
Agriculture

7.1 Introduction

Farming in the Sundarbans is primarily an individualised household activity but there are aspects of collective action in it, particularly in water provision.

Spontaneous collective action and institutional arrangements for appropriating water by farmers will help illustrate the collectivistic aspects in farming (see Chapter 2, Sections 2 and 3, for institutional arrangements for exploiting common property and different forms of collective action). Before describing the current agricultural scenario in the Sundarbans, I will first provide a brief historical overview of farming in the eco-region, in order to put the developments of this section in perspective.

From Hunter's account (1875 [1998]) it is learnt that groups of *abadkari* (clearers) cultivators from northern tracts would travel by boat to the Sundarbans twice a year to collectively broadcast and harvest paddy on their individually held *abads* or clearings. After sowing their native land, they would arrive in the Sundarbans to broadcast salt-tolerant paddy seeds, and come again, to harvest the same after having harvested their native land. This arrangement seemed logical given the lay of the land and periodic tidal flooding, but over time the broadcast method as well as salt-tolerant variety of paddy¹ was replaced by manual transplanting-sowing method and freshwater variety of paddy. Two developments brought about this change, (i) forest clearing where the delta-building process had reached some order of maturity during the reigns of Hindu and Muslim rulers, and (ii) construction of circuit embankments and occupation of low-lying tracts under the British colonial administration.

Moreover, there was always the preference for paddy cultivation despite abundance of fish varieties in the eco-region due to caste and religious preferences, as well as the fact that rice being non-perishable as compared to fish and other edible estuarine/marine life forms, provided a commodity that could be stored and traded (thus, taxed); it also provided food security to the cultivator (see Chapter 3, Subsection 3.1 for reasons for preferring rice cultivation over fishing). "... Both Hindu and Muslim governments in Bengal favored the culture of the peasant – sedentary, docile and productive – to that of the semi-nomadic fisherman. [...] Over the centuries, as ever more silt was carried down the great rivers and was deposited

¹The original salt-tolerant varieties of paddy have been lost and now through genetic research a new variety of salt-tolerant paddy is being created. The genetically modified variety is yet to receive biosafety clearance.

on the deltaic plain, the fish bearing lagoons (*bil*) that were formed in depressions in the soil gradually dried up. As this happened, the indigenous peoples shifted their livelihoods accordingly, relying less upon fishing and more upon cultivation” (Eaton, 1990; p. 14).

With the expansion of the agricultural frontier and permanent settlement of low-lying tracts, the contradiction between the practice of freshwater agriculture and the natural topography came to fore. The land was capable of producing only a single crop of paddy due to scarcity of freshwater (outside the monsoon period); agricultural activity was thus restricted to this single crop except for cultivation of some vegetables on homestead land for domestic consumption. Measures were initiated in the 1970s to change this situation, efforts were made by the state to introduce a second paddy crop and vegetables during the dry winter months but scarcity of freshwater led to failure of the initiatives. It was only in the 1980s when the Sundarban Development Board (SDB) with assistance from the International Fund for Agricultural Development (IFAD) implemented the “Sundarban Development Project” during 1981-89 at a cost of US\$ 36.2 million (www.ifad.org)² that the practice of raising a second crop gained momentum. This World Bank co-financed project's goal was to improve agricultural production potential in the eco-region. It supported activities focussed on improving drainage and water control for the wet season crop and expanding irrigation facilities for dry season (winter) crops. The project reportedly achieved 91 percent of its drainage and irrigation targets and benefited 1.2 million people; these irrigation canals are locally known as IFAD *khals* (canals) and are state property³ but user rights are defined and exercised through collective action (e.g. Olaotha *khal* on Mousuni Island and Sarak *khal* on Mollakhali Island). The Sundarban Development Project was successful in its own terms but over time the IFAD *khals* became unusable for the purpose they were created. Primarily, due to lack of collective action, the sluice gates became ineffective rendering the water salty, and even where the sluices have been restored the *khal* itself has become derelict. Despite the preference for agriculture and the relatively large investment, the practice and the people dependent on the practice remain vulnerable and the prospects of attaining sustainable development goals in the context of agriculture in the Sundarbans remain uncertain.

The following sections describe the agricultural scenario in the Sundarbans (7.2), the role collective action plays in agriculture particular in distribution of water during dry winter season (7.3), and how farmers negotiate the constraints within which they have to operate (7.4). Finally, in Section 7.5, the chapter analyses how the prevailing limitations weaken the prospects of attaining sustainable development goals in the context of agriculture in the Sundarbans.

² <http://www.ifad.org/english/operations/pi/ind/i049in/index.htm> as viewed on 20 October, 2006.

³ The IFAD *khals* being state property, rather common property, there is no joint effort to maintain these. As a consequence, over time many of these have become derelict. Due to this experience the SDB has almost discontinued the practice of constructing canals. Instead, since 2005, it has floated a scheme for freshwater ponds creating private property in anticipation that private properties would be better maintained than common property. The property owner has to contribute only 10 percent of the cost incurred; the rest is borne by SDB.

7.2 Agriculture in the Sundarbans

Agriculture is the mainstay of the economy of the Sundarbans despite the geo-physical adversity and the fact that 56 percent of the population is landless. In West Bengal in general, marginal farmers constitute the bulk of the peasantry (about 75 percent)⁴, and it is no different in the Sundarbans. This, despite the highly acclaimed land reforms carried out by the leftist government in West Bengal. The West Bengal Land Reforms Act, 1971 allows 5 standard hectare (ha) of irrigated land or 7 ha of unirrigated land for a family of 5, and ½ ha for each additional family member up to a maximum of 7 ha but, in reality average landholding size of a marginal and small farmer in West Bengal is only 0.41 ha and 1.49 ha respectively, and even if all the land on the field research islands were to be distributed evenly, each family would be a marginal farming family with only 0.72 ha and 0.63 ha in Mousuni and Mollakhali respectively according to census figures of 2001⁵. In West Bengal, farmers with land holding below 2.5 acres (1 ha) are defined as marginal and the ones with land holding between 2.5 and 5 acres (2 ha) are deemed as small farmers. However, the concept of marginal and small farmers as perceived by the peasantry of the Sundarbans is a few notches below that defined by the State, a farmer with a holding of between 0.13 and 0.27 ha (1-2 *bigha*) is considered marginal while a farmer with agricultural land between 0.27-0.67 ha (2 and 5 *bigha*) is perceived as small. A small farmer with a relatively small family of 5 members is able to subsist without having to work on someone else's land or seasonally migrate for work. Households with less than 0.13 ha (1 *bigha*) of agricultural land are considered practically landless though I have come across eight households that have no holding at all but still consider themselves as farmers (through their secondary occupation, see first three rows of Table 7.2). Such farmers grow paddy for domestic consumption on seasonally 'leased' land during the *rabi* (dry winter) season. In the *kharif* (monsoon) season, paddy is the only crop, but crop produced in the *rabi* season is diverse, apart from paddy, vegetables and oilseeds are also cultivated. These were introduced through the 1970s and 1980s as cash crops by the Agriculture Department, Government of West Bengal, through the office of the Agriculture Development Officer (ADO) at the Development Block level, the Sundarban Development Board through the Agriculture Growth Centres (AGCs) at the sub-Block level (27 of them), and initiatives of NGOs like the Rama Krishna Mission (RKM) in Kultali Development Block and the Tagore Society for Rural Development (TSRD) in Gosaba and Sagar Development Blocks. Since then cultivation of winter crops has become an important economic activity in the eco-region. The winter crops are also important from the perspective of conservation efforts in the eco-region since it keeps people away from venturing into the Protected Area and thus, the Forest Department (Sunderban Tiger Reserve), Government of West Bengal, and WWF-India through the Sundarbans Programme, also contribute in raising productivity and the extent of farming during winter by restoring derelict freshwater canals, and providing mechanised farm implements. For example, in Mollakhali, the STR has restored part of the Marichjhapi *khal* and

⁴ 'Agrarian Scenario of West Bengal' official website of Agriculture Department, West Bengal. <http://www.wbgov.com/e-gov/English/Departments/DepartmentFrameNew.asp?DpId=5> as viewed on 24 November 2006.

⁵ See Table 7.2 for a break-up of landholding of the sample population.

provided solar lighting sets through the local Forest Protection Committee (FPC) while WWF-India has re-excavated part of the Sarasa *khal* apart from providing pump sets, power tillers and a tractor to the Gobindapur Palli Unnayan Samiti, a community-based organisation ('club')⁶. Due to the experiences of SDB and Forest Department as well as its own experience at Mollakhali as regards collective action for restoration of freshwater canals, WWF is attempting course correction by intertwining *interest* of different social categories/groups so that re-excavation is possible without external aid though it is likely that as with Government initiatives through Ecodevelopment Committees/Forest Protection Committees (EDCs/FPCs) the better off will derive greater benefits than the target population.

Important cash crops of the region apart from paddy in the two seasons are chilli pepper, watermelon and cucumber, different varieties of gourds, pumpkin, tomato, and oilseeds like sunflower, mustard and sesame. Profit margins from vegetable crops are reported to be higher provided the market is buoyant. In the eastern part of Sundarbans, cultivation of watermelon though profitable has been practically discontinued because transportation and storage of produce pose problems. Also, the period when watermelon is ready to harvest, coincides with hailstorms causing extensive damage to the crop while still in the field or while being transported in open boats. Though oilseeds were promoted as cash crops, the produce is consumed domestically because the market for oilseeds is not well developed in the eco-region and farmers have to depend on government procurement which is quota driven, once the quota is reached the market crashes which does not allow farmers to recover cost of production. The Rama Krishna Mission at Nimpith (Jaynagar Development Block) procures oilseeds but for farmers of Mousuni and Mollakhali, getting their produce to Nimpith is not a viable option. The Agriculture Department (the office of the ADO) or the Sundarbans Development Board (the AGCs) do not concern themselves with marketing of produce, the Agriculture Department in particular is concerned with activities relating to policy decisions on agricultural production and productivity, and its extension through technology generation, transfer of technology, ensuring availability and timely distribution of agriculture inputs especially seeds, fertilisers, subsidy, and credit along with support services like soil testing, soil and water conservation, seed testing and certification, planned production, and quality control of fertilisers and pesticides. The SDB through the AGCs provide extension services in terms of availability and timely distribution of agricultural inputs especially seeds and support services like soil testing, soil and water conservation, and demonstration of cultivation techniques. The farmers however, depend more on the fertilizer shops for inputs and information than on the ADOs and AGCs, none of my respondents has ever received any demonstration from the AGCs or have had their field tested for soil characteristics. The ADOs are based at the Development Block Headquarters and for farmers who are from distant islands, it is difficult and time consuming to avail of the services. The AGCs though more disperse are less motivated and the one at Chotomollakhali presents a sorry picture. This AGC is under the jurisdiction of the Canning Branch Office of the SDB. The officials at the AGC cannot entertain requests for a particular variety of seed from the farmers; they can only distribute what they receive. It is usually the

⁶ See Chapter 3, Section 5, for a description of a 'club'.

Gram Panchayat which selects the beneficiaries of seed distribution and not necessarily the ones who are keen to experiment and innovate since beneficiaries are selected on the basis of political considerations. This leaves the officials of the AGC with nothing much to do, all six of whom are from outside the active delta region. In fact, they man the office by turns while the rest are supposedly on field trips, the person manning the office spends the night in the office itself thus saving personal establishment cost. The power station has been instructed not to provide electricity to the office from Friday through Sunday because the officials by their own admission leave the island by 11:00 hrs on Friday and return on Monday around 16:00 hrs (see Footnote 8, Chapter 6). The officials appear quite satisfied with the arrangement which allows them to attend to personal work during the week and be with their families on the mainland and attribute this 'convenience' to poor communication and isolated existence.

The Markets at Chotomollakhali and Bagdanga have six and two licensed fertilizer shops respectively (licensed by the Agriculture Department). These shops stock fertilizers, micronutrients, pesticides as well as some seed varieties though except for paddy seeds, most farmers depend on seeds from earlier crops of their own or that of relatives and neighbours. Each of the fertilizer shops has a regular clientele of between 100 and 300 farmers who depend on the shop owners for advice on use of chemical fertilizers and pesticides. Until 2002, the shop owners received training from the manufacturers as well as credit from the dealers which they extended to the farmers. The fertilizer shop owners report that around 2002, the agrochemical market was consolidated by a few large companies and changed from being a buyers' market to a sellers' market from the perspective of shop owners and farmers thus training and credit facilities were withdrawn, consequently farmers who require credit have to borrow from moneylenders. The shop owners also feel the squeeze because of the lower off take of chemical fertilizers (which is actually good in ecological terms) and increased competition from newer shops which are coming up in the localities. Fertilizer shop owners at the Markets claim that between 1998 and 2004, the number of fertilizer shops has doubled. Credit from moneylenders is a very expensive proposition, interest rates range between 36 and 60 percent per annum. Many of the farmers are not eligible for credit extended by the State Government for a number of reasons such as not owning land, unclear land title, and default on previous loan; 45 of my respondents (out of a total of 80) are ineligible for government credit facility.

Households with no landholding or marginal holding take land on 'lease' for a season at a time during the dry winter season from relatives and neighbours to mostly produce paddy for self-consumption. Inability to produce paddy for self-consumption is a matter of shame for a cultivator household. The 'lease agreement' is usually verbal and informal, and if the lessee for some genuine reason cannot pay the entire agreed amount which varies between Rs. 200-400/- (\$ 4.50-9.00) per *bigha* (0.13 ha) per season, the leaser does not make much of an issue and accepts reduced payment in cash or crop yield. However, there is no reverse mechanism to charge more as rental in case of a bumper crop. This mechanism works due to kinship ties, and the 'letting off' is governed by social mores and values wherein it is unjust to cash-in somebody's distress. The leaser does not want to be seen as someone who takes advantage of difficult times of his relative or neighbour. This

'old' value still dominates lease agreements probably due to agriculture being an ancient practice, and the earlier socio-economic structure where market was not the prime mover.

Relatively smaller families (with five members or less) with 0.27 ha (2 *bighas*) or more of land can afford to produce cash crops which can be vegetables or paddy. Decisions regarding the type of winter crop are based on many factors as will be evident in Section 7.4, but, for the landless or marginal and the well off it is fairly straightforward, the choice is invariably paddy probably because it is a traditional crop and requires no intensive management and day-to-day care. Farmers report ease of cultivation, food security, and less risk (minimum support price declared by the Government), and non-perishability as the factors responsible for large-scale preference for cultivation of paddy.

Unlike paddy, cultivation of vegetables during the *rabi* season is more demanding in terms of labour and infrastructure. Vegetable crops require more skilled labour for soil preparation, continuous attention to individual plants at various stages of growth, watering and harvesting, giving rise to a clutch of service providers. Some of these services are purchased outright, some others are exchanged or paid for in kind, while still others are organised through collective action. Usually, rent for equipment is paid for in cash, labour is exchanged, and water is managed through collective action. Section 7.3 will illustrate water management through *spontaneous* collective action in some detail. For example, in case of a locality where most farmers are cultivating chilli pepper, labour for watering and tending the individual plants is exchanged (mostly women but also men) but labour for harvesting is paid in kind (mostly women and children) while transportation and storage of water is organised communally by men; for every 10 kilograms of chilli plucked, the harvester receives 1kg of chilli pepper which s/he is free to sell.

Depending on plot size, either tractors or power tillers are used for soil preparation. Two of the large farmers at Mollakhali own tractors which they rent out along with the driver for a fee of Rs. 3750/- (\$ 83.50) per ha or Rs. 500/- (\$ 11.00) per *bigha* (fuel excluded). Tractor owners from outside the Sundarbans, as far away as Haryana and Punjab (about 1500 km away to the west) enter into contracts for tilling land and bring over their tractors to the islands for the purpose; Mousuni usually has a tractor for tilling from Haryana for a particular time of the year. Power tillers are more readily available on the islands and can be rented for Rs. 3000/- (about \$ 67.00) per ha (Rs. 400/- (\$ 9.00) per *bigha*), driver and fuel included. Mid-size farmers (landholding 2.7 ha), farmers' associations⁷ and NGOs own power tillers, pump sets and other equipments; pump sets (without fuel) and manual threshing machines can be hired for Rs. 40/- (\$ 0.90) a day. Larger farmers also have husking machines but it is cheaper to have rice husked at the Markets; if it is meant for sale only then it is taken to the Market or else it is husked locally.

⁷ Farmers' associations are promoted by the leftist parties, CPI(M) in particular. Such associations have formal membership and political affiliation. A collective-action organisation but not of the *spontaneous* kind, not statutory thus not *institutionalised* either but formal (see Chapter 2, Section 3, for different forms of collective action).

The Markets on the islands have designated *haat* (open market) days, usually once a week; itinerant traders buy local produce from the farmers on these days. On other days agents of traders who are local residents make rounds of the villages to buy produce at cheaper rates. Agents also extend small loans (between Rs. 3000/- (\$ 67.00) and Rs. 5000/- (\$ 111.00)) to the farmers and once a loan is taken then it is obligatory for the farmer to sell his produce to the particular agent. Produce procured by the agents is not routed through the local Markets but is directly sent to larger markets at places like Canning, Kakdwip and Bashirhat from where it is sent to Kolkata and its suburbs. Farmers seldom take their produce to these larger markets because (i) transportation is difficult, and (ii) farmers do not feel confident operating in these larger markets. Under such circumstances price realisation for the farmers is poor and return on investment inadequate. Moreover, storage facilities on the islands being non-existent, farmers are desperate to sell their produce at the earliest. In fact, one of the reasons for chilli pepper and paddy being preferred is that dried red chilli pepper and rice allow the farmer to exercise some control over the timing of sale, for other crops a farmer has no control over the timing of sale. Lack of storage leads to a glut in the local market, depressing prices and there are instances where the farmer does not recover even the cost of production since there is no minimum support price (declared by the Government) for vegetables as in the case of food grains.

Farmers in western Sundarbans usually receive better prices for their produce as compared to farmers in eastern Sundarbans in absolute terms as well as share of retail price (see Table 7.1). There are two reasons for this, (i) rail and road connectivity is better in western Sundarbans and (ii) there are more markets along the road on the western side for the farmer to choose from, the farther he takes his produce, the better price he receives. For farmers of eastern Sundarbans, this is not an option since the nearest railhead is at Canning but getting there involves a number of changes in mode of transport and is tide dependent as there is no bridge across the Matla River.

My findings are based on interactions with 80 farming households (49 from Mousuni and 31 from Mollakhali) of which 27 are primarily fishers of different kind (18 fishermen, 5 shrimp farmers and 4 shrimp seed collectors) but claim to be farmers reflecting the bias for farming over fishing. These farming households either produce paddy for self-consumption or cultivate cash crops during the dry winter season as a secondary means of livelihood. Details of the respondent households are as in Table 7.2.

7.3 Collective action in agriculture

The Sundarbans receive about 175 cm of rain on an average every year but most of it is during June through September, sporadic rains occur in pre- and post-monsoon months of April, May and October, November. Thus, availability of water is uncertain in the *rabi* season unless secured in advance. Water is stored in canals, ponds and roadside ditches (*nayanjuli*) and is available for agricultural use in the dry season. Ponds are private property as is the water in it, public use of private ponds is restricted to domestic use and bathing. *Nayanjuli* are public property, these ditches

Table 7.1: Price realisation by farmers and producer's share in consumer's price⁸

Cash crop	Average price realised (Rs./kg)		Share of retail price (%)	
	Mousuni	Mollakhali	Mousuni	Mollakhali
Rice	6-8	5-8	54-72	45-72
Potato	3	2-3	50	33-50
Dried red chilli pepper	30-45	20-40	42-64	29-57
Sunflower seed	12-15	10-12	-	-
Pumpkin	2-2.5	2	27-33	27
Wheat	-	5	-	80
Tomato	3-4	-	36-41	-
Watermelon	3-3.5 per piece	2-3 per piece	Farmer sells by numbers, consumer buys by weight; farmer receives a fraction of what consumer pays	

⁸ Dollar equivalent of price realisation has not been worked out since the values are very small, all ranging between less than a cent to 30 cents except for dried red chilli pepper which can fetch as much as a Dollar per kilogram.

Table 7.2: Landholding and occupational details of respondents

Number of households	Land holding (ha)	Perceived category	State defined category	Primary occupation	Secondary occupation
5	None	Landless yet farmers	Landless	Fishing	Rabi paddy cultivation
2	None			Shrimp seed collection	Rabi paddy cultivation
1	None			Shrimp farming	Rabi paddy cultivation
2	= 0.13	Practically landless yet farmers		Shrimp seed collection	Vegetable/Kharif paddy cultivation
4	= 0.13			Fishing	Kharif paddy cultivation
13	0.13-0.27			Kharif paddy cultivation	Migrant labourer/Sea fishing
4	0.13-0.27	Marginal	Marginal	Kharif paddy cultivation	Van-rickshaw driver
3	0.13-0.27			Kharif paddy cultivation	Shrimp seed trader
5	0.13-0.27			Kharif paddy cultivation	Fishing/Honey collection
13	> 0.27-0.67	Small		Kharif paddy cultivation	Mostly rabi paddy cultivation but also vegetables at times
3	> 0.67-1.3			Kharif paddy cultivation	Vegetable cultivation/Inland freshwater canal fishing
1	> 0.67-1.3	Medium	Small	Kharif paddy cultivation	Vegetable cultivation/Shrimp farming
12	> 0.67-1.3			Kharif paddy cultivation	Mostly vegetables but also rabi paddy at times
8	> 1.3-2.0	Large		Kharif paddy cultivation	Mostly vegetables but also rabi paddy at times
4	> 2.0-2.7		Medium	Kharif paddy cultivation	Rabi paddy cultivation

get dug up on the two sides of a road in the process of raising the surface for the road⁹. Canals are also public property but in stretches. It is private property when it is demarcated by cross-bunds. In Mousuni, the Olaotha *khal* is no longer a canal but a series of 14 elongated ponds at least two of which are private property. The users (water appropriators) banded into *khal samitis* have delimited the canal by cross-bunds which are roads running perpendicular to the canal. Earlier water could flow under the cross-bunds but with freshwater gaining value after introduction of winter crops the flow of water has been blocked to exercise ownership of water by particular *khal samitis*. Two of the stretches are private property since the canal at the time of construction passed through individual property and the owners have title over those stretches and made monetary contribution towards its construction, therefore, the water contained in such stretches are also private property¹⁰.

Owners of houses and agricultural fields adjoining *nayanjuli* have the first right of refusal to the water contained in it, some adjoining property owners do not use it and their share can be used by others which is worked out before the onset of *rabi* season. These households do not raise the second crop because they have shops at the main Markets or hold government jobs, do not own agricultural land that is viable for raising a second crop or do not have sufficient labour in-house. Subject to volume of water available, farmers from a water scarce locality, get together to arrange transportation and storage into their locality. This involves a series of negotiations not only among the beneficiaries themselves but also the property owners adjoining the *nayanjuli* to decide on the volume of water to be removed which is measured in hours, for example, 'nine hours of water' implies that water can be drawn from the source for nine hours using a specified pump. However, this water to be removed needs to be stored in some place which could be a pond or canal. Thus, another set of negotiations take place with the owner or users of pond or canal regarding storage and subsequent use. If storage and use is spread over the entire season then two hours of water is deducted, implying that 'seven hours of water' can be used over the season. Water is transported over long distances using polythene tubes (serving as delivery pipes) and diesel powered pump. Beneficiaries pool in the money to hire tubes and pump, and also ensure that there are no leakages or pilferage en route. All of this is carried out through *spontaneous* collective action.

Water from public canals cannot be sold or given away; its use is fixed to a specific plot of land free of charges. A *khal samiti* or canal committee oversees water distribution from the canal or a stretch thereof. The committee consists of an odd number of members from among the users selected through discussion and voice vote, a new committee takes over at the turn of the year. All those who live or have

⁹ Roads and *nayanjulis* are seldom constructed through collective action as in case of embankments. These are constructed through award of contracts by relevant local self-government bodies or departments of the State Government.

¹⁰ Usually canals are public property constructed on public land but are also at times public property on private land where land owners voluntarily give up ownership of land over which the canal passes. However, if labour is provided by a land owner while constructing the canal over private land, that particular stretch remains private. There are also instances of discontinuous canals where a particular land owner has not agreed to the arrangement of constructing public property on private land or for paying for its construction on that stretch to retain ownership.

an agricultural field along the canal up to 300 metre on either side are deemed as users. The volume of water is divided equally among the users, and is measured in hours. Designated plots of the users up to 300 m from the canal can be irrigated; these plots can be 'leased' out and commands Rs. 3000/- (\$ 67.00) per ha (Rs. 400/- (\$ 9.00) per *bigha*). The *samiti* or committee however, does not look after the maintenance of the canal or stretch thereof. When depth is considerably lost, the Garm Panchayat is approached for re-excavation which in turn approaches the Panchayat Samiti and if no funds are available then the SDB, Forest Department (FD) and/or NGOs are approached. The concept of *shramdaan* (donation of voluntary labour) for restoring the canal is absent on the field research islands. Only in dire crises is money pooled in to have the canal partly restored, one such initiative was in progress during my field research in Mousuni. Canals with openings to creeks or rivers (originally designed as irrigation cum drainage canals) are overseen by the Gram Panchayat and are usually leased for brackish water fishery. Thus, instead of *spontaneous* collective action, the users and the collective action organisation (*khal samiti*) looks for intervention of *institutionalised* collective action at different levels (Panchayat Samiti) or at different forms (SDB or FD).

Some of the canal *samitis* which are also farmers' associations or a part thereof own mechanised farm implements like tractors, power tillers and pump sets which are usually donations from iNGOs such as GOAL-India and WWF-India. The *samitis* raise subscriptions among members for maintenance of the implements. Members get to use the implements by turn rent free as worked out by the *samiti*, others can hire the implements.

As noted in the previous section, labour is exchanged as well as paid for in kind among farming households but in Mousuni, labour is also contributed communally to see a household through in times of distress caused due to serious illness or death. Such contribution is made irrespective of the stage of cultivation, it could be during sowing, harvesting or even in between in case of vegetables which require tending.

7.4 Negotiating a dilemma

Though farmers report higher profits from vegetable crops if prices are good, the decision to cultivate vegetables or paddy is dictated by a number of factors. The following narrative provides a glimpse of the choices or rather the lack of them that a small farmer has when deciding on the type of *rabi* crop.

Biplab Mondol is a young man in his early twenties from Chotomollakhali living with his parents and grandmother. Biplab is the last of the four children in the family and the only male child¹¹. His family owns 0.76 ha of agricultural land but his father mortgaged all of it for Rs. 25000/- (about \$ 556.00) (Rs. 5000/- (\$ 111.00) per *bigha*) since he is incapable of working the land himself due to severe injuries he had sustained during two separate encounters with bandits when Biplab was still a child. Biplab's father is a member of a canal *samiti* charged with the responsibility

¹¹ If the first two children in the family are daughters, couples invariably try for a son which results in a family size of 6-7 on an average. If the first two children are sons, the family size on an average is 4-5.

for monitoring water extraction for which he is compensated by a right to withdraw a specified volume of water from the canal which he usually sells since the plot Biplab cultivates is away from the canal his father monitors. The youngest of the three daughters in the family married in February 2005 and the family incurred an expenditure of Rs. 30,000/- (\$ 667.00). Being the only capable male in the family it was Biplab's responsibility to organise the money. He borrowed Rs. 24,000/- (\$ 533.00) in total from two different sources, his two brothers-in-law contributed the rest. Biplab would have to repay Rs. 16,000/- (\$ 356.00) in six months.

Biplab cultivates 0.27 ha of his uncle's (father's younger brother) land on a 50 percent share basis. His uncle has settled in the southern outskirts of Kolkata with his family and has no intention of returning to the village and has decided to sell off his land. Biplab has just one more season to raise a crop on his uncle's field. Since Biplab has been raising crops on his uncle's land and sharing the crop diligently, he will receive 1/4th of the sale proceed amounting to about Rs. 10,000/- (\$ 222.00) with which he intends to have 0.27 ha of family land released from mortgage.

Before the onset of the *rabi* season of 2004-2005 Biplab has to make up his mind whether to produce chilli pepper or paddy. In the *kharif* season he cultivated paddy and the yield will be about 2200 kg of rice per hectare (about 300 kg per *bigha*). Biplab will receive 300 kilograms as his share which will see his family through for about 117 days. He could repeat the effort in the *rabi* season or he could cultivate chilli pepper. His uncle's plot can produce up to six quintals of dried red chilli pepper which can fetch Rs. 24,000/- (\$ 533.00) if the market is good, it would cost him Rs. 4000/- (\$ 89.00) to cultivate chilli pepper. Thus, his net share of the profit would be Rs. 10,000/- (\$ 222.00), the other half being his uncle's share. Biplab could use that money to repay part of his debt.

Biplab gave up the lure of repaying part of his debt through profit from chilli pepper and instead decided to secure rice for his family for at least another 117 days; productivity of winter paddy crop is higher due to improved seed variety. His decision was influenced by the fact that one of his uncles, Keshab Mondol, a larger farmer with 2.7 ha of land with a smaller family of three, is holding on to four quintals of dried red chilli pepper from the last season because price did not rise beyond Rs. 21/- (about \$ 0.50) per kilogram. If dried red chilli pepper fetches the same amount this year Biplab would just about recover cost since he only gets 50 percent of the profit but has to make the entire investment.

Gauri Mondol, one of Biplab's aunts with 0.9 ha of land and a small family of four (both sons) is looking forward to cultivating chilli pepper instead of paddy during the same season. She expects the price of dried red chilli pepper to improve this season and to make a decent profit. Her logic is that farmers like Biplab and ones even worse off than Biplab have shifted to paddy en masse. She tried explaining the logic to Biplab but he would not change his mind since the plot he cultivates is surrounded by paddy plots which will hold at least 5-8 cm of standing water. Chilli pepper plants cannot survive in standing water and Biplab fears that field crabs could easily cause leaks in the small bunds separating his plot from the plots around. Thus, Biplab's decision against chilli pepper can be interpreted as collective will 'enforced' due to the location of the plot that he cultivates. By maintaining the same

interest as his neighbours, he is assured of a paddy crop but by having a contrasting *interest* he runs the risk of losing the chilli crop though earnings are likely to be higher in the latter case. Biplab does not have the choice but Gauri does, because her plot being larger, she can afford to maintain a buffer between her chilli pepper plot and the neighbouring paddy plots. Biplab is reconciled to the fact that he will sell part of the mortgaged family land to repay his debt.

7.5 Analysis

Sustainable development, as I have come to understand and have indicated in Section 2.4, is the process that ensures choices and the continued freedom to make those choices. But, by the time a farmer like Biplab is born, the family into which he is born has already forfeited the choices and strengthened the *driving force* in terms of 'excessive population growth' that undermines human well-being. Three factors compound the situation even further (i) breach in embankment due to the geo-physical dynamic, (ii) limited *spontaneous* collective action within the farming community, and (iii) lack of vision and planning on the part of the Agriculture Department, all together resulting in an inadequate infrastructure.

I will not address the geo-physical dynamic here since it has been dealt with in Chapter 4. As outlined in Chapter 2, this study is about achieving an understanding of the configurations of conditions that cause the contrasting forces to be in operation in the Sundarbans. The freshwater canals and the absence of *spontaneous* collective action in maintaining them present such a contrast. The freshwater canals are common property in terms of right to exploit water being held by persons in common but the institutional arrangement has an inbuilt contrast. While the arrangement for appropriation of water from the canal gives it a character more like exclusive possession on a continuum of property rights, the canal itself is placed towards the other end of the continuum, like no property or commons thus becoming derelict. Due to absence of *spontaneous* collective action not only do the canals become derelict but also the sluice gates are rendered ineffective/inoperative, eventually turning a freshwater canal to brackish water one. This gives rise to a "commons situation" (as defined by Wade, 1988) where by the absence of collective action, not only benefits of cooperation are foregone but even worse, it results in degradation of the common property. Deterioration of the canal becomes a public-good dilemma, and all those who would benefit find it costly to contribute and would prefer others to pay for the good instead, which is apparent from the fact that the Gram Panchayat or other agencies are approached for re-excavation exhibiting lack of *spontaneous* collective action and a dependence on *institutionalised* forms of collective action. Also, for some of the canal users there might be an incentive in the sluice gates becoming ineffective so that brackish water aquaculture, a more profitable proposition than agriculture, becomes possible. Possibly, the idea of the same canal serving irrigation and drainage purposes as elsewhere is inappropriate for a place like the Sundarbans.

Apart from the desire of a few to turn freshwater canals to brackish water ones, absence of *spontaneous* collective action in maintaining canals by the users themselves has two reasons. One, though endowments and landholding of users are unequal, water is distributed equally among the users and not proportionate to landholding, this has the implication that contributions, if made, need to be made

equally. However, contributions made by the relatively better endowed users cannot be matched by the less endowed users, making reaching a consensus difficult. The second reason that can be attributed to this lack of collective action is the precedence set by the Sundarban Development Board, Forest Department as well as other agencies in restoring canals (collective action organisations of different forms and at a different level). Users have come to expect that every time canals need to be restored, it will be organised and paid for by the state or iNGOs. Therefore, though it is in the *interest* of the users and despite existence of *organisation* in the form of *khal samiti*, the *khal samiti* makes no attempt to *mobilise* the users when *opportunity* presents itself in the form of declining benefits. Because collective action is a function of a group's (i) extent of shared *interest*, (ii) the intensity of its *organisation*, (iii) its *mobilisation*, and (iv) the *opportunity* available, collective action remains absent in the absence of *intensive involvement* of the members of the organisation and lack of *mobilisation* by the organisation despite the fact that common *interest* and opportunity exist. *Khal samitis* and farmers' associations are however able to manage the renting of equipment for three reasons: (a) deterioration of farm equipment occurs over a relatively shorter span of time as compared to the siltation of a canal and therefore, the deteriorated state is more perceptible; (b) it costs less to maintain and restore farm equipment and does not call for collective action in terms of labour; and (c) out of service equipment does not affect all users equally since machinery breakdown can occur when some of the users have already benefited from the use of the machinery. To avoid situations where other members cannot benefit from the use of the same machinery, problems are attended to more promptly than in case of a canal which affects all users equally. But, as in the case of a derelict canal which requires re-excavation, a tractor is unlikely to be replaced through collective action. The commonly owned tractor in Mollakhali is relatively new, it was donated by WWF in 2004 and it will be some time before it will need replacement¹².

According to Lele (1991), as already indicated, sustainable development is the process of directed change that not only has the traditional objective of meeting basic needs of current and future generations but also to sustain the ecological and social basis of human life. The population pressure of 700 persons or more per square kilometre on the island does not permit agricultural land to be kept fallow to regenerate and recover thus compromising sustainability of the freshwater agro-ecosystem. Under such a scenario the Agriculture Department deems it fit to promote cash crops but does not address infrastructure or marketing issues. If farmers are unable to store their produce and market them at an appropriate time, the 'market' will and indeed does take advantage of the situation. The farmer is denied the choice which in turn curtails his freedom to make choices regarding the type of crop he would like to cultivate, he is forced to cultivate chilli pepper and when every other farmer does the same, glut in local Markets lowers the price, making recovery of costs that much more difficult. Sen (2000) argues that continued deprivation leads

¹² The 'club' which manages the farm equipments donated by WWF has built a corpus of Rs. 70,000/- (\$ 1,556.00) (maintained in a separate bank account) from levying user fees which they intend to use for major repairs.

to downward adaptation of needs, and in the absence of remunerative prices for their produce as well as the lack of choices in terms of types of crop, a great majority of the farming households are continually adapting downwards. Under such circumstances, there is hardly any scope for the principle of justice between contemporaries and future generations to play out; as a consequence freedom of future generations is compromised. Consequently, maintaining status quo for households like Biplab's is an uphill task. Biplab and his ilk in Mollakhali and Mousuni as well as elsewhere are sliding down which has a cascading effect across generations. Such a course corrects itself only as a matter of chance, or through extraordinary effort of a succeeding individual or succeeding individuals, but in which generation remains a matter of chance as well. Obviously, given the significance of the eco-region, its fragility and the large human population, course corrections as a matter of chance is beyond what the present generation of Biplab can afford.