

Private Investment in Groundwater Irrigation and Emergence of Reverse Tenancy during Boro Cultivation since 1990s: A Case Study in West Bengal



Prosenjit Mukherjee
Assistant Professor,
Deptt. of Economics,
Bangabasi Evening College,
Kolkata, West Bengal

Abstract

West Bengal has made notable progress in achieving food security, despite extreme population pressures and limited land resources. After two decades of sluggish performance prior to the late 1980s, the production of rice, the dominant staple food, has increased much faster than the population. Progress can largely be attributed to the enforcement of tenancy reforms and the rapid expansion of groundwater irrigation. This policy promoted rapid expansion of irrigated "boro" rice farming in the dry season. As boro cultivation required controlled irrigation it flourished where canal irrigation in the post-monsoon season was adequate. In many areas that were outside the command areas of the governmental irrigation facilities, private farmers invested in groundwater extraction devices such as low-lift power pumps and shallow tubewells (STWs). In the early 1990s, Mini-Submersible Tube-Wells (MSTWs) began to take over from the earlier diesel powered STWs in some rural areas. The larger cultivators invested in MSTWs and proceeded to offer to the smaller farmers, in the 15 acre command area of the MSTW, the option of a thika contract for leasing in their land under fixed rent or fixed produce for that season. In this way, the growth of private water market in the post monsoon season led to reverse tenancy i.e., leasing out of land from relatively smaller to relatively large farmers. This paper traces the development of minor irrigation and explains the role of private investment in groundwater extraction mechanism and its impact on the seasonal tenancy relations in West Bengal.

Keywords: Reverse Tenancy, Irrigation Water, Boro Rice, Groundwater Market, Operation Barga, Thika Contract.

Introduction

Groundwater has emerged as the main source of irrigation for smallholder farmers in West Bengal and much of it has been through private investments. West Bengal has made notable progress in achieving food security, despite extreme population pressures, limited land resources, and an agrarian structure dominated by small and tenant farmers. The development of minor irrigation, particularly private investment based expansion of shallow tubewells, has contributed to this impressive performance, and was an outcome of the government's market liberalization policy for irrigation equipment in the late 1980s. This policy promoted rapid expansion of irrigated "boro" rice farming in the dry season. West Bengal is primarily a paddy producing state, though traditionally other crops like jute, potato, oilseeds and pulses are also grown. Time series data published by the Government of West Bengal reveals that in terms of area under cultivation, the acreage under boro paddy is second only to the area under monsoon paddy in the state. The agricultural transformation occurred essentially because of land reforms; a new agricultural technology was successfully adopted on a large scale across most parts of the state like percentage of irrigated area and fertilizer consumption that also varied widely across the districts. Further cultivation of summer (boro) paddy in the post monsoon season expanded rapidly after the introduction of HYV seeds and the spread of irrigation facilities.

Until the beginning of the 1990s, it appeared that in rice cultivation the small and the marginal farmers had found security of tenure. But today,

the access to water appears to be slipping away from many of the farmers in some parts of West Bengal, especially in parts of the districts of Burdwan, Murshidabad, Hoogly, West-Midnapore and Birbhum. Since the early 1980s there has been a rapid increase in boro cultivation in various districts of West Bengal. Boro paddy cultivation is generally based on the use of HYV (High Yield Variety) seeds. As this requires controlled irrigation it flourishes where canal irrigation in the post-monsoon season is adequate. In many cases canal irrigation is supplemented by underground water drawn by diesel or electrically-powered tubewells. In areas where canal irrigation is inadequate or unavailable, cultivation is carried out primarily through the use of groundwater. In many areas that are outside the command areas of the governmental irrigation facilities, private farmers invested in groundwater extraction devices. Private investment in groundwater extraction mechanisms and the emergence of markets for the supply of groundwater have a significant role in the spread of boro cultivation. Previously (for much of the 1980s) the high risk factor involved in boro cultivation had led the larger landowners to lease out land on a fixed contract 'thika' lease (fixed rent seasonal tenancy). Thus, initially, small and marginal farmers, even landless farmers in West Bengal were directly engaged in the cultivation of boro paddy.

In the early 1990s, Mini-Submersible Tube-Wells (MSTWs) began to take over from the earlier diesel power Shallow Tube-Wells (STWs) in some rural areas. The electrically powered MSTWs can easily raise water from more than 20 meters below the ground and thereby reach more secure water resources. The previous tenancy situation has now reversed itself in many areas. The larger cultivators have individually or jointly invested in an MSTW and proceeded to offer to all the farmers (usually the smaller farmers) in the 15 acre command area of the MSTW, the option of a thika contract for leasing in their land under fixed rent or fixed produce for that season. The owners of water source usually either refuse to sell the water to others or they form a cartel among themselves and raise the price of water to such a high level that relatively smaller farmers find it profitable to lease out their land to the owners of MSTW, STW, DTW (Deep Tube-Wells) etc. In this way, the growth of private water market in the post monsoon season has led to reverse tenancy i.e., leasing out of land from relatively smaller to relatively large farmers in rural West Bengal.

Objective of the Study

The objective of this paper is to trace the development of minor irrigation in West Bengal and also to explain the role of private investment in groundwater extraction mechanism and its impact on the seasonal tenancy relations in West Bengal. The paper, therefore, intends to review the emerging changes in the contractual relationship in agricultural land markets in West Bengal in the context of private

investment in groundwater irrigation during boro rice cultivation. The study is based on data collected from surveys conducted in some village households of Burdwan, Murshidabad, Birbhum, West-Midnapore and Hoogly districts.

Review of Literature

The literature on reverse tenancy is limited and purely empirical, consisting almost solely by case studies. In the literature on the structure of the land-lease market, two contrasting views are generally put forward. One view projects the tenant as the weaker party and the market for land-lease is seen as a source of exploitation of the tenant (Bharadwaj, 1974). At another extreme, it has been argued that the tenants do not necessarily constitute the weaker party; rather, the 'exploiter-exploited' relationship gets transformed into one where the better-off landed farmers lease in land to augment their farm-size further from the owners or bargadars of petty holdings for whom self-cultivation turns out to be uneconomical. This is claimed to happen more particularly with the penetration of new technology in agriculture (Bardhan, 1976). The second view is the base of Reverse tenancy.

According to Sengupta and Gazdar (1997), the reasons for agricultural take-off in mid 1980s were most likely to have been the introduction of a new variety of high yielding rice, boro, and the fall in the price of fertilisers relative to rice. He found that irrigation was the key engine of growth or leading input. According to the report of the National Commission on Rural Labour (1991), the new technology, being market oriented and capital intensive, mainly favoured the big peasants.

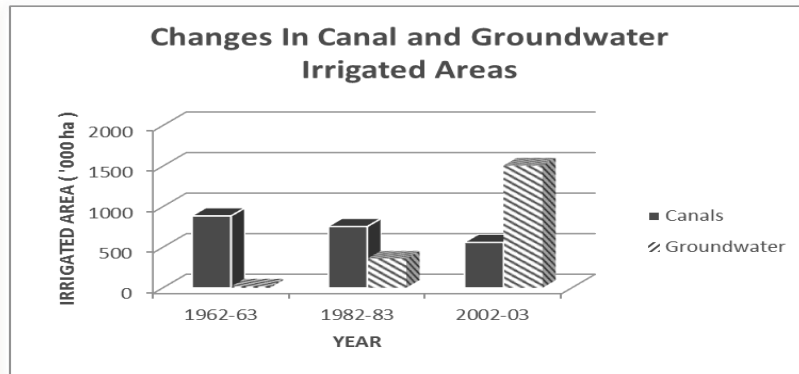
Groundwater Scenario of West Bengal

Groundwater is a prime natural resource in the earth. Groundwater plays a crucial role in the country in increasing food and agricultural production, providing drinking water and facilitating industrial development. Groundwater irrigation is the primary source of water in the dry months of year and supplements rainfall in monsoon season if rainfall is low. It has emerged as the main source of irrigation for smallholder farmers in West Bengal and much of it has been through private investments.

In the late 1980s and early 1990s, agricultural growth rates were 6% per annum, which was attributed to expansion in the area under boro rice cultivation and an increase in yield of all paddy crops due to assured irrigation from tubewells. Groundwater has rapidly emerged to occupy a dominant place in West Bengal's agriculture and food security in recent years. Over the past two decades it has become the main source of growth in irrigated areas, and now accounts for around 50 per cent of the irrigated area in the state.

There have been changes in agricultural water management with canal irrigation declining and groundwater irrigation dramatically increasing (see figure 1).

Figure 1
Changes in Canal and Groundwater Irrigated Areas



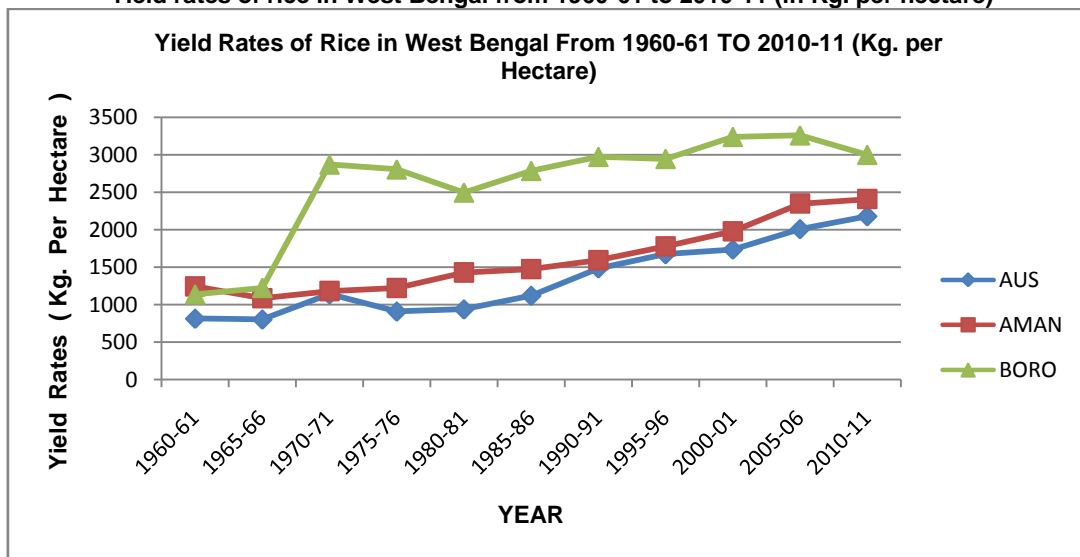
Source: Narayanamoorthy, 2007

Boro Rice: Changing Cropping Pattern Using Groundwater

Rice is the most dominating food crop covering more than 70 per cent of the cropped area of West Bengal. The main causes of growth of rice production in the state are the adoption of higher

yielding varieties of monsoonal aman paddy and the cultivation of winter boro paddy, in rotation with aman. Both of these forms of intensification were enabled by the rapid spread of groundwater irrigation, mainly in the form of privately owned STWs.

Figure 2
Yield rates of rice in West Bengal from 1960-61 to 2010-11 (in Kg. per hectare)



Source : Statistical Abstract, Bureau of Applied Economics & Statistics, Government of West Bengal

Boro rice is cultivated in waterlogged, low-lying or medium lands with irrigation during November to May. With the increase in irrigation facilities, boro crop is now being taken in areas outside its traditional boundaries and a new cropping system is emerging. Figure 2 shows that yield rate (Kg per Hectare) of boro rice is greater than that of Aus and Aman rice. In West Bengal, major boro rice growing districts are Burdwan, Murshidabad, 24-Parganas (North and South), Midnapore, Nadia, Hoogli, Birbhum and Bankura.

Changes of Seasonal Tenancy Relations due to Private Investment in Groundwater Irrigation: Emergence of Reverse Tenancy.

Reverse leasing of land from relatively small to relatively large farmers is a growing feature of West

Bengal. In the post monsoon season (specially in the rabi season), in many districts of West Bengal, the marginal and small farmers are found to lease out their land to large farmers for the cultivation of boro rice, potato, vegetables, cereals etc. which require large investment and adequate water. In the rabi season, operational holdings (or sizes) generally rise as the large operators, with the capital and the networks to manage high input cultivation, 'acquire' cultivation right from the small holders; whereas such land is resumed for cultivation during the Aman season by poorer farmers under traditional forms of tenancy with usual rationales applying.

The growth of private water market is the main reason of reverse leasing. The large farmers have their own Pump-sets, Shallow Tube-wells

(STW), Shallow Pumps, Mini- Submersible Tube-wells (MSTW) etc. whereas the small farmers have to buy water from the large farmers. In the early 1990s, MTSWs began to take over from the earlier diesel power STWs in some rural areas. MTSWs were introduced when the water-level fell in the aquifers and STWs could not ensure water supply. The MSTWs can easily raise water from more than 20 meters below the ground and thereby reach more secure water resources. This also increased the command area. In the early 1990s, an MSTW cost approximately Rs. 65,000 to install (this can increase to more than Rs. 90,000 if the electrical motor is more than 5 horsepower and driven by a separate diesel generator) and further a payment of Rs. 1,500 per annum for the electricity consumed. In late 1990s, the cost had risen almost to Rs.1,30,000 (data collected from some large farmers at the time of interview). Thus the private ownership of MSTWs is concentrated in the hand of some large cultivators. This situation gives the owner of the MSTW a perpetual monopoly over water distribution in the command area. The owners form a cartel among themselves and raise the price of water to such a high level that the relatively smaller farmers are compelled to lease out their land to the owners of MSTWs.

The small farmers' limited access to institutional credit is a constraint to investment in new agricultural technology. Small farmers are often unable to satisfy the commercial criterion of credit worthiness (value of assets, land etc.). Thus small farmers, largely being pushed outside the institutional credit of the organized money market, are forced to borrow mostly from non-institutional sources. They are forced to borrow from money lenders, landlords, water suppliers which lead them to surrender their land to big peasants. The agricultural credit system in the country is not realistic. Agriculture is an unorganized profession. Its success and failure depends to a large extent, on climatic factors. Further it is not always possible to distinguish between productive and unproductive loans. Farmers often require loans for consumption purpose as well. The financial agencies do not grant loans for unproductive consumption purposes. Rich farmers and landlords, not only often provide production loans to their tenants, but also provide consumption loans to ensure the supply of labour at a stipulated period (particularly during the peak season) at the prevailing market rate. Accordingly the small farmers are forced to fall back upon money-lenders, water supplier, traders, mahajans etc. who are basically the big farmers or landlords.

The return from cultivation per unit of land is higher in large holdings than for the small holdings perhaps due to differential input costs and credit costs. Large farmers purchase raw materials at a lower cost, as compared to small farmers, as they purchase in bulk quantities. The large farmers can afford to store their grains and sell it in the market after four or five months (i.e. August/September) and thereby get a good price of their produce. The small farmers can sell their produce immediately after

harvesting season (i.e. March/April) as they cannot bear the cost of storing the grains for a long period; they also need to finance their daily needs, pay back loans they have taken from mahajans and invest for the next aman crop.

Such leasing in the post monsoon season takes advantage of two major loopholes in the Land Reform Act. According to West Bengal land Reform Act, a barga may be recorded if the tenancy is for an entire agricultural year (i.e. from the first day of Baisakh to the last day Chaitra in Bengali calendar) as opposed to a cropping season on condition of delivering a share of produce as opposed to fixed rent or fixed produce.

Gains of Both the Small and the Large Farmers due to Seasonal Reverse Leasing

The large farmers' desire and ability to maximize income through expansion of the size of operational holdings is an important reason of reverse leasing. According to the report of the National Commission on Rural Labour (1991), the new technology, being market oriented and capital intensive, has mainly favoured the big peasants. The small farmers not possessing the required resource base or requisite knowledge or risk-bearing capacity have lagged behind in the adoption and application of technology.

The marginal farmers' desire to maximize income through leasing out of land specially in the 'boro season' and wage earnings by hiring out labour within and outside agriculture are a prime reason of reverse tenancy. The small farmers now can lease out their land to the MSTW owners for boro season in exchange of fixed rent under 'thika' contract. At the same time, they can earn some money by selling labour. In this strategy, they now get dual income: (a) Income from fixed rent of land and (b) Income from selling labour.

Both the parties, the small and the large farmers (or in other words, the lessor and the lessee) gain from this leasing contract. As this leasing from small to large farmers is entirely verbal and informal, legal proceedings can easily be avoided in such cases. In such an agreement both the parties are happy - the landlord (or the owner of water source) gets the full control over the whole land during that season, the bargadar (or small farmer) gets the required share without any responsibility of cultivation and without losing the barga-right. The bargadars gladly accept this proposal of reverse tenancy because in this case he has no risk-bearing factors of cultivation, he has no responsibility on the land, no physical effort for growing crop; and in as much as this is a verbal agreement there is no possibility of cancellation of the barga-rights of the small farmers. Even at the off-time the farmer now can look for a new fixed-wage job which increases the total income of the farmer. This gain from trade approach is the basic logic of Reverse Tenancy. Here the parties, the landlord and the small farmer gain from this mutual agreement (trade).

The Study Area

Our survey is aimed at collecting comprehensive data on some village households of Burdwan, Murshidabad, Birbhum, West-Medinipur and Hoogly districts. These districts are taken as sample because, for the most part, boro cultivation is heavily dependent on groundwater extraction using submersible pump sets. In many areas, the expansion of cultivation of boro paddy leads to a fall in the groundwater level in the post monsoon months and STWs can no longer be relied upon to provide an adequate supply of water in the critical months of April and May. The case studies of five blocks each from one district were conducted by us. In this section we present case studies of moujas. Two moujas have been selected from each block of a district.

1. Two moujas, Kusumgram (J.L. No: 71) and Rauthgram (J.L.No: 81) have been selected from Monteswar Block of Burdwan District.
2. Two moujas, Gokarna (J.L. No: 19) and Mahalandi (J.L.No: 20) have been selected from Kandi Block of Murshidabad District.
3. Two moujas, Taloa (J.L. No: 37) and Dakshingram (J.L.No: 150) have been selected from Mayureswar I Block of Birbhum District.
4. Two moujas, Shyamsundarpur (J.L. No: 63) and Mulgram (J.L.No: 75) have been selected from Ghatal Block of West Medinipur District.
5. Two moujas, Pontba (J.L. No: 55) and Bargram (J.L.No: 68) have been selected from Pandua Block of Hoogly District.

Table1: Sample Analysis

Block	Landless (0 Bigha)	Marginal (0-5 Bigha)	Small (5-10 Bigha)	Medium (10-20 Bigha)	Semi-Medium (20-30)	Large (>30 Bigha)	Total
Monteswar (Burdwan)	10	11	13	8	12	6	60
Mayure-swarl (Birbhum)	8	7	11	11	10	7	54
Kandi (Murshidabad)	10	12	15	7	12	6	62
Ghatal (West Medinipur)	5	7	12	12	11	5	52
Pandua (Hoogly)	8	8	11	14	10	6	57
Total	41	45	62	52	55	30	285

Source: Primary Data Collected by the Author

Table 2
Ownership of MSTWs in Survey Villages among Different Size-Classes

Blocks	Monteswar (Burdwan)	Mayureswarl (Birbhum)	Kandi (Murshidabad)	Ghatal (West Medinipur)	Pandua (Hoogly)	Total MSTW owner	No. of person interviewed
Landless	--	--	--	--	--	00	41
0 - 5	--	--	--	--	--	00	45
5 - 10	--	--	--	--	--	00	62
10 - 20	01	01	03	02	01	08	52
20 - 30	--	02	04	01	03	10	55
>30	04	05	05	03	03	20	30
Total	05	08	12	06	07	38	285

Source: Primary Survey by the Author

The tables show that in our survey a total of 285 farmers, from all five blocks, are taken as sample of which 41 are landless, 45 are marginal farmers (0 – 5 bighas), 62 are small farmers (5 – 10 bighas), 52 are medium farmers (10 – 20 bighas), 55 are semi-medium farmers (20 – 30 bighas) and 30 are large farmers (> 30 bighas). In the sample of 285 farmers, 60 have been selected from Monteswar block, Burdwan, 54 are from Mayureswar-I, Birbhum, 62 are from Kandi, Murshidabad, 52 are from Ghatal block, West Medinipur and finally 57 are from Pandua block, Hoogly.

Out of that 285 farmers, 38 are found to be the MSTW owners of which 5 are from Monteswar block, 8 are from Mayureswar I, 12 from Kandi, 6 from Ghatal and 7 are from Pandua block. It is interesting to note that there is no MSTW owner among the landless, marginal and small farmers. The ownership of MSTW is mainly concentrated in the group of semi-medium and large farmers; among the 30 large farmers, in the sample, 20 are MSTW owners.

In the early 1990s, an MSTW cost approximately Rs. 65,000 to install (this can increase to more than Rs. 90,000 if the electrical motor is more than 5 horsepower and driven by a separate diesel

generator) and further a payment of Rs. 1,500 per annum for the electricity consumed (Webster, 1999). In 2010, the cost had risen almost to Rs.1,50,000 (data collected from some large farmers at the time of interview). Thus the private ownership of MSTWs is

concentrated in the hand of some large cultivators. This situation gives the owner of the MSTW a perpetual monopoly over water distribution in the command area.

Table 3
Distribution of Leasing-In in Monteswar Block, Burdwan

Size Class in Bigha	Do not Lease in	Land Less 0	0 - 5	5 - 10	10 - 20	20 - 30	>30	No of Person Inter-Viewed (60)
Lessor / Lessee								
Landless 0	04	--	--	02	04	03	--	10
0 - 5	05	--	02	02	05	01	--	11
5 - 10	06	--	03	03	02	03	--	13
10 - 20	05	--	01	--	03	01	--	08
20 - 30	02	--	09	07	10	01	01	12
>30	00	--	06	05	04	03	--	06

Table 4
Distribution of Leasing-In in Mayureswar-I Block, Birbhum

Size Class in Bigha	Do not Lease in	Land Less 0	0 - 5	5 - 10	10 - 20	20 - 30	>30	No of Person Inter-Viewed (54)
Lessor / Lessee								
Landless 0	04	--	--	--	--	01	04	08
0 - 5	06	--	--	01	--	--	--	07
5 - 10	09	--	01	--	--	--	01	11
10 - 20	07	--	01	02	--	02	--	11
20 - 30	03	--	04	03	05	01	01	10

Table 5
Distribution of Leasing-In in Kandi Block, Murshidabad

Size Class in Bigha	Do not Lease in	Land Less 0	0 - 5	5 - 10	10 - 20	20 - 30	>30	No of person inter-viewed (62)
Lessor / Lessee								
Landless 0	03	--	02	04	03	--	--	10
0 - 5	10	--	--	--	--	01	01	12
5 - 10	11	--	01	--	--	02	01	15
10 - 20	04	--	01	02	--	--	02	07
20 - 30	02	--	09	07	06	02	02	12

Table 6
Distribution of Leasing-In in Ghatal Block, West Medinipur

Size Class in Bigha	Do not Lease in	Land Less 0	0 - 5	5 - 10	10 - 20	20 - 30	>30	No of person inter-viewed (52)
Lessor / Lessee								
Landless 0	02	--	--	--	--	02	02	05
0 - 5	05	--	--	--	--	02	01	07
5 - 10	09	--	02	--	01	--	--	12
10 - 20	07	--	02	01	03	--	01	12
20 - 30	02	--	07	09	06	03	01	11
>30	01	--	05	05	04	02	01	05

Table 7
Distribution of Leasing-In in Pandua Block, Hoogly

Size Class in Bigha	Do not Lease in	Land Less 0	0 - 5	5 - 10	10 - 20	20 - 30	>30	No of Person Inter-Viewed (57)
Lessor								
Lessee								
Landless 0	02	--	03	02	03	02	01	08
0 - 5	06	--	--	--	--	01	02	08
5 - 10	07	--	01	01	02	--	01	11
10 - 20	08	--	02	02	--	01	01	14
20 - 30	04	--	03	05	05	02	--	10
>30	--	--	06	05	06	03	01	06

The Tables (3 to 7) indicate that in each and every village the size holding class >30 bighas of land are leasing in land from other cultivators in the boro season; whereas they are not leasing out their land to others. In general, large farmers lease out plots that are small in size and located outside the command area of their pump-sets (earlier, we got this phenomenon in our survey villages of Burdwan and Murshidabad districts, Mukherjee(2014)). No farmer with > 30 bighas of land in the other villages lease out land. It is observed that there are a few small farmers who do not lease out their land. This may be due to the following reasons. First, the advantage of costless supply of family labour leads them to lease in land; second, family burden or old age may be an impediment to migration; and finally, the relative cost of buying food grains is higher than that of producing it by oneself. We also note an important feature of the lease arrangements that there is always a tendency of smaller unrecorded lessees leasing in land more from the smaller lessors.

Keeping all these in mind, a small farmer faces two options.

1. To lease out his land to the large farmers.
2. To cultivate the land himself.

In most cases it has been seen that first option is more profitable for the small farmers. Taking a closer look at the issue of leasing out of land it was apparent that the large farmers (especially who have control on the supply of water in a particular area) form a cartel and charge a high price for the water they sell to the smaller farmers so that it becomes unprofitable for the latter to cultivate their own lands. They are then left with the only option of leasing out their land to the nearest large farmer (who owns a pump-set). If the small farmer chooses the second option, he ends up with higher costs, lower return and longer labour hours spent. If he opts for leasing out the land to a large farmer then he earns a fixed rent (or fixed produce) per bigha without providing any labour; and can earn some money by selling his labour. Given the cost of water and the leasing cost of land, we can draw an important conclusion that it is always better for a small farmer to lease out his land, if he has an alternative employment opportunity at hand.

Conclusion

Reverse Tenancy in the post monsoon season takes advantage of two major loopholes in the

Land Reform Act. According to West Bengal land Reform Act, a barga may be recorded if the tenancy is for an entire agricultural year (i.e. from the first day of Baisakh to the last day Chaitra in Bengali calendar) as opposed to a cropping season on condition of delivering a share of produce as opposed to fixed rent or fixed produce.

The typical seasonal tenancy situation we encountered during field research involved owners who did not have direct access to a water source and who could not afford the high input costs (including purchasing water from neighboring) necessary to grow a boro season crop. During boro season, such landowners rented out some or all of their land to lessees who would pay all input costs and pay the owner a fixed-rent in cash or kind, typically equivalent to between 1/6 and 1/4 the value of the crop depending on the locality (but on a fixed-rent, not share basis). Such lessees were sometimes neighboring landowners who had access to irrigation water through bore wells. The tenancy arrangements were typically verbal (not written or formalized).

Overall, however, our field research revealed that:

1. Landowners often do not lease out their land because they are afraid that the tenants will record as bargadars;
2. Even with seasonal leasing arrangements, landowners run the risk that seasonal tenants will try to record as bargadars; and, thus
3. Such arrangements are not entered into without a substantial degree of mutual understanding and trust between the parties.

Several interviewees opined that restrictions on prospective tenancies on agricultural land work against the interests of all agricultural households (including the poorest) and should be removed. In our study, we found that both the parties, the small and the large farmers (or in other words, the lessor and the lessee) gained from this leasing contract. These interviewees stated that the legal prohibitions on tenancy caused some landowners to leave land fallow or farm it inefficiently, and also prevent land-poor, labour-rich or technology-rich households from leasing in land.

In order to encourage land to be used efficiently and to make additional land available to landless or marginal farmers, we recommend that the government should ease the broad prohibition on

fixed-rent tenancy to allow farmers the right to lease-in land. If such tenancy arrangements are legally recognized, the legislation should also include several provisions:

First, the law should require that any such rental or lease agreement be in writing and should provide a mandatory, standardized form for such agreements that gives the tenant rights of exclusive possession but does not set maximum rent payments or a minimum length of terms.

Second, the law must make clear that such tenants will not be given any long-term or hereditary rights to the land beyond that contained in the written agreement.

Hence, it may be conjectured that reverse tenancy leads to an increase in the area under boro cultivation above what would have occurred had this not been possible. For the possibility of reverse tenancy increases the incentives of large farmers to invest in MSTWs which guarantee an adequate water supply for large tracts of land.

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