Ind. Jn. of Agri. Econ.
Vol.68, No.2, April-June 2013

RESEARCH NOTES

Impact of Fish Farming on Land Relations: Evidence from a Village Study in West Bengal

Shantanu De Roy*

ABSTRACT

Prawn farming in the states of Odisha, Andhra Pradesh and Tamil Nadu had led to eviction of tenants and loss of agricultural land and fishing areas for poor people. There is no study that has analysed land relations in prawn farming in West Bengal. This paper analyses land relations in prawn farming in West Bengal on the basis of data collected from a household survey in a village in the Sunderban estuarine region. The analysis of the structure of ownership holdings showed that there was inequality in the distribution of land in Tentultala. The Gini coefficient of distribution of ownership holdings was 0.66. Fish farming had led to concentration of land among the big farmers of fish in Tentultala. These households had almost 70 per cent of total operated area in Tentultala. The Gini coefficient of distribution of operational holdings was 0.93. The development of a land lease market had enhanced livelihood security of small land owners and *bargadars*. Thus, unlike many other areas in India, prawn farming had led to improvement in livelihood security for a section of poor people that had ownership and cultivating rights over land.

Keywords: Land relations, Fish farming.

JEL: Q15, Q22

I

INTRODUCTION

India is one of the largest producers of prawn in the world. The share of India in global prawn production was almost 10 per cent in 2005. Over the years, particularly since the early 1980s, the importance of aquaculture in total prawn production, globally and in India, has increased rapidly. The share of aquaculture in total prawn production has increased from 1.5 per cent in 1980 to 18.5 per cent in 1995. In 2005, about one-third of total prawn production in India was from aquaculture.[1] Blue Revolution is the term used to describe growth in prawn culture in the coastal areas of developing countries since the late seventies and early eighties (Deb, 1998). Given the large export potential of fish and prawns, the Union Government and governments of coastal states in India have actively promoted brackishwater fish and prawn farming since the onset of liberalisation policies in the early 1990s (Ayyappan and Krishnan, 2004). However, the impact of the development of prawn culture in the coastal areas of Tamil Nadu, Odisha and Andhra Pradesh was adverse for the poor and working people. Studies have shown that expansion of prawn farming in the coastal areas of Tamil Nadu, Odisha and Andhra Pradesh has led to loss of ownership

*Foundation for Agrarian Studies, Kolkata.
The author is thankful to Madhura Swaminathan for comments.

rights over agricultural land, eviction of tenants from land and loss of livelihood of the poor people (Halim, 2004, Kagoo and Rajalakshmi, 2002, Naganathan *et al.*, 1995 and Mukul, 1994). Conversely, land was appropriated by a few business houses and family members of politicians, bureaucrats and marine product merchants that were involved in prawn farming, with active State support. Halim (2004) in a village level study in Bhadrak district in Odisha argued that brackishwater prawn culture had resulted in land alienation of poor peasants among other negative effects. He argued that degradation in the quality of soil due to pollution from prawn farms had forced poor peasants to sell land to large prawn companies and rich people. He argued that changes in land use from agriculture to brackish water fish farming had led to loss of employment and income of the sharecroppers. He mentioned that the World Bank and various trans-national investors and district level political leaders had invested heavily in brackishwater prawn farming in the study villages. Kagoo and Rajalakshmi (2002) had argued that conversion of agricultural land into aquaculture farms had aggravated landlessness among farmers. He argued that the development of prawn culture had led to loss of livelihood for the tenants in Andhra Pradesh and Tamil Nadu. In a study in Nagai-Quaid-E-Milleth district in Tamil Nadu and Karaikal in Pondicherry, Naganathan *et al.* (1995) argued that the cultivable land holdings were acquired by treacherous and insidious methods by large companies, engaged in brackishwater prawn farming, by giving false promises like employment opportunities and provision of infrastructural facilities. They argued that land ceiling regulations of the state were discarded. These had resulted in alienation of fertile lands from peasants and loss of access and control over common property resources that were traditionally utilised by the poor people. Mukul (1994) in a study in Nagai-Quaid-E-Milleth district in Tamil Nadu argued that development of brackishwater prawn farming by large business houses had led to eviction of tenants and agricultural labourers, who were dependent on land for their livelihood. The study mentions that about 15000 acres of fertile agricultural land were acquired by large business houses for brackishwater prawn farming in the district. In Odisha, the development of prawn farming in the Chilika Lake region has led to loss of fishing rights of the poor fishers in that area (Pattanaik, 2006 and Samal, 2002). Samal (2002) argued that around 14000 acres of land was leased out, through the lease policy of the Government of Odisha, to non-fishers in the Chilika Lake area by 2002. Non-fishers were national and trans-national investors involved in prawn farming. In addition, encroachment of around 20000 acres, in the same year, by non-fishers had reduced the share of area for capture fishing for poor fishers in the local areas. Pattanaik (2006) argued that the lease policy of Government of Odisha since 1991 had significantly affected the economic options available to the local fishing communities and in their livelihood or survival strategies. This had led to displacement of local fishing communities and increased violence involving property and tenurial rights.

To sum up, prawn farming had led to eviction of tenants, small land owners, agricultural labourers and poor fishers from land and fishing areas in the coastal areas

of Odisha, Andhra Pradesh and Tamil Nadu. Livelihood security of poor people was adversely affected with the development of prawn farming in these areas. Agricultural land and fishing areas were appropriated by a few national and trans-national investors and rich people involved in prawn farming. However, most of these studies do not clearly specify the methodology of collecting statistical data and qualitative information used for the analysis. Except for Samal (2002), none of these studies is based on detailed household level surveys. There was no detailed discussion of tenancy relations that had developed with the introduction of prawn farming in study areas. These studies do not analyse the extent of land owned or operated by poor households in the study areas and how the development of prawn farming changed the distribution of ownership and operational holdings. There is no study that has discussed the impact of prawn farming on land relations in West Bengal—a state characterised by preponderance of small sized operational holdings. According to the data from the NSSO survey of land and livestock holdings, almost 89 per cent of all operational holdings were marginal (not more than 2.47 acres) in West Bengal, and there were no operational holdings whose extent was greater than 24.7 acres in 2002-03. The operational holdings of not more than 2.47 acres accounted for 58.3 per cent of total operated area in 2002-03.[2] Studies on fish and prawn farming in West Bengal have mainly discussed the viability of integrated culture of fish-prawn and paddy and its potential in improving livelihood security of the farmers, particularly in the Sunderban estuarine region.[3] This is an area that needs more research. This study is a contribution in filling this gap in the existing literature.

West Bengal is one of the largest producers of prawn in India that had registered impressive growth rate in prawn production between 2000-01 and 2006-07. The state has the highest potential area for prawn farming among the maritime states in India (Bhattacharya, 2009). Brackishwater fish farming in West Bengal is mainly done in the Sunderbans region, in the districts of North 24 Parganas, South 24 Parganas and East Medinipur. It is one of the few states in India that had implemented land reforms in the rural areas. Hence, unlike many other states in India ownership and tenancy rights over land of the poor people is firmly established in West Bengal. A large amount of literature has shown that redistribution of land and tenurial security, as part of land reform in West Bengal, has led to securing of rights over land for the rural poor and working people (Mishra and Rawal, 2002; Dasgupta, 1995). It is argued that the implementation of land reform along with democratisation of institutions of local government, a three-tier panchayat system, had resulted in changes in correlation of class forces in favour of the poor and working people in rural West Bengal (Khasnabis, 2008, Majumdar, 2003, Banerjee *et al*., 2002, Lieten, 1990 and Dutt, 1981).

This paper analyses the impact of development of brackishwater fish farming on land relations in West Bengal. The paper addresses the following issues: (a) Impact of the development of prawn farming on the distribution of operational holdings, (b) Tenancy relations in prawn farming and sub-leasing of Barga land for prawn farming.

Since these issues require primary data, a village was selected in which prawn farming was done extensively. Tentultala, located in the medium saline region of the Sunderbans, was the study area since it satisfied this criterion perfectly.[4] The location of the village in medium saline region facilitated the production of Rohu, Parsia and Tilapia along with prawn (see Ghosh, 2001). Land in Tentultala was entirely used for prawn farming and it was almost a perennial activity in the village.[5] Prawn farming was introduced in Tentultala in 1990 and it was done in brackish water. The author has used prawn farming and fish farming synonymously in this paper. Prawn farmers were termed as fish farmers in this paper. The paper is organised as follows: Section II discusses location of the village. Section III discusses the field work methodology. The basic features of Tentultala are discussed in the fourth section, while Section V discusses the ecology of the village. Section VI identifies socio-economic classes in Tentultala. The analyses of structure of ownership holdings in Tentultala is presented in the next section. Section VIII analyses the structure of operational holdings in Tentultala. Section IX discusses the consolidation of land through leasing in Tentultala. Section X discusses sub-leasing of Barga land for fish farming followed by conclusion in the final section.

II

LOCATION

Tentultala is in Minakhan block of North 24 Parganas, West Bengal. It is located adjacent to Kumarjole Khal that starts from the river Sakha Bidyadhari—an offshoot from the Raimangal river. The nearest town, Ghusighata, is about 2 km away and is situated on the Basanti Road, which is a State Highway.

Tentultala is about 34 km from Kolkata and frequent buses to Kolkata are available from Ghusighata. It has an all-weather road passing through it. The means of transport within the village is manually driven van-rickshaws or motor van-rickshaws.

III

FIELD WORK METHODOLOGY

The study is based on primary data. Primary data were collected from a census survey of households in May-June 2006. About 244 households were surveyed in 2005-06. Data on the extent of homestead land and land that was used for agriculture and fish farming were collected for each household in the village. Also, data on the extent of land leased out and leased in were collected for each of the households in the village. The names of the lessors and lessees, duration and type of contract of leased land and rent paid and received were collected for each of the households.

IV

BASIC FEATURES OF TENTULTALA

In 2005-06, the total population of Tentultala was 1336 and total number of households was 244. Of the total number of households in 2005-06, about 44.7 per cent were Scheduled Castes and the rest (55.3 per cent) were Muslims. There were 698 males (47.3 per cent) and 638 females (52.3 per cent) in the village. Muslims (781 out of 1336) were 58.5 per cent of the total population. The Hindus comprised the rest, that was about 41.5 per cent of the total population and they belonged to the Paundra Kshatriya caste. All Hindus in the village were Scheduled Castes. The average household size in 2005-06 was 5.5. Female literacy rate in the village is 53.3 per cent; the corresponding figure for males is 70.3 per cent. In 2005-06, there was a middle school (up to standard ten) and a primary school (up to standard five) in the village. There were higher secondary schools in Ghusighata (2 km away), Chandipur (3 km away) and Ghatakpukur (7 km away). In 2005-06, the nearest government sponsored college was in Bhangar (about 10 kms away). In 2005-06, almost 96.4 per cent of total extent of operational holdings, of resident households in Tentultala, was used for prawn farming; the rest were used for agriculture.

V

ECOLOGY OF THE VILLAGE

Salinity of soil is a feature of the Sunderbans estuarine region. During summers, salinity of soil in the region was in the range of 15-25 ds/m—water salinity during this point of time was 20-40 ds/m.[6] As a result, land was unsuitable for cultivation of agricultural crops during summers. Thus, agricultural land in Tentultala, prior to the introduction of fish farming in the early nineties, remained fallow during summers. During monsoons, soil salinity in the estuarine region declined to 4-7 ds/m and paddy was cultivated for four months. Agricultural lands in Tentultala were single cropped paddy land till 1990. It was to make profitable use of these fallow lands and vast resources of saline water, that fish farming was introduced in Tentultala in 1990. Up to 2002, there was an integrated culture of paddy-cum-fishery, in which paddy cultivation was done for four months, during monsoons, and fish farming for the remaining eight months. Since 2002, paddy cultivation during monsoons was not done. There was thus transformation in land use in Tentultala whereby land was exclusively used for fish farming, between February and September-October, since 2002. A typical monsoon climate prevailed in the estuarine region for almost 4-5 months in the year. Monsoon usually starts from mid-June and continues till mid-October. Winter season prevails from mid-November to mid-February. During summers, the maximum temperature reaches almost 35-36 degree centigrade; during winters the minimum temperature falls to 10 degree centigrade. According to Chakraborty *et al*., (2002), "at Sunderbans area the temperature is very suitable

during March to September for culture of Penaeus Monodon" (giant tiger prawns). Rainfall during winters was negligible (Naskar, 1985). To sum, the soil and ecology of the village was suitable for profitable utilisation of land through prawn farming and it had become the primary source of income and employment in 2005-06.[7]

VI

CLASSIFICATION OF HOUSEHOLDS IN TENTULTALA

Classification of households in Tentultala was essential to analyse the distribution of ownership and operational holdings across classes, identify the lessors and lessees, i.e., who were the lessees of land and who were the lessors. Classification of households into distinct socio-economic classes was important for understanding the pattern of leasing of land in Tentultala across classes.

Since crop production was only of marginal importance in the economy of Tentultala, conventional criteria used for analysing agrarian class structure could not be applied to the village. In this paper, the socio-economic classes in Tentultala were identified on the basis of source of income, their role in the process of fish and prawn farming, the pattern of labour deployment and participation in labour market and the extent of their operational holdings (that is, of fish farms and agricultural land). The precise criteria used for identifying each of these classes were as follows:

(a) *Big farmers of fish*: Households that derived their incomes mainly from prawn farming, did not use family labour for agriculture and fish farming, did not participate in wage labour and operated fish farms that were more than 10 acres were classified as big farmers of fish. In 2005-06, this class comprised 7 households (Table 1). Of these, 5 households were also engaged in other businesses or had small extent of agricultural land. In this class, 6 households also leased out plots of land (that were not contiguous to their fish farms) to other prawn farmers.

(b) *Medium farmers of fish*: Among the households for which prawn farming was the main source of income, those that operated fish farms of at least 3 acres but not more than 10 acres were classified as medium farmers of fish. In 2005-06, 5 households belonged to this class. Among them, 2 households were engaged in self-employment/business occupations and agriculture and 3 households participated in wage-labour. About 4 households also leased out some plots of land (which were not contiguous with their fish farms) to other fish farmers and earned rental income.

(c) *Small farmers of fish*: Among the households for which prawn farming was the main source of income, those who farmed fish and prawns on less than 3 acres of land were classified as small farmers of fish. In 2005-06, there were 10 such households in Tentultala; these comprised 4.1 per cent of all resident households in the village (Table 1). This class also included a number of small landowners who were able to produce fish and prawns on their own land or was able to lease in small amount of land. Some of these households had the advantage of owning land close to the main channel so that they could directly get access to brackish water. As a result,

they were able to do prawn farming on relatively small extent of land. Typically, incomes of these households from prawn and fish production were small. As a result, 4 among them also participated in wage labour and 2 among them were engaged in other activities. About 6 households leased out some plots of land (that were not contiguous to their fish farms) to other prawn farmers and earned rental income.

(d) *Households primarily dependent on rental income from land*: Many households in Tentultala, in particular, small landowners leased out their land to the prawn farmers. Also, bargadars sub-leased Barga land to the prawn farmers. In 2005-06, for 70 households, which included many relatively income and asset poor households, rent from the land leased out to fish farmers was the main source of income. These have been classified as households primarily dependent on rental income from land. Among these households, 39 were also involved in other activities like prawn farming, self-employment/business occupations, agriculture and hiring out of labour. In the reference year, 31 households belonging to this class were not involved in any other economic activity and depended totally on rental income from leasing out of land.

(e) *Hired manual labourers*: In 2005-06, wage labour was the primary source of income for 114 households out of 244 households that were residents in Tentultala (Table 1). These households were classified as hired manual labourers. They were mainly involved in hiring out of labour in the fisheries in operations like guarding, fishing and earthwork. Among them, 51 households were solely dependent on hiring out of labour, 23 households had small plots of land which was either leased out to other prawn farmers or used by the households for prawn farming. There were 17 households that had small incomes from petty businesses. There were 5 households that were involved in the cultivation of agricultural crops.

(f) *Households primarily dependent on businesses other than agriculture and fish farming*: In 2005-06, 37 households in Tentultala obtained their income primarily from self-employment/business occupations other than agriculture or prawn farming (Table 1). Of these, incomes from self-employment occupations/businesses were the only source of income for 23 households in 2005-06. Members of working age group participated in various kinds of petty businesses, motor van rickshaw driving and tuitions. Of households in this class, 16 had some earnings from wage labour, 18 had rental income from leasing out of land for prawn farming and 10 were engaged in prawn farming themselves.

(g) *Salaried employees*: In 2005-06, the main income of 1 household was from salaried regular employment outside fish farming (Table 1). This household did not perform manual wage labour in fish farming or agriculture nor did they have their own business. This household earned rental income from land leased out to prawn farmers.

TABLE 1. NUMBER AND PROPORTION OF HOUSEHOLDS IN DIFFERENT ECONOMIC CLASS, TENTULTALA, 2005-06

Economic class (1)	Number of households in each category (2)	Proportion of the total (per cent) (3)
Hired manual labourers	114	46.7
Households primarily dependent on rental income from land	70	28.7
Small farmers of fish	10	4.1
Medium farmers of fish	5	2.1
Large farmers of fish	7	2.9
Households primarily dependent on businesses other than agriculture and fish farming	37	15.2
Salaried employees	1	0.4
Total	244	100.0

Source: Field survey, May-June 2006.

Table 1 shows the number and proportion of households in different classes. About 75 per cent of the households in Tentultala were found to be either hired manual labourers or households primarily dependent on rental income from land. The importance of the latter was on account of two reasons. These were, (a) the number of households in this class was one of the highest in Tentultala and (b) it shows that ownership over land was the main source of livelihood security to large sections of the population in Tentultala. The Table shows that 9.1 per cent of households were mainly dependent on profit income from fish farming.

VII

STRUCTURE OF OWNERSHIP HOLDINGS IN TENTULTALA

Land is the fundamental means of production in an agrarian society. It is a major form of holding wealth. In this section, we examine the structure of ownership holdings in Tentultala in 2005-06. Table 2 shows the distribution of ownership holdings across classes. Access over homestead land and average size of homestead land were not considered in this analysis. The Gini coefficient of distribution of ownership of land in Tentultala was 0.66.

It shows the index of access to land owned by households across classes. Access over homestead land has not been considered in this analysis. The index of access of an economic category ‘i’ is defined as the share of total land owned by the economic category ‘i’ to the share of this economic category in the total number of households.

As is typical of rural West Bengal, the pattern of ownership holdings in Tentultala was characterised by preponderance of small-sized holdings.[8] There is no household that had owned more than 2.3 acres of land, on average. The largest landowning family in Tentultala owned only 3.7 acres of land in 2005-06.

TABLE 2. DISTRIBUTION OF OWNERSHIP HOLDINGS ACROSS CLASS, TENTULTALA, 2005-06

Economic class (1)	Proportion of the total number of households (per cent) (2)	Extent of ownership holdings (acres) (3)	Share of area owned (per cent) (4)	Index of access (5)
Hired manual labourers	46.9	12.5	9.6	0.2
Households primarily dependent on rental income from land	28.8	80.4	61.9	2.2
Small farmers of fish	4.1	7.7	5.9	1.4
Medium farmers of fish	2.1	6	4.6	2.2
Large farmers of fish	2.9	11.6	8.9	3.1
Households primarily dependent on businesses other than agriculture and fish farming	15.2	11.6	8.9	0.6
Total	100.0	129.8	100.0	n.a.

Source: Field survey, May-June 2006.
Note: One household in the class of salaried employees has not been considered.

In 2005-06, the share in total owned area was higher than the share in total population for the large farmers of fish, medium farmers of fish, households primarily dependent on rental income from land and the small farmers of fish. Of all classes, access index was the highest for the large farmers of fish. About 2.9 per cent of households in Tentultala were large farmers of fish in 2005-06. However, their share in total land owned was 8.9 per cent. The average size of land owned by these households was 1.7 acres in 2005-06.

Hired manual labourers and the households primarily dependent on businesses other than agriculture and fish farming had lower access index and lower average size of owned land as compared to other classes. Index of access of hired manual labourers was 0.2; the corresponding figure for households primarily dependent on businesses other than agriculture and fisheries was 0.6. About 57 per cent of hired manual labourers were landless and the rest owned small plots of land (less than 1 acre) in 2005-06. The share of these households in total land owned was 9.6 per cent, which was lowest of all classes in Tentultala. However, the share of hired manual labourers in total number of households was highest of all classes in 2005-06 (46.9 per cent). In 2005-06, access index and average size of owned land was lowest for these households. Households primarily dependent on businesses other than agriculture and fisheries were involved in petty businesses in 2005-06. Almost 60 per cent of these households were landless in 2005-06. Of the total land owned by households in Tentultala, the share of this class was 8.9 per cent and their share in total number of households was 15.2 per cent. The structure of ownership holdings showed that big farmers of fish, medium farmers of fish, households primarily dependent on rental income from land and small farmers of fish were better off than the hired manual labourers and households primarily dependent on businesses other than agriculture and fish farming were land poor.

VIII

STRUCTURE OF OPERATIONAL HOLDINGS IN TENTULTALA

The structure of operational holdings showed a different pattern than the structure of ownership holdings (Tables 2 and 3). Table 3 shows that there was concentration of land among the large farmers of fish. Consolidation of land took place through large scale leasing in of land by the large farmers of fish (Table 4). The Gini coefficient of distribution of operational holdings in Tentultala was 0.93.

There is no study that analyses the impact of fish farming on the distribution of operational holdings, over time, in the district of North 24 Parganas or for the state of West Bengal as a whole. The study has used official sources of data to analyse the distribution of operational holdings across different classes of farmers in the district of North 24 Parganas. The data shows that there were preponderance of small and marginal farmers in the district (North 24 Parganas), in terms of number of holdings and area operated. According to the District Human Development Report (2010) of North 24 Parganas, 94.1 per cent of operational holdings were under marginal and small farmers in 1990-91 that had increased to 96.82 per cent in 2000-01. Almost 74.15 per cent of the total extent of operational holdings was used by marginal and small farmers; this had increased to 86.56 per cent in 2000-01 in the district. The share in total operated area for large farmers in the district had declined from 0.09 per cent in 1990-91 to 0.02 per cent in 2000-01. The average size of operational holding in the district was 1.7 acre in 1990-91 while the corresponding figure in 2000-01 was 1.6 acre.[9] Agriculture in the district was dominated by small and marginal farmers and traditional *aman* rice was the major crop in the district in 2005-06.[10]

While one cannot claim that the data used represent rural West Bengal or even the rural areas of the district of North 24 Parganas, nevertheless, the patterns of distribution of operational holdings in the study village do point to the impact of fish farming on structure of operational holdings, particularly its effect on concentration of land holdings and land relations.

Table 3 shows that the large farmers of fish had the largest share in total area operated in Tentultala in 2005-06. About 2.9 per cent of these households had about 69.6 per cent of the total operated area. These households had operated on 228.6 acres of land. The extent of operational holdings of the large farmers of fish was more than total extent of land owned by all resident households in Tentultala (129.8 acres as shown in Table 2). This is an indication of the small size of plots owned by resident households in Tentultala. Of the economic classes, the share in area operated was least for the hired manual labourers and the households primarily dependent on businesses other than agriculture and fish farms. In 2005-06, the shares in area operated by each of these classes were 1.3 per cent.

TABLE 3. DISTRIBUTION OF OPERATIONAL HOLDINGS ACROSS CLASS, TENTULTALA, 2005-06

Economic class (1)	Proportion of the total number of households (per cent) (2)	Extent of operational holdings (acres) (3)	Share of area operated (per cent) (4)
Hired manual labourers	46.7	4.3	1.3
Households primarily dependent on rental income from land	28.7	45.7	13.9
Small farmers of fish	4.1	16.1	4.9
Medium farmers of fish	2.1	29.6	9.0
Large farmers of fish	2.9	228.7	69.6
Households primarily dependent on businesses other than agriculture and fish farming	15.2	4.3	1.3
Salaried employees	0.4	–	–
Total	100.0	328.6	100.0

Source: Field survey, May-June 2006.

To sum, there was high degree of inequality in the distribution of operational holdings in Tentultala. The degree of concentration in the distribution of operational holdings was higher than ownership holdings in Tentultala. The analysis of distribution of operational holdings showed that the share of large farmers of fish in total area operated was almost 70 per cent. These households had leased in huge tracts of land for fish farming.

IX

CONSOLIDATION OF LAND THROUGH LEASING

9.1 *Leasing of Land Due to Water Sharing in Fish Farms*

Brackish water was a crucial ingredient for fish farming in Tentultala in 2005-06. Kumarjole Khal, a canal situated adjacent to the village, was the source of water for fish farming in Tentultala. Channels were constructed to supply water to the fish farms in Tentultala.

Water sharing in the fish farms through channels was done since 1990 when fish farming was introduced in Tentultala. The width of these channels was 7-8 feet. These channels were constructed by fish farmers who had considerable capital and wielded influence in the village. There were economies of scale involved in the construction of these channels. The channels were not built to supply water to individual plots of land which were, as is the feature in West Bengal, of very small size. This would have resulted in wastage of land to make channels. This was avoided by consolidation of plots of land into large fish farms so that they were connected to Kumarjole Khal through channels. Consolidation of land in Tentultala was done through large scale leasing of land by few fish farmers who had access to capital as shown below. Thus, economies of scale in supplying water resulted in concentration

of production that led to considerable bargaining power to a few fish farmers with access to capital.

9.2 *Leasing of Land on Fixed-Rent Contracts for Three Years*

Consolidation was achieved through large scale leasing of land by a few fish farmers that had access to capital. Land was leased on fixed rent contracts for a period of three years in Tentultala. A shorter term lease than three years was not profitable for the fish farmers due to investment and time required for preparing fish farms. On the other hand, a longer lease contract (more than 3 years) was not made since that will deny the landowners to participate in prawn farming once they have sufficient capital to invest in fish farming. The contract was renewed at the end of third year. Table 4 shows the lessees of land in Tentultala in 2005-06.

The Table showed that the extent of land leased in for three years on fixed rent contracts was 295.3 acres. The large farmers of fish were the most important lessees of land. These households accounted for 71.6 per cent of the total land leased in for fish farming in Tentultala in 2005-06. About 211.3 acres of land was leased in by these households. Large-scale leasing in of land had led to concentration of operational holdings in Tentultala in 2005-06.

TABLE 4. EXTENT AND PROPORTION OF LAND LEASED IN ON FIXED RENT CONTRACTS FOR THREE YEARS BY HOUSEHOLDS ACROSS CLASS, TENTULTALA, 2005-06

Economic class (1)	Extent of land leased in on fixed rent contracts for three years (acres) (2)	Proportion of the total (per cent) (3)
Hired manual labourers	3.6	1.2
Households primarily dependent on rental income from land	36.8	12.5
Small farmers of fish	13.6	4.6
Medium farmers of fish	27.5	9.3
Large farmers of fish	211.3	71.6
Households primarily dependent on businesses other than agriculture and fish farming	2.5	0.9
Total	295.3	100.0

Source: Field survey, May-June 2006.

The terms and conditions of fixed rent contracts in 2005-06 were:

(i) The contract imposed restrictions on the fish farmers to transfer fish farming rights on land holdings in the fisheries within three years to individual(s) who were not part of the agreement in the *Amalnama*. In case of transfer of fish farming rights, the contract was cancelled.

(ii) By this contract, the landowners allowed the fish farmers to use their land for three years for brackish water fish farming with water from the adjoining canal.

(iii) The contract specified the amount to be paid as rent by the fish farmers to the landowners for leased land. It mentioned that rent for leased land was to be paid in cash. In 2005-06, rent per acre was ` 12,000-` 19,500.

(iv) The contract mentioned that payment of rent was to be done in two instalments. The first instalment was to be paid at the start of the season, in January, and the next one in July.

(v) Water was a crucial ingredient for fish farming in Tentultala. Water in the fisheries was carried through a system of channels for which land was leased in by the fish farmers. The contract allowed the fish farmers to construct channels for carrying water in the fisheries. The contract gave no right to the landowners to obstruct the construction of channels by the fish farmers. Landowners charged a premium over rent, from the fish farmers for leasing out of land for the construction of channels. The contract stipulated the premium amount that was to be paid by the fish farmers to the landowners from whom land was leased in for the construction of channels. In 2005-06 it was ` 6,000 - ` 7,200 per acre. However, in contravention to the contract, the amount of premium actually paid by the fish farmers was ` 1,500 - ` 2,100 per acre in 2005-06. Decline in the level of production of prawns and profit in fish farming in the year that preceded the reference year, were the reasons cited by the fish farmers for paying lesser amount than that mentioned in the *Amalnama* to the landowners.

(vi) By this contract, fish farmers had to transfer operational rights over land to the landowners for the cultivation of agricultural crops, by the end of July of the calendar year. Thus the contract specified the use of land for fish farming for eight months (December to July) and agriculture for the remaining four months, during monsoons. Thus, continuation of fish farming beyond eight months, throughout the year that was done in Tentultala since 2002, was in contravention to the contract as stated in the *Amalnama*.

(vii) The fish farmers were not responsible for the loss of agricultural crops due to flood, drought, diseases or attack of pests. However, they had to provide compensation for deliberate destruction of agricultural crops due to any action on their part. The amount of compensation that was to be paid by the fish farmers to the landowners was not specifically mentioned in the *Amalnama*. Also, the relevance of this clause is doubtful as cultivation of agricultural crops was not done in Tentultala since 2002.

(viii) The contract did not allow the landowners to use pesticides on land

Thus, the contract while allowing the fish farmers to use land for fish farming for three years also puts certain restrictions on the way land can be used. There were certain provisions in the contract that were followed and some were not. Fish farming was a perennial activity in the village in 2005-06; however, the contract specified the duration of fish farming for 8 months and agriculture for 4 months. Also, the

premium that was paid by fish farmers to landowners for leased land for constructing channels was lower than the amount that was mentioned in the contract in 2005-06. *Bargadars* were paid half of the rent for leased land that was not mentioned in the contract in 2005-06. However, fish farmers had to pay rent for leased land in 2 installments, as per the contract.

X

SUB-LEASING OF *BARGA* LAND FOR FISH FARMING

Operation Barga was one of the components of land reforms in West Bengal.[11] It provided security of tenure to the *bargadars*. In West Bengal, heritable and non-transferable sharecropping (*Barga*) rights enabled the rural poor to cultivate land over which they did not have ownership rights. Cultivating rights were given to the rural poor with statutory safeguards that prevented eviction of *bargadars* from the leased land.[12] Table 5 shows the extent and proportion of *Barga* land leased out to other fish farmers and used by the *bargadars* in Tentultala.

In 2005-06, there were 46 bargadars and 27.24 acres of land were recorded as *Barga* land in Tentultala. *Barga* land was exclusively used for fish farming in 2005-06. About 11.2 per cent of the total extent of *Barga* land was used for fish farming by the *bargadars*. In 2005-06, about 19.6 per cent of the *bargadars* were involved in fish farming on land over which they had *Barga* rights. It shows that almost 89 per cent of the land over which bargadars in Tentultala had *Barga* rights was further sub-leased to other fish farmers.

TABLE 5. EXTENT AND PROPORTION OF *BARGA* LAND LEASED OUT AND USED BY THE *BARGADARS* IN TENTULTALA, 2005-06

Sl. No. (1)	*Barga* land used by the *bargadars*/leased out (2)	Number of *bargadars* (3)	Extent of *Barga* land (acres) (4)	Proportion of the total (per cent) (5)
1.	Used for fish farming by the *bargadars*	9	3.04	11.2
2.	Leased out to other fish farmers	37	24.20	88.8
3.	Total	46	27.24	100.0

Source: Field survey, May-June 2006.

Personal cultivation on *Barga* land in Tentultala was rarer as compared to leasing out of *Barga* land. *Barga* land was sub-leased on fixed rent contracts for a period of three years in fish farming. Government legislation in West Bengal clearly mentions that *Barga* rights can be terminated if land is not cultivated by the bargadars, personally, or has been used for purposes other than agriculture.[13] However, in 2005-06, cultivation rights of the *bargadars* were not terminated and there was no eviction of the *bargadars* from land. Moreover, rent from leasing out of *Barga* land was shared equally between *bargadars* and the landowners. This was mainly on account of the strength of organised peasant movement in the area and was not based on a

firm statutory right. However, this is an area of concern as weakening of organised peasant movement can have serious implications on the continuation of *Barga* rights for *bargadars*.

XI

CONCLUSIONS

Studies have shown that prawn farming in the coastal areas of Andhra Pradesh, Odisha and Tamil Nadu had led to loss of land for the poor people. A few business houses and members of the family of politicians and bureaucrats, with active support of the State, had appropriated agricultural land and fishing areas that was used by poor people for prawn farming. Prawn farming had led to loss of livelihood for the poor people in these areas. There are no studies that has analysed the impact of prawn farming on land relations in West Bengal. This is despite the fact that West Bengal being one of the largest producers of prawn in India that had registered impressive growth rate in prawn farming between 2000-01 and 2006-07.

An economy that was based on single cropping of paddy, primarily for subsistence, was transformed into one in which fish and prawn production was done entirely for the market. The survey data showed that in 2005-06, cultivation of agricultural crops in Tentultala was primarily done for household consumption.[14]

The study identified seven distinct classes in Tentultala. While on the one hand there were the large farmers of fish that had leased in land and had a major share in the total operated area; at the other end, there were hired manual labourers who were primarily dependent on working for others. The analysis of the structure of ownership holdings showed that there was inequality in the distribution of land in Tentultala. The Gini coefficient of distribution of ownership holdings was 0.66. Access index of land was lowest for hired manual labourers and highest for the big farmers of fish and a single household that was primarily dependent on salaries. The largest landowning family in Tentultala owned only 3.7 acres of land in 2005-06 which shows the small size of land, a feature that is common in rural West Bengal.

Fish farming had led to concentration of land among the big farmers of fish in Tentultala. These households had almost 70 per cent of the total operated area in Tentultala. The Gini coefficient of distribution of operational holdings was 0.93. Leasing of land on fixed-rent contracts was the main form of tenancy. Land was leased in the fisheries for a period of three years in Tentultala. The contract was renewed at the end of third year. The contract was signed in a document known as *Amalnama* in local parlance. The terms and conditions of the contract specified the rent to be paid by the fish farmers, mode of payment of rent, duration of the lease, restrictions on fish farmers regarding transfer of fish farming rights within lease period and restrictions on landowners regarding use of pesticides on land. Unlike fish farming, agriculture in the district of North 24 Parganas was dominated by the small and marginal farmers that had almost 87 per cent of the total operated area in

2000-01. One would like to reiterate that data collected through the village survey in 2006, are by no stretch of imagination representative of rural North 24 Parganas or rural West Bengal. Nevertheless, the findings from this survey do give an idea regarding the impact of fish farming on land relations.

Leasing in of land by the large farmers of fish had led to concentration in operational holdings by this class of households in Tentultala. The development of a land lease market had enhanced livelihood security of small land owners and *bargadars*. Thus, unlike many other areas in India, prawn farming had led to improvement in livelihood security for a section of poor people that had ownership and cultivating rights over land. They received rental income by leasing out of land in fish farms. However, sub-leasing of *Barga* land in fish farms can have detrimental impact on the rights of cultivators. In 2005-06, almost 89 per cent of the total extent of *Barg*a land was sub-leased in fish farms on fixed rent contracts; the rest were used by the bargadars for fish farming. Personal cultivation on *Barga* land by the *bargadars* was a rare feature in Tentultala. This, according to the West Bengal Land Reform Act, 1955 could be used by the landowners to evict bargadars from land. However, *bargadars* were not evicted from land in Tentultala that was in contravention to land reform legislations in West Bengal. Also, the rent from leasing out of *Barga* land was shared equally between *bargadars* and landowners. This was a result of a strong peasant movement in the area which ensured that despite lack of a statutory right, these *bargadars* were not evicted. However, it cannot be ruled out that a weakening of peasant movement could seriously threaten the rights of these *bargadars* over land.

Received April 2012. *Revision accepted April 2013.*

NOTES

1. See FIGIS database of the FAO. The share of aquaculture in total prawn production in India has declined to 21 per cent between 2005 and 2008.

2. NSS Report No. 492, "Some Aspects of Operational Land Holdings in India", 2002-03.

3. See for instance, Chattopadhyay *et al*., (1983), Natarajan (1983), Central Soil Salinity Research Institute, Naskar (1985), (1988), Das *et al*., (1996), Ghosh (2001) and Chakravorty *et al*., (2002).

4. See, for instance, Alagarswamy (1995) and Ghosh (2001) for classification of fish farms in the Sunderbans region of West Bengal on the basis of salinity level.

5. Resident households in Tentultala had 328.6 acres of land. Of these, about 96.4 per cent was used for fish and prawn farming and the rest for agriculture.

6. See the document prepared by the Central Soil Salinity Research Institute, Canning, West Bengal.

ds/m=decisiemens per metre.

7. See De Roy (2012) for a detailed discussion

8. See for instance Mishra and Rawal (2002) and UNDP (2004) for a discussion on fragmented holdings in West Bengal.

9. See District Human Development Report of North 24 Parganas (2010) at http://www.wbplan.gov.in/htm/HumanDev/DHDR/24%20pgs%20north.PDF.

According to the District Human Development Report (2010), the extent of operational holdings of marginal farmers were lesser than 2.47 acres (1 hectare) and for small farmers it was higher than 2.47 acres but lesser than 4.94 acres (greater than 1 hectare but lesser than 2 hectares). Large farmers had operational holdings of 110 hectares and more.

10. See District Human Development Report of North 24 Parganas (2010).and Government of West Bengal: Economic Review 2008-09 (2010).

11. Redistribution of ceiling surplus land and redistribution of homestead land were other components of land reform in West Bengal.

12. See Sections 15, 15A, 16, and 16A of the West Bengal Land Reforms Act, 1955.

13. The basis for the termination of cultivation of *bargadars* in West Bengal are mentioned in details in sections 17(1) (a), 17 (1) (b), 17 (1) (c) and 17 (1) (d) of the West Bengal Land Reforms Act, 1955.

These state that: Section 17(1) (a): "that the *bargadar* has without any reasonable cause failed to cultivate the land, or has used it for any purpose other than agriculture;"

Section 17(1) (b): "that the land is not cultivated by the *bargadar* personally;"

Section 17(1) (c): "that the *bargadar* has failed to tender deposit to the full extent the share of the produce" which is 50 per cent if the inputs are supplied by the landowner and 75 per cent in all other cases.

Section 17 (1) (d): "that the person owning the land requires it bona fide for bringing it under personal cultivation."

14. This paper is a part of my doctoral thesis titled, "Production and Market Relations in Prawn Farming in West Bengal". Of the total operational holdings, which were used by households in Tentultala, the share of agriculture was 3.6 per cent and the rest was for prawn farming. Agriculture, as an occupation, was of marginal importance in Tentultala. In 2005-06, 3.6 per cent of total work force participated in cultivation of agricultural crops. Income from cultivation of agricultural crops was discussed in another chapter on household incomes. Survey data show that 0.6 per cent of total household income was from cultivation of agricultural crops. See De Roy (2012) for a detailed discussion.

REFERENCES

Alagarswamy, K. (1995), "Regional Study and Workshop on the Environmental Assessment and Management of Shrimp Farming", organised by Food and Agriculture Organisation and Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, Thailand.

Ayyappan, S. and M. Krishnan (2004), "Fisheries Sector in India: Dimensions of Development", *Indian Journal of Agricultural Economics*, Vol. 59, No. 3, July-September, pp. 392-412.

Banerjee, A.V., P.J. Gertler and M. Ghatak (2002), "Empowerment and Efficiency: Tenancy Reform in West Bengal", *The Journal of Political Economy*, Vol. 110, No. 2, pp. 239-280.

Bhattacharya, P. (2009), *Economics of Shrimp Farming: A Comparative Study of Traditional Vs. Scientific Shrimp Farming in West Bengal*, Working Paper No. 218, The Institute of Social and Economic Change, Bangalore.

Central Soil Salinity Research Institute (1988), *Rice-Fish Multiple Cropping in Coastal Saline Areas*, Document Prepared by the Central Soil Salinity Research Institute and the Central Inland Fisheries Research Institute (CIFRI), Canning, West Bengal.

Chakraborti, R.K., J.K.Sundaray and T.K.Ghoshal (2002), "Production of Penaeus Monodon in the Tide-fed Ponds of Sunderbans", *Indian Journal of Fish*, Vol. 49, No. 4, pp. 419-426.

Chattopadhyay, G.N., A. Ghosh and P.K. Saha (1983), "A Note on the Possibility of Salinisation of Soils under Paddy cum Brackish water Aquaculture in some Coastal Saline Soils", *Journal of Indian Society of Coastal Agricultural Research*, Vol. 1, No. 1, pp. 43-45.

Das, R.N., U.K. Laha and B. Mazumdar (1996), "Studies on Technology on Paddy-cum-Fish and Prawn Farming in Low Lying Coastal Zone of West Bengal", *Journal of the Indian Society of Coastal Agricultural Research*, Vol. 14, Nos. 1 and 2, pp. 229-232.

Dasgupta, B. (1995), "Institutional Reforms and Poverty Alleviation in West Bengal", *Economic and Political Weekly*, Vol. 30, No. 41/42, October 14-21, pp. 2691-2702.

De Roy, S. (2012), "Impact of Fish Farming on Household Income: Evidence from a Village Study in West Bengal", *Economic and Political Weekly*, Vol. 47, No. 35, September 1, pp. 68-74.

Deb, A.K. (1998), "Fake Blue Revolution: Environmental and Socio-Economic Impacts of Shrimp Culture in the Coastal Areas of Bangladesh", *Ocean and Coastal Management*, Vol. 41, No. 1, pp. 63-88.

Dutt, K. (1981), "Operation Barga: Gains and Constraints", *Economic and Political Weekly*, Vol. 16, No. 25/26, June 20-27, pp. A58-A60.

Ghosh, A. (2001), "Fisheries Development of Estuarine Wetlands in West Bengal", Paper Presented at the Summer School on Culture Based Fisheries for Inland Fisheries Development, Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal.

Government of West Bengal (2010), *District Human Development Report: North 24 Parganas*, Development and Planning Department of the Government of West Bengal, Kolkata.

Government of West Bengal (2010), *Economic Review 2008-2009: Statistical Appendix*, Bureau of Applied Economics and Statistics, Development and Planning Department, Kolkata.

Kagoo, I.E. and L. Rajalakshmi (2002), "Environmental and Social Conflicts of Aquaculture in Tamil Nadu and Andhra Pradesh", *Journal of Social and Economic Development*, Vol. 4, No. 1, pp. 13-26.

Khasnabis, R. (2008), "The Economy of West Bengal", *Economic and Political Weekly*, Vol. 43, No. 52, December 27, pp. 103-115.

Halim, U. (2004), *Shrimp Monoculture in India: Its Impact on the Livelihood of Coastal Poor*, Report of the Asia Pacific Research Network (APRN), Quezon City, Philippines.

Lieten, G.K. (1990), "Depeasantisation Discontinued: Land Reforms in West Bengal", *Economic and Political Weekly*, Vol. 25, No. 40, October 6, pp. 2265-2271.

Majumdar, M. (2003), "From Land Reforms to Land Markets: A Redistributive Shift in West Bengal", *Economic and Political Weekly*, Vol. 38, No. 49, December 6, pp. 5147-5149.

Mishra, S.K. and V. Rawal (2002), "*Agrarian Relations in Contemporary West Bengal and Tasks for the Left"*, in Ramachandran and Swaminathan (Eds.) (2002), *Agrarian Studies—Essays on Agrarian Relations in Less Developed Countries*, Tulika Publishers, New Delhi.

Mukul (1994), "Aquaculture Boom: Who Pays?", *Economic and Political Weekly*, Vol. 29, No. 49, December 3, pp. 3075-3078.

Naganathan, M.; K.J. Sivagnanam and C. Rajendran (1995), "Blue Revolution in a Green Belt", *Economic and Political Weekly*, Vol.30, No.12, March 25, pp.607-608.

Naskar, K. (1985), "A Short History and the Present Trends of Brackishwater Fish Culture in Paddy Fields at the Kulti-Minakhan Areas of Sunderbans in West Bengal", *Journal of the Indian Society of Coastal Agricultural Research*, Vol. 3, No. 2, pp. 115-124.

Natarajan, A.V. (1983), "Possibilities of Brackish Water Paddy cum Fish Farming in Coastal Saline Soils", *Journal of the Indian Society of Coastal Agricultural Research*, Vol. 1, No. 1, pp. 27-30.

Pattanaik, S. (2006), "Commercialisation of Shrimp Trade, Environment and Rural Poverty: A Socio-Ecological Exploration in Coastal Orissa", Paper Presented at the Workshop on 'Trade, Environment and Rural Poverty', Institute of Economic Growth, New Delhi.

Samal, K.C. (2002), "Shrimp Culture in Chilika Lake: Case of Occupational Displacement of Fishermen", *Economic and Political Weekly*, Vol.37, No.18, May 4, pp.1714-1718.

Shukla, T.N. (Ed.) (2008), *West Bengal Land Reforms Act, 1955*, Kamal Law House, Kolkata, West Bengal.

UNDP (2004), *West Bengal Human Development Report 2004*, Department of Development and Planning, Government of West Bengal, Kolkata.