as and fishery are generally considered a low profession in India and practice mainly by the members of a number of backwards communities. Within the framework of rural development, paddy alternate fish farming has great potential in India which requires medium cash outlays and could provide significant increases in rural employment and family incomes. However, the constraints that hamper the development of paddy alternate fish farming are technical, socio-economic and management related in nature. Many farmers also lack motivation or find it difficult to change work and social habits in order to grow fish in paddy field. Further, the success of paddy alternate fish farming is also affected by lack of reliable sources of quality fish seed reasonably priced supplemental feeds; lack of control of diseases; lack of sufficient water during the post-monsoon seasons. Moreover, there is an urgent need to formulate ecological guidelines for fish cultivation in paddy fields.

Fish culture, is no more compatible with paddy farming wherever the latest high yielding varieties of paddy are cultivated. These developments have substantially curtailed fish culture in rice fields in Japan, where a greater crop of rice alone is by far preferred over a supplementary crop of fish with a lower rice crop (Jhingran, 1991). Nevertheless, wherever paddy continues to be cultivated on traditional lines, fish culture in paddy fields is common, e.g., in parts of Italy, Japan, Taiwan, Malaysia, several African countries, in Arkanas (U.S.A) and to some extent in India. In India, paddy-cum-fish culture has been described in detail by Hora (1951), Chacko and Ganapati (1952), Iyenger (1953 and 1962), Alikunhi (1960), Alikunhi (1955), Tripathy (1963) etc. Fish is widely consumed in Asia and certainly in West Bengal, India where per capita consumption is estimated to be 15.6 kg in comparison to Indian rate of 9.0 kg. It is considered to be the major source of animal protein for the majority of people in Asia and a major source of vital micro-nutrients (Govt. of West Bengal 2004, Demaine and Halwart, 2001, Hassan, 2001).

Freshwater fish, because of its relatively low price, represents a vital source of animal protein for lower income groups (FAO 2001), especially in West Bengal where it is estimated that, about 94% of farmers may be classed as poor (Economist, 2004). Rice consumption in West Bengal, India is reported to be 139.68 kg/head/year and 127.56 kg/head/year (1993-1994) in rural and urban areas of India respectively (Saha, and Bardhan Roy, 2001). Active experimentation can potentially yield even greater benefits or provide the information more quickly (Garaway *et al.,* 2002; Peterman and McAllister, 1993). It is estimated that 12 million people are directly engaged in fishing and about 60 million are exclusively depending on it for livelihood in India (Sekhar, Raju, Manasi Latha Lenin, 2006).

Study Area

The study was conducted in the block of Moyna is located in Latitude 22^040" N and Longitude 87^050" E under East Midnapore District, West Bengal, India consisting of 84 villages. This low lying area is saucer shaped where major rain water is logged for maximum period of year.

MATERIALS AND METHODS

Four paddy field were selected at Moyna block, Purba Medinipur for this research. Four sites are different mouza of this block. These sites are Site-I (Paramananda Pur), Site-II (Dakshin Changra Chak), Site-III (Dakshin Anukha), Site-IV (Bhandar Chak), Area of each site is approximate 50-100 Hector, 1.3 meter in depth. These water bodies are used as rearing site where fingerlings are left for 6 months for growing as market fish. After harvesting of fish, paddy cultivation is started. During these 6 months fisher man controlled physico-chemical condition and maintain all type culture method. This culture technique totally commercial process and rate of growth are high than other natural fish culture. The study was carried out among 100 farmers. The first stage in implementing the experiment was to consult with the farmers at each of the sites that had been selected.

Some questionnaires have been gave them to collect some important answers. The survey question on the basis of Fish farmers profile (Age group, cast, occupation, Education, Family Size, Social Participation, Economic status of the farmer, Income and Expenditure Distribution and Borrowing Sources), stakeholder analysis, distribution of different benefit and market channel etc. On the basis of survey report a concrete concept arise on fish farmer socio-economic status of Moyna Block, Purba Medinipur, West Bengal, India.

RESULTS AND DISCUSSION

Socio-economic profile of the fish farmers

Age

The age group of the farmers of the sample (Table 1) varied between 21 and 70 years, but majority of them belong to the age group of 31-40 years, where in Site-I was 45%, in site-II was 38%, in site-III was 47%, and in site-IV was 42%. The older age group found in site-II (4%) and less number in site-III (1%).

Table 1. Age Group Distribution of different Study sites

Age group (year)	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV (N=100)
10-20	-	-	-	5 (5%)
21-30	36(36%)	42(42%)	32(32%)	38(38%)
31-40	45(45%)	38(38%)	47(47%)	42(42%)
41-50	10(10%)	16(16%)	14(14%)	8(8%)
51-60	7(7%)	10(10%)	6(6%)	7(7%)
61-70	2(2%)	4(4%)	1(1%)	-

Caste

Maximum members of the sample belong to scheduled cast community which was 61% in site-I, 58% in site-II, 54% in site-III and 63% in site-IV. General cast is high in site-III (31%). There are scheduled tribe cast very poor which are tabulated in Table 2

Table 2. Castes of different Study sites

Caste	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=100)
General	27(27%)	25(25%)	31(31%)	30(30%0
SC	61(61%)	58(58%)	54(54%)	63(63%)
ST	-	3(3%)	-	2(2%)
OBC	12(12%)	14(14%)	15(15%0	5(5%)

Occupation

Agricultural farmers and fishermen are operationally defined as the persons who irrespective of cast pursue agriculture and fishery as their cheap occupation respectively.

The primary occupation of all the respondents (Table 3) was observed to be agriculture in site-I (38%), in site-II (40%), in site-III (39 %), in site-IV (35%) which was followed by fish culture 31% in site-I, 36 % in site-II, 30% in site-III, 46% in site-IV.

Table 3. Occupation of different Study sites

Occupation	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=100)
Agriculture	38(38%)	40(40%)	39(39%)	35(35%)
Fish Culture	31(31%)	36(36%)	30(30%)	46(46%)
Business	17(17%)	8(8%)	16(16%)	6(6%)
Labour	8(8%)	12(12%)	7(7%)	11(11%)
Fish sell	6(6%)	4(4%)	8(8%)	2(2%)

Education

Regarding education the present study (Table 4) shows that the farmers of the sample have variability in education system which starts from illiterate to graduate level. Maximum number of farmers of site -I (42%) eight pass and most of the sites are literate. Graduation and above are as follows, site-I (9%), site-II (5%), site-III (8 %), site-IV (3 %).

participate in farming activities for subsistence of livelihood of members of their families.

It has been observed in all the work sites, the farmers are widely experienced varied between 16 to 21 years in site-I and experienced varied between 10 to 15 years site-III and site-IV. And least experienced varied between 35 to 40 years in site-IV.

Social participation

Operationally it has defined as the degree to which the respondents are involved in formal organization to attend the meeting. Attendance of the meeting either as a member or as office bearer is considered important. The study reveals that a few famers of the sample of all the work sites are members of the committee and they attend meeting regularly. Social participation of co-operative society is 8% in site-I, 6% in site-II, 12% in site-III and 8% in site-IV respectively.

Table 4. Education of different Study sites

Education	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=100)
Illiterate	-	2(2%)	-	2(2%)
Can sign only	3(3%)	-	2(2%	6(6%)
Can read & write only	5(5%)	7(7%)	8(8%)	12(12%)
Primary	11(11%)	25(25%)	20(20%)	18(18%)
Eight stander	42(42%)	38(38%)	30(30%)	30(30%)
Secondary	19(19%)	13(13%)	22(22%)	20(20%)
Higher Secondary	11(11%)	10(10%)	10(10%)	9(9%)
Graduation & above	9(9%)	5(5%)	8(8%)	3(3%)

Table 5. Family Distribution of different Study sites

Family Size	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=100)
1-4	16(16%)	13(13%)	15(15%)	18(18%)
5-7	52(52%)	50(50%)	55(55%)	50(50%)
8-10	24(24%)	33(33%)	23(23%)	20(20%)
11 and above	8(8%)	5(5%)	7(7%)	12(12%)
Family norms				
Joint	40(40%)	39(39%)	32(32%)	30(30%)
Nuclear	60(60%)	61(61%)	68(68%)	70(70%)
Experience in agriculture/Fishing(Years)				
5-9	14(14%)	20(20%)	20(20%)	14(14%)
10-15	30(30%)	30(30%)	35(35%)	34(34%)
16-21	36(36%)	15(15%)	12(12%)	16(16%)
22-27	10(10%)	17(17%)	20(20%)	26(26%)
28-34	6(6%)	8(8%)	13(13%)	8(8%)
35-40	4(4%)	10(10%)	5(5%)	2(2%)

Table 6. Social Participation of different Study sites

Social participation	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=50)
Co-operative society	8(8%)	6(6%)	12(12%)	8(8%)
Village committee	32(32%)	22(22%)	30(30%)	28(28%)
Youth Club/ Science Club	60(60%)	72 (70%)	58(58%)	64(64%)

Family

Family is an institution that is found in all societies. In this study (Table 5) farmers of all the worksites have 5-7 members, which is 55% in site- III, 52% in site-I, 52% in site-1, 50% in site-II and site-IV. The farmers of site-IV were also maintained a smaller family norms of 1-4 numbers i.e. 18 %. Whereas site-I preferred joint family norms i.e. 40 % but site-IV preferred nuclear family i.e. 70%. It is interesting to note that farmers of the sample all were married. A farming family is a primary economic group. It is also a basic production unit. Adult males

Highest social participation of village committee is 32% in site-I and lowest is 22% in site-II. Highest participation of youth club is 72% at site-II and lowest in 58 % in site-III respectively (Table 6)

Economic status of the farmer

The economic status of the farmers has been measured with the help of some components of socio-economic status (Table 7) which consists of possession of house land, animals and materials. The dowelling house made of brick walls and

cemented floor was observed to be possessed by maximum number of farmers, followed by houses made of tin/tile shade. Farmers of all sites possess 100% agricultural land. Farmers of site-IV possess 52% pond which is highest value and site-IV possess 38% which is least value than other. Almost all the farmers of all the worksites are possessing residential plots. The farmers domesticate cow and duck was preferred by maximum number of farmers. As regards, are materials most of the having radio and Television.

Income and Expenditure Distribution

The study (Table 8) indicates that income during season maximum number of farmers of site-I (24%) earn between Rs. 11000 to 13000 per month, site-II (23%) earn between Rs. 9001 to 11000, site-III (28%) earn between Rs. 7001 to 9000, site-IV (26%) earn between Rs. 7001 to 9000. During off season income of the farmers goes down to maximum farmers which vary between Rs. 4001 to 5000 in all the sites. While ascending the expenditure incurred by the farmers for their livelihood it is observed that maximum farmers need Rs. 4001 to 5000 per month at site-I (40%), at site-II (40%), at site-IV (39%) and maximum farmer need Rs.3000 to 4000 per month at site-III.

Borrowing Sources

The perusal (Table 9) indicates that they borrow money from Bank, at site-1 site-2, site-3 site-4 are 50%, 50%, 45% and 40%, respectively. Towards repayment of maximum loan only 76% at site-1 and fails to repay 6% at site-4.

STAKEHOLDER ANALYSIS

The stakeholder analysis matrix has been indicated four block. Block 'A' indicated highly importance and low influence, block 'B' indicated highly importance and high influence, block 'C' indicated low importance and low influence and block 'D' also indicated low importance and highly influence. From this matrix can study a brief summery about stakeholders who are engaged in pisciculture activity of Moyna Block (Figure: 1). Stakeholders at Moyna Block who are engaged in pisciculture activities have been classified into three groups which are primary stakeholder, secondary stakeholder, key stake holder. There is a stakeholder matrix which interpreted four things i.e. high importance, low importance, low influence, high influence. The study sites also reveal that high importance and highly influence stakeholders are fisherman, vendors, commission agent, hatchery farmer, Department/Ministry of Fisheries, lease holder, fingerling collector, and moneylenders respectively.

Table 7. Economic status of the farmer at Different Study Sites

Characteristics	Site-I (N=100)	Site-II (N=100)	Site-III (N=100)	Site-IV(N=100)
House in possession				
Concrete	56(56%)	63(63%)	58(58%)	54(54%)
Thatched hut	8(8%)	12(12%)	7(7%)	10(10%)
Tin/ tile shed	36(36%)	25(25%)	35(35%)	36(36%)
Land in possession				
Agricultural	85(85%)	81(81%)	88(88%)	90 (90%)
Pond	45(45%)	42(42%)	52(52%)	38(38%)
Residential	98(98%)	97(97%)	98(98%)	100 (100%)
Animals in possession				
Cow	21(21%)	18(18%)	22(22%)	16(16%)
Bullock	2(2%)	5(5%)	6(6%)	2 (2%)
Poultry	10(10%)	12(12%)	9(9%)	12(12%)
Duck	17(17%)	15(15%)	16(16%)	20(20%)
Goat	5(5%)	6(6%)	10(10%)	9(9%)
Materials in possession				
T.V	94(94%)	90(90%)	95(95%)	88(88%)
Radio	67(67%)	42(42%)	53(53%)	61(61%)
Rickshaw/Van	10(10%)	7(7%)	5(5%)	7(7%)
Boat	4(4%)	5(5%)	3(3%)	4(4%)
Machine Van	2(2%)	3(3%)	2(2%)	4(4%)

Table 8. Income & Expenditure Distribution at Different Study Sites

Income	Dimensions	Site-I (N=100)	Site-II(N=100)	SiteIII(N=100)	Site IV (N=100)
Income during season per month (Rs.)	5001-7000	16(16%)	14(14%)	15(15%)	14(14%)
	7001-9000	18(18%)	21(21%)	28(28%)	26(26%)
	9001-11000	16(16%)	23(23%)	12(12%)	22(22%)
	11001-13000	24(24%)	16(16%)	25(25%)	22(22%)
	13001-15000	16(16%)	20(20%)	12(12%)	8(8%)
	15001-above	10(10%)	6(6%)	8(8%)	8(8%)
Income during off season per month (Rs.)	2001-3000	-	4(4%)	8(8%)	-
	3001-4000	36(36%)	30(30%)	42(42%)	36(36%)
	4001-5000	40(40%)	40(40%)	30(30%)	39(39%)
	5001-6000	24(24%)	26(26%)	20(20%)	25(25%)
Expenditure for livelihood per month/head (Rs.)	1000-2000	30(30%)	24(24%)	30(30%)	20(20%)
	2001-3000	38(38%)	40(40%)	45(45%)	50(50%)
	3001-above	32(32%)	36(36%)	25(25%)	30(30%)

High importance and low influence stakeholders are daily labour farmer, rickshaw pullers, transporters, Block Development Officers, traders, landowners, wholesaler and Gramin Bank respectively.

and co-operative societies respectively. Low importance and low influence stakeholders are net maker, ice plant workers, agricultural labour, commission agent, Grampanchyat, NGOs, Ministry of Environment and Forest (MoEF).

Table 9. Borrowing Sources at different Study Sites

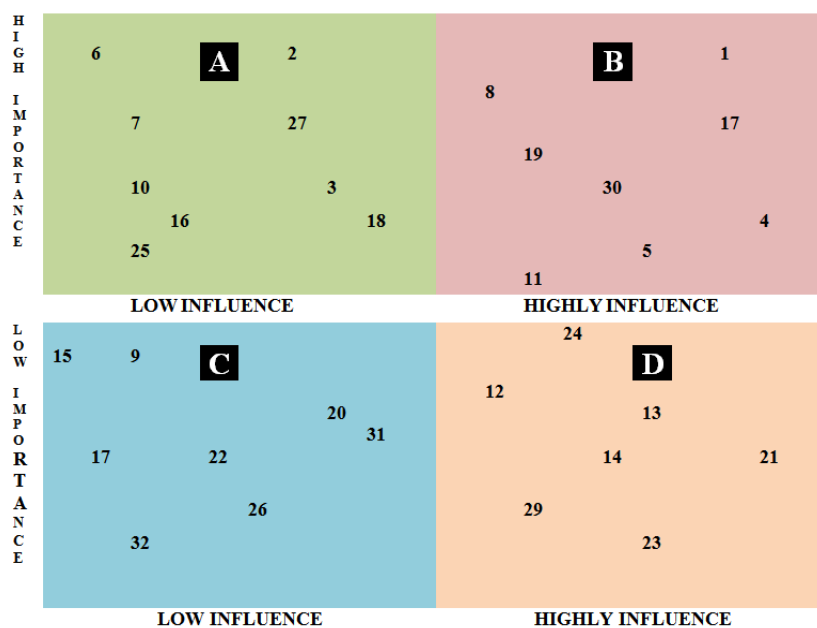| Characteristics	Site-I (N=100)	Site-II (N=100)	Site-III(N=100)	Site-IV(N=100)
Money lender	16(16%)	17(17%)	15(15%)	14(14%)
Relatives	-	-	-	-
Friends	-	-	10(10%)	10(10%)
Society	26(26%)	25(25%)	30(30%)	36(36%)
Bank	50(50%)	50(50%)	45(45%)	40(40%)
Middle Men	8(8%)	8(8%)	-	-
Repayment of loan				
Regular	76(76%)	Regular	76(76%)	Regular
Irregular	24(24%)	Irregular	24(24%)	Irregular
Fails to repay	-	Fails to repay	-	Fails to repay

Figure 1. Stakeholder Analysis: Summary Matrix

Primary Stakeholder		Secondary Stakeholder	Key Stakeholder
1.Fisherman		21.Private Bank	31. State Govt.
2.Rickshaw pullers	18.Wholesaler	22.Gram Panchyat	32.MoEF
3.Landowners	19.Hatchery Farmer	23.Co-operative Societies	
4.Lease holders	20.Agricultural Labour	24.National Bank	
5.Fingerling Collector		25.Gramin Bank	
6.Daily Laboure/Farmer		26.NGOs	
7.Transporter		27.B.D.O	
8.Vendors		28.NIC(National Insurance Company)	
9.Ice plant workers		29.Fishery Extension Officer(FEO)	
10.Traders		30.Department/Ministry of Fisheries	
11.Moneylenders			
12.Middle Man			
13.Representatives of fertilizer's Companies			
14.Food Suppliers			
15.Net Makers			
16.Net maker			
17.Commission Agent			

Low importance and highly influence stakeholders are National Bank, middle man, representatives of fertilizer's companies, food suppliers, Fishery Extension officer (FEO)

Distribution of Different Benefits

There are different benefits from the lease system of management area. Nutritional, financial and service benefit has

been exhibit significantly. Wider communities has been benefited by payment to households in time of hardship; maintenance of school building, roads and other; village festival etc.

On the other hand landowners have been benefited by development of irrigation system and dyke renovation; tilling of the landowner land.
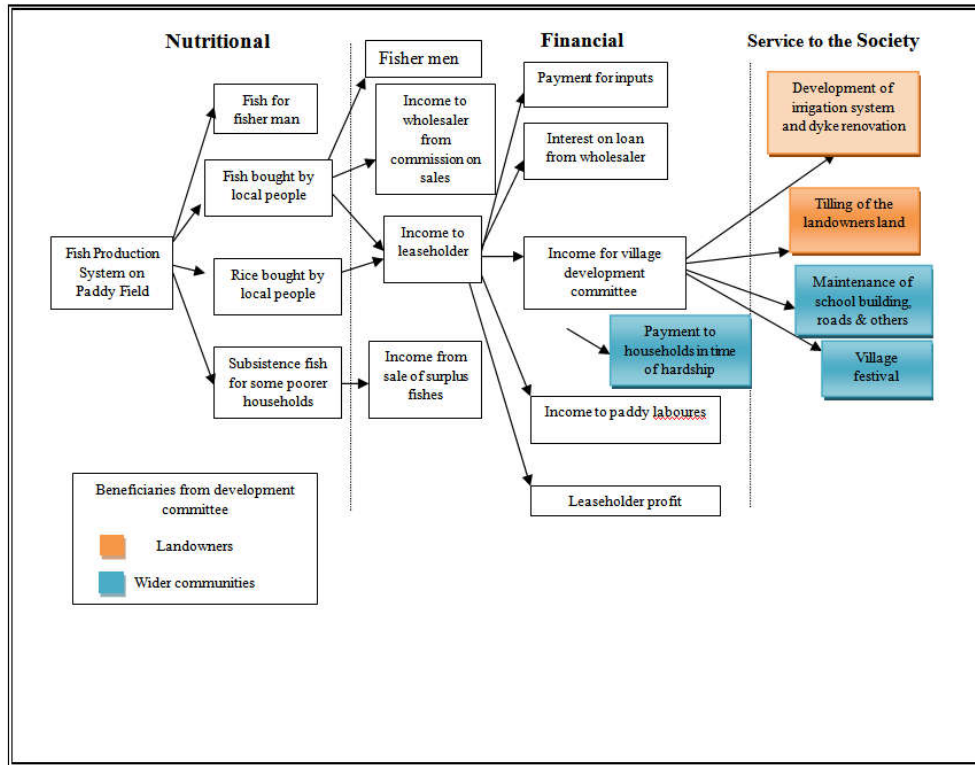

Figure 2. Distribution of different benefits from the lease holder-cum-fishermen system to the different level of society at Moyna vis-a-vis the socio-economic development
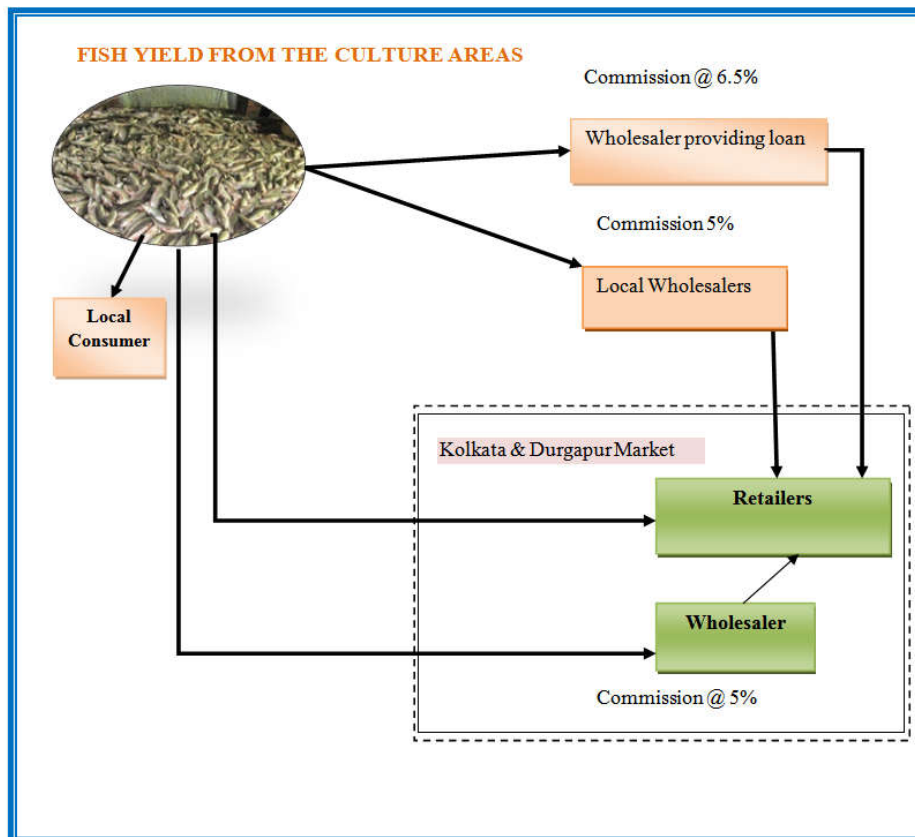

Figure 3.

From this type of culture system financially benefited group is wholesaler, leaseholder, village development committee, paddy labour, fishery farmers, money lenders and labour communities etc. Nutritionally this type of culture system indicate some benefit which are fish for fisher man, fish brought by local people, rice brought by local people and subsistence fish for poorer households (Figure 2).

Marketing Channel

The fish farmer has a variety of options for marketing the fish from the water body. In the first instance the fishermen is tied by the conditions of the loan agreement to supply a certain value of fish to the wholesaler from whom they took the loan needed to rent the water body. Beyond this, the farmers may sale fish to local consumers who purchase directly (this account for only a very small amount of fish), local wholesalers, and wholesalers in market towns or direct to the retailers at the market. The wholesalers providing loan are taken more commission from the rent holder @ 6.5% (Figure 3).

Conclusion

The fish yield from four water body of Moyna portrayed an encouraging venture. The fish yield varied between 4200 to 4900 kg/ha./6month. A large number of varieties of wild fishes were also recorded which also good price in the market. The socio-economic conditions of the rural community at Moyna Block are most important factors for development and utilization of paddy alternate fish culture. Because majority among them are coming from backward communities, who are poor illiterate and superstitious. They are poor in economical, social, cultural, political, spiritual and ecological development as a result of which they always feel alone among their surroundings. Few opportunists like cheater, money lenders etc are trying at that time to take their anxious opportunities from these ignorant people. During very early days of fisheries development in the state it was realized that socio-economic advancement of the rural people is essential for proper development of the industries in relevance to agriculture and fisheries. Paddy alternate fish culture makes multiple use of the paddy field to maximize the utilization of land and water resources and can also increase the production value of paddy fields. Profits can be even higher if fry are reared in the paddy fields. The economic efficiency is increased in the combination system because fish have a high value. This type of culture system is beneficial to human health and the ecological balance of the environment. One of the important factors that have influenced the utilization and development of rice -fish farming of the State, is the socio-economic conditions of the rural poor community. Agriculture as well as fishery are generally considered a low profession in India and practiced mainly by the members of a number of backwards communities, who are largely illiterate, superstitious and extremely poor. The low standard of living condition, the unhygienic surroundings in which they sell their product, their poor cultural status have resulted in their social isolation. The vicious circle of circumstances has crippled the fishermen community both socially and economically.

Acknowledgement

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