ASA University Review, Vol. 6 No. 2, July–December, 2012

Impact of Shrimp Cultivation on Social Life in Rural Bangladesh: A Case of Bujbunia Village in Khulna District

Al Jamal Mustafa Shindaini^{*} Gazi Abdulla-hel Baqui^{**}

Abstract

In rural Bangladesh, nowadays shrimp cultivation has become a common sight, especially along the coastal areas. As a result, the traditional crop production is seldom found there. Thus, change in occupations has already taken place. This has affected the living pattern of the rural poor. The impact is also noticeable socially and culturally. So, this study has been carried out at Bujbunia village in Khulna district where shrimp cultivation increased over the years. This paper shows how this shrimp cultivation brought a negative impact on the social life of the rural poor of that village and thus the changes in occupation took place. All the respondents of study area are engaged in different occupations. The study was conducted with the help of questionnaire survey, case study, rapid rural appraisal and participation observation. The study also presents the results, followed by some recommendations.

Keywords: Shrimp culture, socio-economic change, occupations, problems, respondents, rural Bangladesh, effective solutions

Introduction

Bangladesh provides her people with various occupations, not only in cities, but also in her rural society. However, changes in occupation have been discerned with the touch of modern science and technology and thus new occupations have emerged. Of all the occupations, shrimp cultivation meanwhile gets popularity in the southwest region of Bangladesh and also achieves momentum here. Economic gain is the ambitious key to this but this change is exerting an impact on rural socio-economic life-style.

Modern shrimp farming has socio-economic costs, besides it forms the ecological consequences (Bailey I988, Primavera 1993, Baird & Quarto 1994 & Barraclough & Finger-Stich 1996). A cost benefit analysis concluded that shrimp culture caused more economic harm than good, the damage outweighing the benefits by 4 to 1 (63 billion Rupees vs. 15 billion Rupees annual earning) in Andhra Pradesh and by 1.5 to1 in Tamil Nadu (Khor, 1995). These costs also included loss of mangroves, salinity and unemployment rise. Social and environmental problems are only some recent incidents in the broader processes associated with expansion of other monocultures (e.g. banana, cotton, coffee and sugar) that have generated social exclusion and environmental degradation (Barraclough & Finger-Stitch 1996). Appropriate consultation must be undertaken

^{*}Senior Lecturer, Department of Business Administration, Northern University Bangladesh ^{**}Ex-Registrar (In-Charge), Khulna University

within local communities so that potential conflicts are properly identified, avoided, minimized, and/or mitigated through open and transparent negotiation on the basis of an assessment towards risks and current impacts on the surrounding communities. Culture ponds for shrimp and fish account for the destruction of 20-50% of mangrove worldwide in recent decades (Primavra, 1995).

Mangroves have, in fact, contributed significantly to the well-being of coastal communities for centuries through products used for fuel, construction, fishing, agriculture, food for livestock, paper, medicine, leather and food mainly fish, crustaceans and molluscs (Macnae 1974, Dela cruz 1979, Christensen 1982, Tesoro 1984, Footland & Sornsen 1996). A positive correlation between mangrove area and shrimp fish catches has been documented for the Philippines, Malaysia, Indonesia and Australia (Primavera 1995), and is reflected till the parallel decline in Philippine mangroves and Municipal fisheries. However, setting of shrimp farms often results in production failures, environmental degradation, land use conflicts and social injustice. Thus, it is imperative that, when shrimp firms are put into operation, due consideration is given to the ecologically sensitive habitats and the environmental sustainability of the shrimp farming operations.

Destruction of mangroves along the Philippines coastline accounts in part for the great losses to life and property inflicted by all average of 20 typhoons and tsunamis each year, around 3000 deaths in Zambonga province in 1976, 1000 in northern Panay in 1984, and 7000 in Ormoc and other Leyte towns in 1991. In the Sundarbans in Bangladesh, mangroves protected villagers from a 1960 tidal wave but a cyclone caused thousands of deaths and enormous property damage in 1991 after the installation of shrimp farms (Choudhury, Quader & Islam et al. 1994). Shrimp farming changed the life style of the people of the coastal belt but from a specific perspective (Azad, 1999). Now a days, shrimp cultivation has become an important industry in the vast tracts of coastal land. It, now under saline water throughout the year, once produced a huge amount of crops. It has not only changed the landscape, it has also changed the lives of people of the regions. Though it is a great source of income, it causes harm to the total ecology and life-pattern as well. As a result, the poor families have been proceeding towards unknown destinations.

It is learnt that a Non Government Organization (NGO) conducts a study on the impact of commercial shrimp cultivation on the socio-economic and ecological conditions in the three coastal districts of Khulna, Satkhira and Bagerhat. They found that the socio- economic and family status of the people living outside the shrimp cultivation area appear higher than that of those living along the shrimp cultivation belt. Social relationship among the villagers has changed due to shrimp cultivation. As there was peace, the villages had no scarcity of food and other things for livelihood. The study conducted in the area showed the nature of relationship in rural social life flow, under much suffering, due to shrimp cultivation. It indicates that shrimp cultivation affected the relationship, including both interpersonal relation within the family and among relatives and communities.

Statement of the Problem

Bangladesh has already emerged as an important producer of cultured shrimp and thus has been helping the fisheries sector to contribute substantially to GDP. The contribution of fisheries sector to GDP is 6% (compared with 1% in India and Thailand, two neighboring countries, World Bank, 1989). Though the country earns foreign revenue by exporting shrimp, its cultivation on crop land in the south-western region is exerting negative impact on the rural society. The present study therefore aims at conducting a survey to examine the role of shrimp cultivation on social life of the rural people.

Research area and Operational definition of the Concepts

The study was conducted on the rural people of one village namely "Bujbunia" of 906 acres in Khulna district in the south western part of Bangladesh. It is located on the Kazibasha river flowing to the east. The shrimp culture of the study area needs saline water which is taken from this river. Bujbunia consists of 380 households with a total population of 2250. Of the total population, 1110 are male and 1140 are female. The following terminologies are defined in the context of the present paper for better understanding of the related problems and issues: 1) Rural Bangladesh- In this study rural Bangladesh includes rural people who are involved directly or indirectly in different occupations in the study area; 2) Socio Life- Anything related to social life; 3)Impact- Here 'impact' means the social, cultural, environmental and economic effects of shrimp culture on the rural people of Bangladesh; 3)Shrimp Culture- In this study 'Shrimp culture' means artificial cultivation of shrimps in ponds, Ghers and other places in the study area.

Methodology of the Study

This study was conducted through household survey, participant observation, rapid rural appraisal and case study on the people in the selected village called Bujbunia in Khulna.

Sampling

First of all, household listing was prepared on the basis of occupation in the study village. From this list, classification of occupation was made and then in each class 32% households were randomly selected to determine the household sample. Total 380 households have been divided into ten occupational groups, i.e. cultivators, agriculture laborers, agriculture-cum-shrimp culture workers, non agriculture laborers, businessmen, construction laborers, transport employees, fishermen and others. Of this total 380, a sample of 120 households was selected as respondents. The data were collected from two sources (a) primary source that includes sample survey, participant observation, Rapid Rural Appraisal (PRA) and case study. (b) secondary source: from various writings related to study, official documents, research documents etc. Collected data were analyzed in terms of various statistical techniques and presented through various tables, figures etc.

In the socio-economic study, the most important variables are occupational patterns, educational qualification, income, expenditure, religious status and so on. So, it is very much necessary to describe the variables for a better descriptive study like the present one.

Population in the study area

There are 2250 people living in the village under this study. The concentration of both male and female population is the highest in the age group of 15 and below. The data reveal that 39.52 and 47.99 percent of male and female population respectively belong to the above percent of 43.47 of total population belonging to the group. It is, therefore, clear that 43.47 percent of the total population of the study area is to bear by the rest 56.53 percent of the population who belong to the age group 16 and above. But some of the people belonging to the age group are unemployed or too old to work. About 11 percent of the total population belong to the age group 46 and above who may be somewhat unemployed and the rest may be, for the most cases, too old to work. So, about 55 percent of the total population is a burden to the rest 45 percent of the working population. There are 380 households in this village. Of them, 367 are Muslims, 10 are Hindus and 3 are tribal households. The literacy rate of the study area is 35.2%. The main source of income in the study area is agriculture-cum-shrimp culture. Bujbunia Households in the dwelling units have sources of drinking water, toilet facility, electricity and land ownership of Agriculture land. Maximum Households in the study area use straw, bamboo and other materials for building up and thatching the house roofs (For details see the appendix).

Identity of Respondents

The respondents are shown by age. A total number of 120 respondents were interviewed for this study. Of the total respondents, 47.5% are within the age group of 25-49 years followed by 40% at the range of 50-74 years. From this table, it is also revealed that 4.17% respondents are 75 or above 75 years old and 8.33% is 0-24 years old. The mean age of respondents of the study is 47.75. The respondents are shown by sex. A total number of 120 respondents were interviewed for this study. The table shows that the sample size is 120 which is 31.65% of the total households being 380. Of the total sample, 102 are male and 18 are female which represent 85 percent and 15 percent respectively. The sex ratio of the male and female household heads is 566.67: 100. The respondents are presented by marital status. A total number of 120 respondents were interviewed for this study. There are 90.83% married respondents. The problems of the married respondents are mainly family conflict, economic problem, and problems of socialization. It can be seen from the table that 4.17% are divorced and 1.67% are separated among the respondents. Generally the widows are helpless. After the introduction of shrimp cultivation as a new occupation, overall economic condition has decreased. Of the respondents, 3.33% are widows (For details please see the appendix).

The respondents have educational qualifications that are presented here. 8.33% respondents are illiterate. 35% respondents have class one to five level education. Education is the most important

factor determining consciousness of the rural people about the impact of shrimp cultivation as a new occupation. The table shows that 25% respondents have secondary school certificates and 12.5% respondents possess higher secondary certificates. It has been found that, of the respondents, 3.33% obtain graduate degrees and 1.67% respondents have master degrees. In Bangladesh 88.3% (Bangladesh Economic Survey -2005) people are Muslims. A total number of 120 respondents were interviewed for this study. It can be seen that among the respondents 96.67% are Muslims and 2.50% are Hindus. There is no Christian and Buddhist among the respondents. The percentage of Tribal respondents is 0.83%. Land ownership is very important as the socio-economic indicator for this study. The data show that 29.17% are landless households, followed by 41.67% own land, 20.83% shared land, and 8.33% Gher land households. Family type is an important factor related to impact of shrimp cultivation on the rural people. In this study, the percentage of nuclear family is 37.5% whereas 62.5% is the part of joint family system. (For details see the appendix).

Social status and Shrimp cultivation

The social status and security enjoyed due to occupational change by the respondents can be learnt from this study.

Cata and a farmer dante	Answer				T . (. 1
Category of respondents	Yes	%	No	%	— Total
Cultivators	8	26.67	22	.73.33	30
Agriculture laborers	12	75.00	4	25.00	16
Agriculture-cum-shrimp culture laborers	5	25.00	15	75.00	20
Non agriculture laborers	6	66.67	3	33.33	9
Businessmen	12	70.59	5	29.41	17
Construction workers	1	50.00	1	50.00	2
Transport workers	3	50.00	3	50.00	6
Employees	3	75.00	1	25.00	4
Fishermen	5	55.56	4	44.44	9
Others	5	71.43	2	28.57	7
Total	68	100.00	52	100.00	120

Table 1: Percentage distribution of respondents having social status and security

The table 1 indicates that 75% respondents from among the Agriculture laborers feel more insecure than those of cultivators (26.67%) and agriculture-cum-shrimp culture groups.

Reasons	Number of respondents and percentage (Multi-Reasons)		
	Number of respondents	Percentage (%)	
Financial problem	65	38.24	
Working environment is not favorable	25	14.71	
Disintegration of social relationship	10	5.88	
Criminal activity	45	26.47	
Increase of social conflict	25	14.72	
Total	170	100.00	

Table 2: Reasons of facing the problems of losing social status and security by the respondents

Most of the respondents (38.24%) said that financial drawback caused the problem of social status and security for them. On the other hand, 26.47% respondents said that criminal activities caused the problem of social security.

Dowry and Changing Occupation pattern

There is a relationship between change of occupation and increasing demands of dowry on account of the involvement in new occupation i.e. shrimp cultivation

Table 3: Percentage distribution of respondents facing an increasing demand of dowry due to shrimp cultivation

	Number of respondents and percentage		
Answer	Number of respondents	Percentage (%)	
Yes	88	77.33	
No	12	10.00	
No response	20	16.67	
Total	120	100.00	

About 77.33% respondents said that shrimp cultivation has caused the increasing demand of dowry and of having dowry money. The thing is that the guardians and grooms because of poverty aspire after more cash money as dowry.

Deceme	Number of respondents and percentage			
Reasons	Number of respondents	Percentage (%)		
Problem of road communication	45	21.23		
Illiteracy	35	16.51		
Unattractive appearance of brides	20	16.51		
Problem of salinity	48	22.64		
Brides have money because of new occupation.	25	11.74		

39

212

18.40

100.00

Table 4: Reason of increasing dowry (Multi-response)

Others

Total

The table 4 indicates different reasons for demand and increase in demand of dowry in the study area. As is evidenced from the table, 22.64% of the respondents mentioned the problem of salinity. About 21.23% respondents mentioned that bad road communication is another cause of demand for dowry. A more stubborn reason is illiteracy (16.51%).

Table 5: Divorce due to simility cultivation			
Angular	Number of respondents and percentage		
Answer	Number of respondents	Percentage (%)	
Yes	59	49.17	
No	52	42.50	
Others	10	8.33	
Total	120	100.00	

Table 5: Divorce due to shrimp cultivation

According to 49.17% respondents, the incidence of divorce has increased due to new occupation i.e. shrimp culture in the locality.

Table 6: Some specific causes of	increasing divorce due to shrim	p cultivation (Multi response)

Courses	Number of respondents and percentage			
Causes	Number of respondents	Percentage (%)		
Increasing power of males	18	7.59		
Family conflict	75	31.65		
Increase of poverty due to occupational change	22	8.86		
Conflict due to new occupation	55	23.21		
Ability of women to do household works properly	12	5.06		
Security of money	22	9.28		
Others	34	14.35		
Total	237	100.00		

About 31.65% respondents told about the problem of family conflict rise due to occupational change i.e. Shrimp culture. The 23.21% respondents argued that the conflict due to new occupation was another cause of divorce. Poverty is another cause of divorce as mentioned by 8.86% respondents.

Family conflict and Shrimp cultivation

There are various causes of family conflict created due to occupational change i.e. Shrimp culture. The family conflict is increasing due to such occupational change.

Ecoing many family conflict	Number of respondents and percentage		
Facing more family conflict —	Number of respondents	Percentage (%)	
Yes	77	64.17	
No	43	35.83	
Total	120	100.00	

 Table 7: Percentage distributions of respondents facing more family conflict due to shrimp cultivation

The table indicates that about 64.17% respondents have faced more family conflicts due to occupational change i.e. shrimp culture. Forhad Hossain Said, "The degree of quarrel has been increased in the family." The specific causes of family conflict created due to occupational change have been described below in the table 8.

 Table 8: Causes of family conflicts among the respondents due to shrimp cultivation (Multi-response)

Courses	Number of respondents and percentage			
Causes	Number of respondents	Percentage (%)		
Due to occupational change	40	17.39		
Poverty	55	23.91		
The profligacy of respondent's son	18	7.83		
Rearing children	36	15.65		
Inability to do household activities	27	11.74		
More money needed for new occupation	10	4.35		
Lack of understanding	21	9.13		
Others	23	10		
Total	230	100		

About 24% of respondents mentioned poverty as the acute cause of family conflict which was created due to occupational change that is shrimp culture. Due to saline water and other causes, economic condition of the villagers has decreased. In some incidences, the boys and young sons of the respondents were involved in immoral social activities as they were persuaded and supported by the Gher people. This kind of activity has created conflict and breach among family members.

Socialization and Shrimp cultivation

Occupational change has created impact on socialization process. Details are shown below in the table 9.

Table 9: Percentage distribution of the respondents facing the problem of socialization due to shrimp cultivation

Category of respondents	Problem of socialization				
	Yes	%	No	%	Total
Cultivators	17	56.67	13	43.33	30
Agriculture laborers	11	68.75	5	31.25	16
Agriculture cum shrimp culture laborers	6	30	14	70	20
Non agriculture laborers	5	55.56	4	44.44	9
Businessmen	12	70.59	5	29.41	17
Construction workers	2	100	0	0	2
Transport workers	4	66.67	2	33.33	6
Employees	3	75	1	25	4
Fishermen	5	55.56	4	44.44	9
Others	6	85.71	1	40.29	7
Total	71	100.00	49	100.00	120

Most of the respondents among construction group have been facing problem of socialization. The table shows that about 100% respondents of construction families face this kind of socialization problem. On the other hand, only 30% respondents of Agriculture cum shrimp cultivators suffer from this kind of problem.

Problem of Socialization created due to Shrimp culture

The causes of socialization problem are created due to occupational change i.e. shrimp culture. Lack of social interaction has been created due to shrimp culture, too. The data show that there are a number of reasons related to socialization problem. However, 20.06% respondents informed that due to want of money, they were unable to acclimatize themselves to socialization network.

Table 10: Percentage distribution of the respondents facing socialization problem

Socialization Problems	Number of respondents and percentage (Multi-response)		
	Number of respondents	Percentage (%)	
Due to shrimp culture	26	11.61	
Sons involvement in immoral activities	18	8.04	
Dictatorial relationship with relatives	36	16.07	
For want of money	45	20.09	
Lack of social interaction	72	32.14	
Others	27	12.05	
Total	224	100.00	

Case study: Mohammad Abu Zafar Malangi is the chairman of Baliyabhanga Union. He lives in Bujbunia village. He, earlier, was engaged in agriculture. Now he is doing agriculture shrimp farming as a joint venture. As he has a good figure of land, he keeps shining rapidly. But shrimp cultivation could not bring any outstanding change in this village, especially regarding economic phenomenon though some person like Abu Zafar had changed their occupation and taken it for their economic solvency. Mr. Zafar built his house with brick as he found the shrimp cultivation to his economic benefit. He has two children and both of them are studying. His wife, from time to time, takes care of various aspects of shrimp farming. As some people were given charge of it, its result showed no problem. Mr. Zafar's family is a joint one and his two elder brothers helped him, too. His root is deeper in local and sub-local. That is why he gets extra facilities to take care of his farm. But, at times conspiracy to capture his shrimp farm makes him involved in clash with the terrors. He confessed that despite his getting interest in shrimp farming, it had a negative impact on this village especially on social life. Surrounding his house, green vegetables were grown before, but due to salty water in the farm, he added, vegetables growth has been stopped. The vegetables that could provide him with his daily need and now he needs to buy this food intake from the market. As the ratio of salty water has increased, the family is in the grip of various unknown diseases. The domestic animals like duck and hen are dying. The birds and other animals that were found before in the area have disappeared now. As a result of shrimp cultivation, the rate of poverty has increased tremendously. A number of occupations lost their old value and status. It has a vast impact on socio-economic life-style. Women, too, are not free from these problems; they are facing hard days and difficulties. Overall a wrong type of social planning of occupational change has made a tremendous negative impact in the whole region.

Social problems and Shrimp culture

Various social problems have arisen in the study area due to occupational change i.e. shrimp culture. As a new technological innovation, shrimp culture has not only given birth to serious social problems, but such difficulties are extremely hard to overcome. Even the respondents said that they have never faced and found such social problems.

Table 11: Distributions of opinion of respondents about social problems like theft, robbery, murder,
rape etc. in the study area

Answer	Number of respondents and percentage		
Answer	Number of respondents	Percentage (%)	
Yes	78	65	
No	42	35	
Total	120	100	

The table indicates that about 65% of the respondents said that shrimp culture has created serious social problems such as theft, robbery, murder, rape etc. But, those who think that due to shrimp

culture social problems have not increased are 35%. The respondents' view is that shrimp culture as a new occupation is a boon to some people as they are earning a large amount of money and have got higher social status. As a result, those whose richness is of recent origin are soon engaged in various offensive activities; some want to take revenge of their past sufferings at the hands of their opponents when they were driven by their poverty. And some outsiders who are both Gher owners and Gher workers or watchers create various unpleasant situations in the study area like unnecessary broil with others, profligacy, attacks on others for minor causes and above all appearing as humbug.

Recommendations

In spite of some problems arising out of this shrimp cultivation, a number of people of the study area are getting interested in it but overall social life flow standard is facing a great threat; the study shows this contradiction. The following recommendations, on the basis of the shrimp cultivation and the emerging social problems, are put forth for bringing possible and effective solutions.

First, social life is affected due to shrimp cultivation. From the study it can be observed that not only social relationship but also the respondents' previous social status cannot be properly maintained owing to this shrimp culture. Moreover, shrimp cultivation created various social problems like increase of dowry money, divorce, family conflicts, socialization, violence, theft, robbery, rape, harassment to women etc. For this reason, ways are to be found out to stop these social ills.

Second, in addition to updated rural people's values, a more accurate economic analysis of shrimp production from culture ponds is needed. Villagers should cultivate shrimp cooperatively, cultivate vegetables surrounding the shrimp Ghers. This attempt can solve the economic problems of the respondents to some extent.

Third, the Chairmen of Union Parisads of the area should exercise social authority to solve the villagers' problem and they should not be motivated in favor of the shrimp cultivators. Government should also look into it. All should think whether their previous occupations i.e. the paddy cultivation along with others are better or not.

Fourth, the young people of firm areas are unemployed. Only a number of them work under the illiterate or the half-literate Gher owners; they are simply used by them for fulfilling their own selfish ends. The government should increase employment for saving these potential human resources.

Fifth, institutions that protect the local communities and the environment from short-term profit makers must be developed and their rules must be enforced.

Sixth, to solve the existing problems of the respondents due to shrimp cultivation needs a massive program for creating public awareness. The people should spontaneously come forward to improve their economic, social and above all cultural problems created by the shrimp cultivation.

Seven, sanitation is a problem in the study area. Whatever be the economic condition, at least a good sanitary system is essentially required for healthy living. The villagers and other helping bodies should look into it and make efforts to solve this problem. Along with this, the supply of pure drinking water without any amount of salinity in it is to be ensured.

Conclusion

The key factor in the growth of the Asian shrimp industry thrives at the initiative of the private sector, involving multinational corporations. In Bangladesh there are both advantages and disadvantages of shrimp cultivation. Modern shrimp culture has socio-economic and cultural costs, ecological consequences; political instability etc. Conversion, expropriation and privatization of lands, decline of food security, marginalization of coastal communities, unemployment and urban migration, and social conflicts are influencing socio-economic condition. The growth of shrimp cultivation in the closed water bodies depends on the extent and nature of aquaculture even, in the limited bog areas, once treated solely as a source of capture fishery.

Despite the volume of shrimp production, the average yields of shrimps have not been satisfactorily enough. Shrimp culture has a negative effect upon the rural people. The main problem brought about by shrimp cultivation is the inflow of saline water into the polder areas that cause contamination of fresh water ponds used by the population during the dry season as sources of their drinking water. This tells upon the general health of the poor. Saline water also destroys trees and bushes. Besides, the control of farms of shrimps by outsiders has broken the traditional safety net. As a result, the poor rural people have been facing many security and social problems due to shrimp cultivation. Thus, the government and non-government agencies and the people of our country should be aware of such bad effect of this cultivation.

References

- Aksornkae S. (1988) Mangrove habitat degradation and removal in Phangnga and Ban Don Bays. Thailand. Tropical Coastal Area Management 3 (1), p 16.
- AlvarezA. VasconezB. & GuerreroL. (1989) Multi-temporal study of mangrove, shrimp farm and salt flat areas in the coastal zone of Ecuador, through information provided by remote sensing. In Establishing A Sustainable Shrimp Mariculture Industry in Ecuador (ed. by S. Olsen and L. Arriaga), The University of Rhode Island Coastal Resources Center; Ministerio de Energia y Minas, Gobierno de Ecuador; and U.S. Agency for International Development. Ecuador. pp. 141-146
- Azad, Dip (1999) The Dark Side of Shrimp Farming, The Daily Star Magazine, October 8, p. 6
- Bailey C. (1988) The social consequences of tropical shrimp mariculture development. Ocean and ShorelineManagement 11, pp. 31-44.
- Bailey C. & Skladany M. (1991) Aquaculture development in tropical Asia: a re-evaluation. *Natural Resources Forum15*, pp. 66-73.
- Baird I.B. & Quarto A. (1994) The environmental and social costs of developing coastal shrimp aquaculture in Asia In: Trade and Environment: Prospects for Regional Cooperation. Nautilus Institute. Berkeley. CA. pp. 188-214
- Barraclough S. & Finger-Stich A. (1996) Some ecological and social implications of commercial shrimp farming in Asia. UNRISD Discussion Paper 74. United Nations Research Institute for Social Development. Geneva, and World Wide Fund for Nature-International. Gland.Switzerland. p 62
- Choudhury A.M.. Quadir D.A. & Islam M.J. (1994) Study of Chokoria Sundarbans using remote sensing techniques. *ISME Mangrove Ecosystems Technical Report 4*.pp. 1-22.
- Christensen B. (1982) Management and utilization of mangroves in Asia and the Pacific. FAO Environment Paper 3, pp. 1-60.
- Dela Cruz A.A. (1979) The functions of mangroves. Biotrop Special Publication 10.pp 125-138.
- Fottland H. & Sorensen C. (1996) Issues related to the establishment of prawn farms in Tanzania with an
- example from the Rufiji delta. Catchment Forestry Report 96.4, The Mangrove Management Project and Institute of Resource Assessment, Dar Es Salaam, Tanzania. pp. 36
- Khor M. (1995a) Protests over shrimp farms spread throughout India. Third World Resurgence 59, pp. 8-10.
- Macnae W. (1974) *Mangrove Forests and Fisheries*. IOFC/ DEV/74/34. Food and Agriculture Organization. Rome. p. 62
- Ministry of Natural Resources. Philippines. World Bank (1989) Country Report: Philippines. Mangroves of Asia and the Pacific: Status and Management, Technical Report. UNDP /UNESCO Research and Training Shrimp Aquaculture Dialogue Meeting Summary, Jakarta, Indonesia March 9-10,2010. p 5
- Primavera J.H. (1993) A critical review of shrimp pond culture in the Philippines. Reviews in Fisheries Science 1. pp.151-201.
- PrimaveraJ.H. (1995) Mangroves and brackish water pond culture in the Philippines. Hydrobiologia 295. pp. 303-309.
- Tesoro F.O. (1984) Traditional utilization of mangrove forests and management implications in the *Philippines*. Bakawan 3, pp. 6-10.
- Trinh L. (1993) Environmental issues in the Eastern Coastal Region of the Mekong Delta. Asian Wetland News 5/6, pp. 17-18.

Appendix

Table 1: Distribution of population by age and sex				
Age (in years)	Male	Female	Total	
	N = 1110 (%)	N = 1140 (%)	N = 2250	
0-15	39.52	47.99	43.47	
16-25	23.30	20.82	22.11	
26-35	15.41	13.99	14.70	
36-45	9.51	6.77	8.20	
46 and above	12.43	10.53	11.52	
Total	100.00	100.00	100.00	

Table 1: Distribution of population by age and sex

Religion	Household	Population
Muslims	367	2184
Hindus	10	48
Buddhists	00	00
Christians	00	00
Tribal	3	18
Others	00	00
Total	380	2250

 Table 3: Percentage distribution of Bujbunia's people by literacy (7+ years)

Male	Female	Total
N = 1110 (%)	N = 1140 (%)	N = 2250
41.0	29.4	35.2

Table 4. Main source of meone of Households in the dwening diffs.			
Main source of income	Number of households		
Cultivators	95		
Agriculture laborers	50		
Agriculture-cum-shrimp culture workers	62		
Non Agriculture laborers	29		
Businessmen	53		
Construction laborers	5		
Transport workers	10		
Employees	13		
Fishermen	30		
Others	23		
Total	380		

 Table 5: Bujbunia Households have sources of drinking water, toilet facility, electricity and land ownership of Agriculture land but the survey shows the following

			-	0			·		0		
Total	Sour	ce of D	rinking	water		Toilet Fa	cility		Households	Own	land
House	Тар	Tube	Well	Pond	River	Sanitary	Other	No	with	Yes	No
holds		well							electricity		
380	0	367	0	0	13	100	265	5	0	155	225

Table 6: The roof materials for the dwelling households

Type of materials	Number of houses	Percentage	
Straw/Bamboo	322	84.74	
Tile/CI Sheet	48	12.63	
Cement	10	2.63	
Total	380	100	

Table 7: Percentage distribution of respondents by age

A and (in year)	Number of respondents and percentage			
Age (in year)	Number of respondents	Percentage (%)		
0-24	10	8.33		
25-49	57	47.50		
50-74	48	40.00		
75+	5	4.17		
Total	120	100.00		

Table 8: Distribution of sample by sex

Sex by Sample (S=120)	Number of respondents	Percentage (%)
Male	102	85
Female	18	15
Total	120	100

Table 9: Percentage distribution of the respondents having marital status

Marital Status —	Number of respondents and percentage	
	Number of respondents	Percentage (%)
Married	109	90.83
Unmarried	0	0
Widow/Widower	4	3.33
Divorced	5	4.17
Separation	2	1.67
Total	120	100.00

Educational	Number of respondents and percentage	
Qualification	Number of respondents	Percentage (%)
Illiterate	10	8.33
Class I-V	42	35
Class VI-X	17	14.17
S.S.C	30	25
H.S.C	15	12.5
Graduate	4	3.33
Post-Graduate	2	1.67
Others	0	0
Total	120	100.00

Table 10: Percentage distribution of the respondents' educational qualification

Table 11: Percentage distribution of respondents by religion

	Number of respondents and percentage	
Religion	Number of respondents	Percentage (%)
Muslims	116	96.67%
Hindus	3	2.50
Christians	0	0
Buddhists	0	0
Tribal	1	0.83
Total	120	100.00

Table 12: Percentage distribution of respondents by land ownership

Category	Number of respondents and per-	Number of respondents and percentage	
	Number of respondents	Percentage (%)	
Own land	50	41.67	
Shared land	25	20.83	
Gher land	10	8.33	
Landless	35	29.17	
Total	120	100	

Table 13: Percentage distribution of respondents by family types

Family types	Number of respondents and percent	Number of respondents and percentage	
	Number of respondents	Percentage (%)	
Extended	75	62.5	
Nuclear	45	37.5	
Total	120	100	