

Land Acquisition in Indian Sundarbans: The role of information networks in the land sale for building public infrastructure¹

Anirban Mukherjee^a Prasenjit Sarkhel^b,

^a *Department of Economics, University of Calcutta, India*

^b *Department of Economics, University of Kalyani, India*

Abstract

The existing discussion on land acquisition for development project emphasizes the problem of inappropriate compensation. We argue that besides inadequate compensation, information lag about the compensation process and expected private returns from public projects are critical stumbling block in the process of acquisition. In this paper, using the household survey data collected from Indian Sundarbans -in the aftermath of cyclone Aila-we examine whether members of socio-political networks behave differently in the context of the decision to sell land to government for (re)building public infrastructure namely river embankments. We estimate the price premium and land sales response of the household using two network measures: kinship with local governments and membership in political parties. Our result suggests that people belonging to political network are more likely to have a lower reservation price for their land than their non-political counterpart. We show that households having access to these social networks are more likely to sell their land because besides getting the first round public good benefit they may get a second round income by participating in the process of public goods construction.

Key words: Land acquisition, Social Network, Compensation, Sundarbans

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1. Introduction

Acquiring land for industry or public infrastructure has become a major issue of political contention in emerging economies such as India and China(Awasthi, 2014; Mahalingam and Vyas, 2011). In recent times there has been a surge of protest movements in both the countries which in fact resulted in change of regimes in different states of India(Bardhan et al., 2014). The protest movements mostly center around two important questions: whether money is the appropriate metric for compensation and if yes, how do we come up with the appropriate amount of compensation. In this paper we examine the role of network membership in the process of negotiation regarding compensation. The main reason behind negotiation failure lies in information asymmetry between government and citizens. Such information asymmetry may be associated with the value of land after the implementation of the project, money required to rehabilitate displaced citizens and general coordination among citizens in deciding whether to sell their respective land for the project. In this paper we conjecture that communities play a major role in negotiation by mitigating such information asymmetry.

We argue that communities continue playing critical roles for both candidate institutions for land acquisition, viz. market and government. One of the most pressing reasons why market may fail in this context, is that market price may undermine the true worth of one's land as the transaction will be done on current valuation. This is particularly true for public infrastructure projects which are expected to increase the valuation of land in future. In such cases landowners may be reluctant to sell their lands in current prices if they believe that the price of land will go up if the proposed infrastructure or industry is built.

The other candidate institution for land acquisition – the government -- has its own problem(Blume et.,al, 1984) -- government may not know the 'right' amount of compensation while land owners will have the incentive to ask for more than required to compensate them.

One of the most critical problems related to market based or any form of voluntary acquisition is the “hold up” problem. This problem occurs if there is indivisibility in the land requirement of a project -- it cannot be built with any less than a fixed amount of land. Once most of the land required for the project is acquired, the value of the remaining plots that are needed to be acquired will go up. Consequently, the money already invested in buying the land cannot earn the buyer any return and, because the land owners who *hold up* their plots can earn higher economic rent, no one will be the first mover from the seller’s side. For solving this problem an auction based mechanism has been suggested by (Ghatak and Ghosh, 2011) which is a hybrid of the market and the government. In this mechanism an area larger than the area required for the proposed project is marked. Then tenders are asked from the farmers revealing the selling price for their land as bid, with a commitment from the government’s side that it will buy the lowest price bid.

Besides being related to the body of work that looks at the problem of land acquisition directly, our paper is also related to the literature that looks at land market participation in general and analyses the incentives for selling or buying. In one such paper (Deininger et al., 2009) finds that people facing higher risk are more likely to sell their land. The existing literature on land sales also sees land sale as an instrument of risk mitigation. For instance, Zimmerman and Carter (2003) show using an optimal control model that poor households may choose asset smoothing over consumption smoothing and which may result in poor people holding on less productive asset. This provides an explanation why poor farmers cling onto land even though they can buy more productive but risky assets using the money they get as compensation. This paper attempts to contribute to this growing literature by analyzing the role of social network in land sales decision. Here, our aim is to characterize the coalitions that might block the public program of land acquisition based on their intensity of social ties

In order to put our work in perspective, we note that the Indian government, in face of nationwide protest movements during 2009-2010, decided to amend the archaic colonial law of land acquisition that does not allow the land owners to negotiate the compensation they get. The Land Acquisition Bill passed recently in the Indian parliament asserts that the compensation would be 4 times the market value of the land for the rural area and in case of urban land the value would be double that of the market rate. It also announces resettlement and rehabilitation package. However, we do not know of any rigorous analysis which resulted in these numbers quoted in the proposed bill(Mahalingam and Vyas, 2011).

While compensation for land is highly context dependent our concern in this paper relates to land acquired for rural infrastructure projects in developing countries like India. Given the fact that livelihood activities in rural areas are highly land dependent the motives that influence demand for compensation needs careful examination. Here, private incentives to sell land are likely to depend on the returns from land that in turn depends on the land use patterns. The land sales decision would then depend on the foregone returns relative to the benefits derived from the proposed public works. We argue that such benefits among other things depend on household's membership in different networks. Therefore, network membership should influence one's decision to sell land.

It is important to note that benefits from a public good may not be limited to its intended use. For example, if a road is built, its benefit is not limited to an expansion of the transportation facility and associated potential expansion in business. The local residents may derive a second round benefit in form of income by getting engaged in the construction process of the road. We argue that it is the second round benefits which usually depend on the landowner's membership in relevant networks – social or political. Members of political parties, for example, often receive the contracts of public goods construction.

However, in some cases the intended benefit of the public good may also accrue to specific groups. There are cases where health care providers favors

one ethnic group over the other (Ryn and Fu, 2003) or cases where agents with better network get higher access to natural resources (Bebbington and Perreault, 1999). In the present study however, we look at the issue of embankment construction whose first order benefit – prevention of flood – is non excludable in nature and therefore is not influenced by political membership.

Our study demonstrates that the reservation value of land might be lower for a household that is better connected in networks which allow its members to avail a second round benefit from the project. Therefore such households are more likely to sell land for public projects than their non-member counterpart.

In this paper we look at the Indian Sundarbans area which was hit by the cyclone Aila in 2009 which displaced 1,00,000 people and submerged a huge area in saline water making the land unsuitable for agricultural purposes. The effect of Aila was even more devastating because of the breach of 3500 km embankments that was erected in the colonial period(Sarkhel, 2013a). The emergent repair and maintenance operation was launched by the government in conjunction with the local institutions like panchayats. Subsequently, the government decided to launch a Land Acquisition program to rebuild and reconstruct the embankments in Aila affected Sundarbans. Initially, the government decided to invoke Section 17 of the Land Acquisition Act 1894 that empowered the government to acquire any land for public purpose. Even though compensation schemes for such acquisition scheme was worked out involving a fixed payment of Rs.5-6 lakh per acre, imminent assembly election slowed down the program. Change of government after the elections led to the change in Land Acquisition policy as well and now the land was sought to be directly purchased from the farm owners at the market rate along with a monthly allowance for the affected family². It had been estimated that INR 5032 crore was required for the Sundraban Embankment Reconstruction Project and it would be implemented on a 75:25 cost sharing basis by the

²(http://www.moneycontrol.com/news/features/sunderbans-land-to-be-acquired-for-embankments_554776.html)

Central and the state governments³. However, only 21 k.m. out of proposed 778 k.ms of embankments could have been constructed. The main problem, according to state government officials, arose because of sluggish land acquisition. In some cases administrative difficulties of validating compensation claims due to inadequate land ownership documents has stalled the acquisition process. However, even for landowners the uncertainty towards disbursement of compensation looms large and has resulted in the formation of resistance movements in some areas (Goswami, 2013). In this background, we use household survey data collected during the period between November and February 2009-10 to hypothesize the plausible factors responsible for delays in and resistance towards Land Acquisition in Indian Sundrabans. The survey asked two main questions regarding the land acquisition, if someone is willing to sell his land, and if yes, what is his expected selling price. We try to find how these two decisions were linked to with his membership in different socio-political networks such as political parties and religious groups etc.

In the next section we elaborate on our conceptual framework by examining the link between social network and contribution to public projects. In the third section we discuss our theoretical model. The fourth section reports our econometric specification while we describe our survey design in section five. We discuss the data descriptive in section six. In section seven we report our estimation strategy and discuss the regression results. The concluding observations are offered in section eight.

2. Social Network and Public Projects

Our conceptual framework builds on Fernandez and Rodrik(1991) who show that citizens may politically block better institutions if they are unsure about their individual benefit from the new innovation. The paper emphasizes the importance of perception of benefit for individual players which may not be directly proportional to the benefit the society gets from an institutional innovation. The same logic applies to the problem of land acquisition. Citizens will tend to politically block projects if they are not sure about their net benefit

³ (<http://www.downtoearth.org.in/content/fancy-wall-sundarbans>)

from a project. Besides giving appropriate compensation, much of the political turmoil can be avoided if proper information about the possible cost and benefit of a project can be given. But while judging the possible benefit from a project depends on the signal one gets from the reality. It is possible that the beliefs different people form from the signals may not converge at all even after infinite number of updates (Acemoglu et al., 2007). Culture often plays an important role in explaining the differences in priors which led citizens to differ in how they interpret a piece of information supplied by government and other authority. This has been seen in the anti land acquisition movement in Nandigram, West Bengal in 2010 when the protest movement continued even after government promised that no land will be acquired for the proposed chemical hub. Hence, information networks such as political parties, social organizations and religious networks play an important role in making the priors of citizens and government converge so that compensation can be negotiated through meaningful discussion.

The implicit assumption that we make in this analysis is that people care about the project to be built in this area (embankment in this case) are willing to be part with their land in exchange of sufficient compensation. However, sufficient compensation is a subjective term depends not only on alternative economic opportunities but also on people's perception about the mechanism of compensation which is usually thought to be extremely bureaucratic and therefore sluggish. Also, the perception that government officials may ask for cut-money for giving out the compensation makes people suspicious about the real value of the proposed compensation⁴. There can also be a suspicion about the government attitude towards the negotiation process. Someone may think that government may never going to give as much as he wants and therefore he asks for more. But then why does not everybody ask for an exorbitant sum of money? This is because asking too high a price may jeopardize the negotiation process which may in turn stop the development activity and hurt the long term interest of the community. Hence, besides the issue of proper compensation, there are can be information lag about the mechanism of

⁴ For example, if one believes that the true compensation for his/her land is Rs.100 and one knows that government officials may ask for 10percentage cut money for giving out the compensation then that personI should ask for Rs.111 for his/her land instead of Rs.100.

distributing compensation and lack of general trust on the government. Such misperceptions can be dealt with the information networks. The aim of this paper is to see the role of information network in mitigating these issues. If our hypothesis is true we should see people belonging to information network doing more reasonable bargaining.

The role of information network and its connection with land acquisition drive in Indian Sundarbans becomes particularly relevant when we consider it in the backdrop of Mahatma Gandhi National Rural Employment Guarantee Act (henceforth MGNREGA) that is one of the largest rural employment guarantee program initiated in 2006. Like its predecessors MGNREGA attempted to provide employment to the unskilled rural populace in projects that are designed to strengthen and construct durable social infrastructure⁵. For Sundarbans part of India majority of MGNREGA projects were channeled for embankment reconstruction in the post Aila phase. In fact, the matter of embankment maintenance in Indian Sundarbans is getting gradually transferred from the Department of Irrigation and Waterways to the *Panchayats*(Sarkhel, 2013a). In view of the fact that people in Sundarbans found employment in embankment projects under MGNREGA we expect that potential jobs associated with land acquisition for embankment reconstruction is likely to influence their land sales decision. However, it is possible that securing jobs in MGNREGA projects is influenced by the nexus of the households with the implementing authority. In fact, available evidences across India and even for Sundarbans in particular suggests that people often take recourse to their social network for garnering additional days of work under MGNREGA(Raabe et al., 2010; Sarkhel, 2013b; Shankar et al., 2011).In the next section, we present a simple theoretical model to analyze the interaction between land sales decision and extent of social connectivity of

⁵The list of admissible works under the MGNREGA falls under the following categories : i) water conservation and water harvesting ii) drought proofing including afforestation iii) irrigation works in general and with special emphasis for the disadvantaged class like scheduled caste and scheduled tribes iv) renovation of traditional water bodies v) land development vi) flood control and protection works vii) rural connectivity viii) organic agriculture and livestock related works ix) Fisheries and coastal area development and finally x) rural drinking water and sanitation projects (<http://nrega.nic.in/netnrega/writereaddata/Circulars/MGNREGS%20works.pdf> accessed on May 24,2015).

potential beneficiaries in the background of land acquisition for public projects like embankment reconstruction.

3. The Theoretical Model

Every individual has one unit of land. We assume that the government plans to acquire a fixed amount of land x from each individual and model the choice of asking price on part of the public that allows the government to buy the land. We assume that if the public project is made then that increase the return to land by preventing flood. Hence, return to land increases once the public project is built. Citizens enjoy two types of benefit from the construction of public project. The first one is the intended benefit of the public good captured by the enhanced return. For example, in our case the project is the embankment which, if built, will increase the expected return to land by preventing flood. The second benefit however, comes through an indirect channel. If the embankment is built then the local people participate in the building process would be earning money. However, people with stronger political connection earn more than their apolitical counterpart. The second channel is often not discussed in the analysis of the land acquisition issue. Note, that while flood protection is in the nature of public benefit and accrues to all and sundry the second benefit is contingent on the extent of the social ties that an individual might possess. Let us now look at the pay-offs from selling the land

If the land is sold at price p and the dam is built, the land owner earns

1. The enhanced return R_1 from the land that is not sold for building dam: $((1-x)R_1)$. This
2. Return by investing the money he gets from land sales: $(px)R_2$
3. Income by participating in the dam building process: $\alpha_i K$, where α_i denotes the share he can get of the total public expenditure on dam and K is the total cost of the project. In theory, there are number of factors that can affect α_i . In the current paper we assume that people with stronger political

connection are able to grab a larger share of the public money than their apolitical counterpart.

Hence the pay-off to individual i in the event of construction of the dam is given by

$$\pi_1^i = (1 - x)R_1 + (px)R_2 + \alpha_i K \dots (1)$$

If the dam is not built he earns R_0 from his entire land with $R_0 < R_1$. The probability that the dam will be built is $q=q(p)$. We assume that the probability is a function of land price and the probability goes down as price goes up. This assumption can be justified by the argument that if land owners ask for too much compensation, government budget may become a binding constraint which may ultimately lead to abandoning the project Also $q'' < 0$. The expected pay-off of the land owner is

$$\pi = q \cdot \pi_1 + R_0 \dots (2)$$

This is equal to

$$\pi = q[(1 - x)R_1 + (px)R_2 + \alpha_i K] + (1 - q)R_0 \dots (3)$$

The landowner's choice of p that maximizes his return must satisfy

$$\frac{\partial \pi}{\partial p} = q' [(1-x)R_1 + (px)R_2 + \alpha_i K - R_0] + xqR_2 = 0 \quad (4)$$

The second order condition must satisfy

$$\Omega = q'' [(1-x)R_1 + (px)R_2 + \alpha_i K - R_0] + q' xR_2 + xR_2 < 0 \quad (5)$$

For consistency we need $p^* \geq 0$. The above expression tells us that the optimal bidding price is rising in the existing return to land – if the land is earning high return in the pre-public good state, the land owners are likely to ask high compensation package. Our main research question focuses on identifying the factors that will facilitate/prevent the process of land acquisition. Next, we ask whether political connection and the second round income generation associated with it will make it more likely to make the

project successful by letting the landowners ask lower price. From (4) and (5) we have :

$$\frac{dp^*}{d\alpha_i} = -\frac{q'K}{\Omega} < 0 \quad (6)$$

We find that higher political connection (which in our theory works as a proxy for one's share in the public expenditure) leads to lower ask price for their land. The direct policy suggestion that comes out of this formulation is that if landowners can be given a second round benefit from the construction of the public project, they are more likely to sell their land for the public projects. This leads to our first theorem

Theorem 1.1 *Landowners who have higher share of income generated through the construction of public project are more likely to give land for the project.*

The problem faced by landowners has a clear trade-off. If they quote a high price that will increase their compensation package ($p.x$) given the project is implemented. But increasing ask price would mean that this would reduce the probability of this project being implemented (q). This means that the effect of asking a high price on expected compensation package ($p.x.q$) is ambiguous. If the project is not implemented by the government because of the high ask price this will negatively affect the landowner's pay-off in two ways – the return from the land is likely to remain low and he will not get any second round income effect from the building of the public project.

Next we ask the question that whether people with access to better investment projects (high R_2) ask for high or low price. In the empirical section we identify Self Help Group (SHG) members as the people with higher return. We argue that SHG members can often take benefit of different government projects that promote micro entrepreneurs. In fact, contemporary evidences suggests that membership in SHG's are often associated with higher level of asset creation apart from short term profits (Deininger and Liu, 2009; Swain and Varghese, 2009). Therefore we can assume that return to their money (R_2) is high. However, this can be true for anyone else with better access to outside

capital market or with better opportunity to invest the money. The effect of high return in outside opportunities is however ambiguous.

$$\frac{dp^*}{dR_2} = - \frac{q(px+x)}{\Omega} \dots (7)$$

$\frac{dp^*}{dR_2} \geq 0$ according as $q'px+xq \geq 0$. Now, $q'px+xq = \frac{\partial pqx}{\partial p}$ where pqx is the expected value of the compensation. From this we get our next theorem.

Theorem 1.2 *Rise in the return to outside investment opportunity leads to rise in the ask price for land as long as the rise in the ask price leads to a rise in the expected value of the compensation package.*

Two refutable hypotheses emerge from the analytical exercise: first those with higher expected higher income from embankment construction in lieu of better political network are likely to contribute more land for the public project of land acquisition. Secondly, among those who are willing to contribute land beneficiaries of other public employment programs might have a higher reservation price. To assess the policy relevance of these results the next section describes the field experiment in Indian Sundarbans regarding household decision to give away land for reconstructing embankments ravaged in cyclone Aila.

4. Econometric Specification

In terms of Eq (4) it follows that

$$p^* = f(R_1, R_2, R_0, K, \alpha_i) \dots (8)$$

is the equilibrium configuration of the ask price. Suppose that the market price of land is \bar{p} per unit of land then for x unit of land it must be the case that

$$\pi^*(p^*) \geq \pi^*(\bar{p}) \dots (9)$$

Where π^* denotes the maximum value function from land sales. Empirically, two situations suggest themselves: first, it might be the case that the market price of land equals the reservation price of the households such that $\pi^*(p^*) = \pi^*(\bar{p})$. Alternatively households might assign a premium over the market price (He and Asami, 2014) such that (8) holds with strict inequality $\pi^*(p^*) > \pi^*(\bar{p})$. In terms of equation (8) the price of land parcels is likely to depend on returns from land if the embankment is constructed, the returns from using the sale proceeds of land parcels stipulated for embankment reconstruction and the return from land in the event the no land is taken up and there is no embankment project. In addition, the sale price of land might also depend on the extent of household's social network and also the public expenditure on embankment reconstruction.

One way of accounting for the returns from land is to control for different uses they are put to. For instance, besides rain-fed mono-cropped agriculture in Sundarbans area, an alternative mode of land use is brackish-water aquaculture (Bhattacharya and Ninan, 2011). In fact, converting paddy fields into aquaculture ponds by trapping saline tidal water have been a dominant practice in Indian Sundarbans for the last few decades (Philcox et al., 2010). We expect the reservation price to be higher for owners of land with relatively higher returns. At the same time the damage potential of the land from embankment breach and flooding could also result in lower returns given a particular use of land. Here, the proximity of the land parcel from the river embankments could be one such indicator of potential loss. To this end we include land classified by different land uses (viz., agriculture and aquaculture) as an explanatory variable. We disaggregate the land put to *ith* use in terms of their distance from the embankment: those that are located within 500 m from the embankments (L_{iE}) and the remaining faraway land (L_{iA}) where i =agriculture, aquaculture. In addition we also included a measure of extreme events to control for the extreme events that might dampen the returns from the land. Keeping in mind the flood prone nature of the Sundarbans (Danda, 2010) we take this to be a measure of tidal inundation; namely the average days of water logging that an household experience over his plot of land (WL) Thus, land

categorised in terms of their use as well as their susceptibility to flood events from embankment breach accounts for R_0 . As the benefits of flood protection is likely to be in the nature of public good we expect R_1 to be constant for all. The potential returns from investing the sale proceeds of the land are not directly observable. Instead, as discussed in section 3 we considered membership in SHG as a proxy for those with potential for earning higher returns through efficient use of funds received from land sales⁶. In such cases they might seek higher price as a compensation for land. We denote this as a binary variable SHG that takes a value 1 if any member of the households belongs to self-help groups and 0 otherwise. One major challenge is to come up with the proxy for the variable α_i . Measures of social network such as involvement in political party are a candidate but there might be endogeneity concerns where people might self-select themselves in the network for want of higher benefit share (Bardhan and Mookherjee, 2006; Das, 2015; Panda, 2014). To circumvent the endogeneity issue we categorize a variable of political association on the basis of time of association of household member with the political party (POLEXP) distinguishing between new entrants and those that have been in the network for a sufficiently long period. If self-selection and clientelism holds then expected earning of relatively new party members from embankment project would be higher and they are likely to have a lower reservation price for land sales. In addition we also consider kinship with the panchayats (RELN) as another indicator for social network as there are frequent claims of nepotism in the disbursement of job cards and MGNREGA employment. We consider three categories of kinship: blood relation of the panchayat members and officials, distant relatives and non-relatives. In addition to the network proxies we also account for the exit options of the households by incorporating proportion of members in non-farm employment both within the village (WKIN) and outside the village (OUT). We also use fixed effects at the Gram Panchayat (GP) level to account for the MGNREGA expenditure on embankment reconstruction as planning of the projects takes place at the GP level.

⁶ Survey results show that the mean difference in livestock holding of household across members and non-members of SHG are positive and statistically significant at less than 1 percent level of significance.

The econometric specification for estimating the land compensation is given as

$$p^* = \beta_0 + \beta_1 L_{iE} + \beta_2 L_{iA} + \beta_3 D + \beta_4 SHG + \beta_5 POLEXP + \beta_6 RELN + \beta_7 WKIN + \beta_8 OUT + \beta_9 GP$$

...(9)

5. Survey Design

5.1 Study Area

We conducted household survey in two blocks of Indian Sunderbans: Basanti from the district of South 24 Parganas and Sandeshkhali II in North 24 Parganas. These areas are one of the worst affected in Sunderbans region from recurrent embankment breaches and had faced considerable damage from exposure to cyclone Aila in 2009(Sarkhel, 2013a). Hence, procurement of land near river banks in these areas as in the Sundarbans as a whole were imminent policy agenda. As discussed earlier, the compensation package would be based on the market rate of the land and this is likely to vary in accordance with different land use. The lands could be different both in terms of alternative uses as well as productivity differential for a given use. In Indian Sundarbans, apart from traditional rain fed paddy cultivation, aquaculture has emerged as one of the fast growing use of land (Ray, 1993). However, given the traditional nature of aquaculture and monsoon dependence of agriculture we expect returns to vary mostly across alternative use of land. Thus, we selected 11 villages from the chosen blocks:7 from Sandeshkhali II and 4 from Basanti, having two dominant land uses: agriculture and aquaculture. We purposively chose the villages on the basis of land use information obtained the records of Sundarbans Development Board-a wing of the Government of West Bengal – and also consulted land use information from village directories of Census 2001⁷. Four of the seven villages chosen in Sandeshkhali-II (North 24 Parganas block) show extensive aquaculture activities while two others have

⁷ From the census records we found that villages where aquaculture is the dominant mode of land use also have higher proportion of land not available for cultivation. As per census definition land not available for cultivation includes areas that are used for non-agricultural uses.

moderate aquaculture practices along with agriculture; only one village in the selection was exclusively engaged in agriculture. Of the four villages chosen from Basanti block (South 24 Parganas), two had a dominance of aquaculture activities while the other two were engaged exclusively in agriculture.

5.2 Questionnaire

We surveyed 534 households from the chosen villages in the two blocks. Of these, 400 households were from the seven villages in Sandeshkhali II while 134 households were from the 4 villages in Basanti. We used stratified random sampling to choose the households from village listings. The sampled households were stratified on the basis of major occupational status viz., aquaculture and agriculture. The household survey was conducted from November –February 2010⁸. We collected information on landholdings of the households both in terms of number of plots owned and their area as well as the use the land is put to. The landholding for each use is further disaggregated in terms of its location characteristics: we collected information on whether the land directly adjoins river embankments and/or whether the land is located within 500 meters from the river embankment⁹ and the land that is further than that. In order to understand the supply decisions of households regarding the sale of land we needed information on the reservation price of land (per unit area) as well as the price that would induce additional supply of land. Further we needed to know the amount of land the households are willing to sacrifice for the stated price. For gauging the reservation price the natural prior would be the market rate of the land. Hence, a two stage question was designed to elicit the “supply” response of the household: first, we asked whether the household is willing to sell his land at the existing market rate and if he answers in the affirmative; the percentage of land he would sell at that price. For those who refused to part with their land at the market rate we further ask them to state the minimum per unit price at which they would be willing to sell their land. Thereafter, we ask them the percentage of land they would willfully

⁸The original survey was designed to elicit households conservation effort towards river embankments in Indian Sundarbans. See (Sarkhel,2013)

⁹ Our plot level information suggested that land adjoin embankments and those that are located at less than 500 meters from the embankments can be disjoint. This is because average plot size in the study area is quite low and so there’s always a possibility that a small land holding is bounded towards the river by even smaller plot size(Sarkhel, 2015).

part with at the quoted price. Note that the survey took place at a time when the Land Acquisition Scheme of the government were not launched and hence these answers were *ex-ante* and are thus likely to be free from any feedback effects of public acquisition scheme. In addition the set of questions pertaining to land sale truncated almost 20 percent of our observations as households that did not have land adjoining the embankments and/or plots within 500 meters of the embankment were left out from the estimation sample. This is because those having land farther from the river embankments have relatively lower probability of coming under the scheme and hence their response would typically be not comparable with those having land closer to the embankments.

To gather information on the extent of household's social network we recorded household's involvement in rural poverty alleviation and workfare programs by recording whether household members have participated in the National Rural Employment Guarantee Scheme (NREGS) both before and after Aila and the number of employment days. We also collected information on whether any member from the households belongs to the Self Help Groups (SHG).

6. Data Description: Land Sales and Social Network

Out of 534 surveyed household we found that 15 percent of the household (79) did not have any land at proximity of 500m from the embankment. As a result, we analysed the responses of truncated sample of 455 household to assess the determinants of land sales decision.

The sample characteristics indicate that on average household has six members and only about 14 percent of all household members have a secondary education. The likelihood of an embankment breach in the previous three years is nearly 100 percent. Aquaculture plots are much larger than agriculture plots. However, for both the types of land viz., aquaculture and agriculture, on an average a higher proportion of the plots are located in the vicinity of the

embankments and in terms of exposure to flood risk both would apparently have identical level of vulnerability.

The provisional package for Land Acquisition in the after math of Aila involved paying land owners at the market rate along with a solatium of 30 percent (*The Telegraph, January 26, 2012*). However, more than two-third of the sampled households refused to sale their land at market price. Table 1 compares the landholding and risk exposure across two groups of households those that agreed to sell their land at the going market rate and others who declined. As expected households with lesser land endowments and higher risk exposure (i.e. those group that experience higher number of embankment breaches and longer period of water logging) have a lower reservation price.

Table 1: Market rate of Plots and Reservation Price across Land, Assets and Risk

Variables	Reservation Price > Market Price of Land	Reservation Price <=Market Price	Mean Diff
Aquaculture Land (bigha)	18.56	6.66	11.90***
Agriculture Land (bigha)	2.71	2.02	0.69*
Embankment breach in the last three years	0.94	1.20	-0.26**
Average length of water logging days	2.03	2.54	-0.51**
Frequency of Government Intervention in the last three years	0.71	0.82	-0.10
Livestock (expressed in Standard Livestock Unit: bull = buffalo = 1, cow = 0.7, goat = sheep = 0.1, pig = 0.4, poultry = duck = 0.02)	2.77	2.99	-0.23

At the same time the price premiums for the overall sample is estimated as a mark up of 17 percent over market price and on average households are willing to sale more than 50 percent of their land at this rate. The median figures are 10 percent and 50 percent respectively.

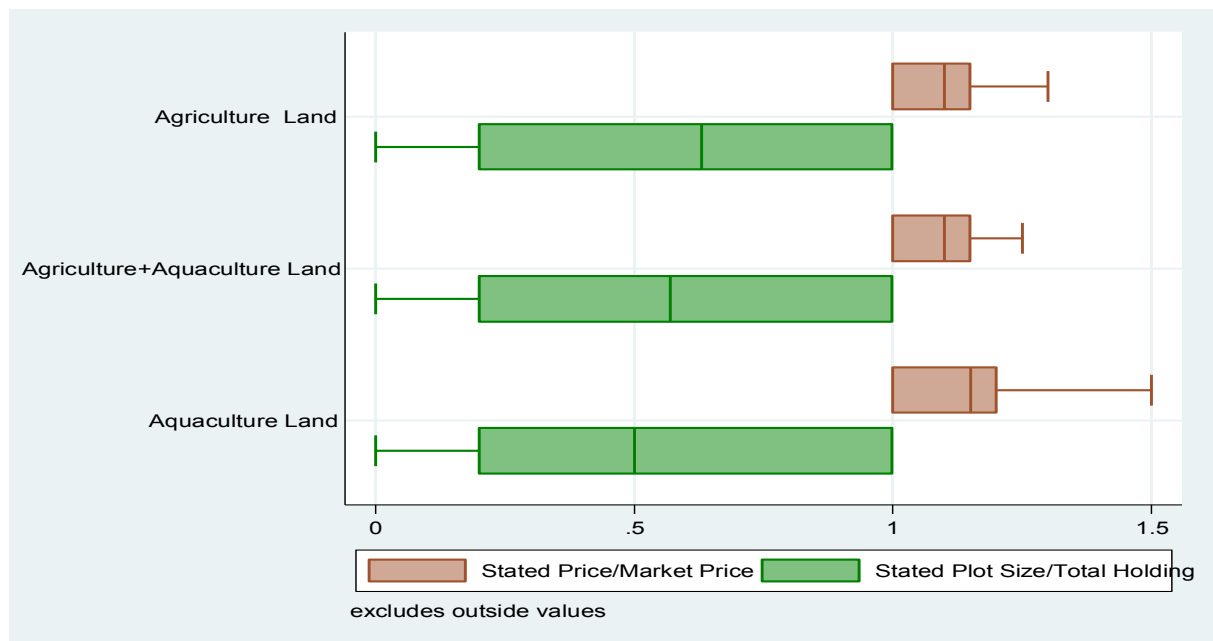


Figure 1 : Distribution of Price Premium and Land Contribution

To further disaggregate this response Figure 1 below plots the proportion of land that people are willing to sell along with the price premium per unit land they reveal, across three categories of household based on their land holdings. Here, we have households owning only agricultural lands, those that own both agriculture and aquaculture and finally those with only aquaculture. Across land class the agricultural households are willing to sale comparatively higher amount of land at a relatively lower price premium than households who owns aquaculture lands.

This observed pattern of land sales lends itself amenable to several economic explanations. First, it may well be the case that faced with identical level of risk agricultural households have lower returns from their land compared to aquaculture households and hence would have a lower reservation price. In fact, the mean net revenue from paddy cultivation is INR 2,387 (USD 44) per-bigha per year (Sarkhel, 2015) . This is almost eight times less than the average annual net return from aquaculture. On the other hand if subsistence constraint is binding for the agricultural household the decision to part with their land might depend on their perception about the credibility of the public program and the other spillover benefits. Here, uncertainty towards government compensation would encourage formation of blocking coalitions that would thwart the movement towards successful program implementation.

Frequent news of land acquisition getting stalled in the aftermath of Aila reinforces this suspicion¹⁰.

We argue in such cases one needs to control for the extent of households involvement into groups and social networks that influences his benefit perception about the public project. As discussed in theoretical section households that have stronger political connection or better connection with the local governments might trade his land for a lower price for his expected earnings from embankment reconstruction through MGNREGA scheme might be relatively higher. To assess the causal relationship of the social network and other potential determinants with land sales decision the next section reports our estimation results.

7. Determinants of Price Premium and Land Sales

7.1 Results

We use OLS to estimate (9)¹¹. In addition to estimating price we also estimated the equation for Land Sales where the elicited amount of land that households were willing to sell at the quoted price is the dependent variable. We take two measures of social connectivity: namely time of association with political parties and kinship measures with the *panchayats*. For the former we categorized the variable into five classes: those that doesn't have any connection with the political network, new entrants in the political network (<1 to 7 years), party members for 8 to 15 years, membership for 15 to 20 years and those that are active members for more than 20 years (See Figure 2). By active members we count those who reported to have regularly attended the political campaigns and had taken part in electoral work of the party. Note, we did not ask information whether the memberships are of ruling and the opposition parties. The timing of the survey corresponded to a phase of political transition with forthcoming assembly elections and hence such questions could have lead to biased responses. Rather we relied on the belief that inclusion in *any* political

¹⁰ As per media reports as of now only 800 acres out of the required 6,000 acres could be acquired (The Telegraph, January 24, 2013). Although one reason for the delay is ambiguity about the ownership status of the land there had been incidents where the inhabitants have formed resistance groups as they think that the scheme doesn't involve local stakeholders and embankments were strengthened in selected areas leaving others at the mercy of nature (Down To Earth, May 31, 2012).

¹¹ Alternatively we could have used 2SLS for simultaneous estimation of price premium and land sales equation. However, estimation results suggested that predicted price might be a weak instrument for land sales and thus might provide inconsistent estimates. We also attempted to estimate seemingly unrelated regression but the estimated correlation between the price and land equations were low.

network in a democratic set up would always allow the household to get employment in public goods construction projects more easily than their non-political counterpart. In effect we estimate four models: two for each of the social connectivity measures for price premiums and land sales. We include some additional variables in the regression like measure of government maintenance works for river embankments. In particular we include a variable *G* that denotes the frequency of government interventions in embankment maintenance as observed by the households in the last three years prior to the survey. In addition to influencing the expected returns from land we surmise that this would also serve as a proxy for credibility of proposed government projects. The descriptive statistics of the explanatory variables are reported in Table 3

Table 2 : Descriptive Statistics of Explanatory Variables (N=455)

Explanatory Variables	Mean	Max	Min
Aquaculture Land at less than 500 m from the embankment	12.50 (44.62)	400	0
Agriculture Land at less than 500 m from the embankment	2.20 (4.20)	29.50	0
Agriculture Land located greater than 500 m from the embankment	0.253 (0.941)	8.50	0
Aquaculture Land located greater than 500 m from the embankment	1.664 (13.01)	218	0
Average days of water logging	2.201 (2.3)	13	0
Frequency of Government Intervention	0.752 (.83)	6	0
Proportion of household members working outside village	0.312 (.26)	1	0
Proportion of household members in off-farm working outside village	0.296 (.25)	1	0
Proportion of household members with school secondary examination	0.147 (.20)	0.800	0
Livestock (expressed in Standard Livestock Unit: bull = buffalo = 1, cow = 0.7, goat = sheep = 0.1, pig = 0.4, poultry = duck = 0.02)	2.861 (2.63)	16.26	0

Note: Figures in parenthesis show standard deviation

On average aquaculture landholdings are higher than agricultural landholdings both adjoining the embankments as well as distant from the river. While households report average of 2 days of water logging per year the frequency of government intervention is less than one per year. In the sampled households approximately 30 percent of the members either work outside the village or are engaged in non-farm employment.

The OLS estimates are reported in Table 3. As expected returns from land plays a significant role in determining the demand for compensation and land sales decision. We find that aquaculture households that have land holdings distant from the embankment have a lower price premium compared to agricultural households. As noted in Section 6 higher returns from aquaculture relative to agriculture enhance the flood protection benefits of interior lands if the embankments were to be constructed. In contrast we don't find any significant effect of agricultural plot holdings both near and distant from the embankments.

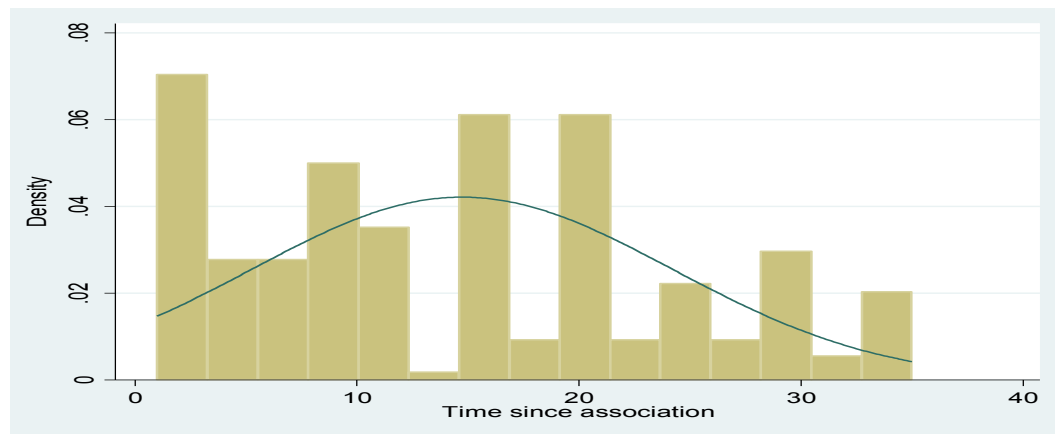


Figure 2 : Distribution of Political Association of the sampled households

Table 3 : Estimates of Price Premium and Land Sales

VARIABLES	(1) Price Premium	(2) Price Premium	(3) Log Land Sales	(4) Log of Land Sales
Aquaculture Land at less than 500 m from the embankment	0.000212 (0.000218)	8.70e-06 (0.000227)	-0.00213*** (0.000727)	-0.00261*** (0.000727)
Agriculture Land at less than 500 m from the embankment	0.00130 (0.00196)	0.00174 (0.00189)	-0.00173 (0.0136)	0.00423 (0.0130)
Agriculture Land located greater than 500 m from the embankment	-0.00322 (0.00899)	-0.00371 (0.00970)	0.00746 (0.0384)	0.0177 (0.0366)
Aquaculture Land located greater than 500 m from the embankment	-0.000962*** (0.000244)	-0.000832*** (0.000245)	-0.000925 (0.00260)	-0.000783 (0.00262)
Average length of Days of logging	0.00455 (0.00898)	0.00326 (0.00866)	-0.0654 (0.0476)	-0.0690 (0.0478)
Square of Water logging	-0.00161* (0.000918)	-0.00130 (0.000888)	0.0120*** (0.00402)	0.0129*** (0.00420)
Involved in Self- Help Groups (1=if household has members in SHG 0 otherwise)	0.0882*** (0.0261)	0.0844*** (0.0248)	-0.328*** (0.118)	-0.343*** (0.122)

Livestock (expressed in Standard Livestock Unit: bull = buffalo = 1, cow = 0.7, goat = sheep = 0.1, pig = 0.4, poultry = duck = 0.02)	-0.00706** (0.00310)	-0.00658** (0.00305)		
Government Maintenance of Flood Control Embankments	0.0341* (0.0206)	0.0261 (0.0200)	-0.122 (0.102)	-0.135 (0.105)
Square of government maintenance	-0.00713* (0.00386)	-0.00504 (0.00362)	0.0308 (0.0209)	0.0350 (0.0213)
Proportion of household members working outside village	-0.263** (0.106)	-0.228** (0.102)	-1.085 (0.761)	-0.943 (0.775)
Proportion of household members in off-farm working outside village	0.206* (0.110)	0.169 (0.105)	0.768 (0.790)	0.617 (0.785)
Proportion of household members with school secondary examination	0.0681 (0.0507)	0.0503 (0.0507)	-0.612** (0.253)	-0.660*** (0.252)
POL1 (1=member of political party for less than 7 years, 0 otherwise)	-0.0748*** (0.0253)		-0.286 (0.182)	
POL2 (1=member of the political party for more than 7 and less than 15 years, 0 otherwise)	-0.0353 (0.0298)		-0.101 (0.147)	
POL3 (1=member of the political party for more than 15 years and less than 20 years, 0 otherwise)	-0.0100 (0.0317)		-0.0697 (0.196)	
POL 4 (1=member of the Political party for more than 20 years)	-0.0638** (0.0321)		0.137 (0.214)	
ST (1=ST 0 otherwise)	-0.0239 (0.0308)	-0.0246 (0.0306)	0.195 (0.202)	0.158 (0.199)
OBC (1=OBC 0 otherwise)	0.0995* (0.0519)	0.0941* (0.0536)	-0.143 (0.207)	-0.167 (0.208)
MUSLIM(1=Muslim, 0otherwise)	0.0971* (0.0512)	0.108** (0.0517)	0.0159 (0.179)	-0.00238 (0.189)
General (1=General, 0 otherwsie)	-0.0345 (0.0321)	-0.0404 (0.0313)	0.00555 (0.181)	-0.0685 (0.173)
Near Kin of Panchayat Officials (1=Near Kin,0 otherwsie)		-0.00361 (0.0203)		-0.102 (0.139)
Distant Relation of Panchayat Officials (1=Distant, 0 otherwise)		0.0926* (0.0516)		0.345*** (0.126)
Constant	1.048*** (0.0442)	1.031*** (0.0405)	4.322*** (0.243)	4.305*** (0.251)
Observations	402	402	419	419
R-squared	0.226	0.219	0.200	0.196

However, the higher the amount of aquaculture land closer to the river embankment lowers would be the willingness to contribute it for embankment reconstruction. At the same time higher the risk exposure of the household given the flood proneness more likely he would trade-off his land at a lower price. This is shown by the significant and negative sign of the coefficient on the square term of the water logging variable (Model I). In terms of the land equation households are also willing to sacrifice more land for incremental increase in inundation (Model III and IV). We find the same impact of additional government intervention on price premium (Model I). Higher government interventions might enhance credibility of the embankment project and people might lower their price premium once they have experienced above threshold public maintenance effort in the past. Similarly households that have members availing exit options outside the village are likely to have lesser stake in the land holdings (Model II and III). Expectedly involvement in employment outside village premises lowers the price premium charged by the household. On the other hand households engaged in nonfarm employment within the village asks for higher price (Model I).

On count of social networks we find that both the new entrants and those that have been in the political network have negative and significant coefficient in the price equation while others doesn't have any significant influence on price premium. However, the political network variables are not significant in the land equations. At the same time kinship variable of the panchayat reveals that compared to the blood relatives, distant relatives demand higher price and are willing to sale a higher portion of the land for the public projects.

7.2 Discussion

We arrive at three major results from the OLS estimates: households with land devoted aquaculture rather than agriculture are more likely to be active in the negotiation process for land acquisition. Those with land in the interior would demand a relatively lower compensation but for on average households having land near the river would be willing to contribute lesser amount of land. This behaviour is consistent as only 12 percent of the sampled household have aquaculture land

proximate to the embankment as well as land (agriculture or aquaculture) in the interior. Hence, for the majority benefit from flood protection would be low and opportunity cost of land near the river would be higher. At the same time we find that new entrants in the political network and those with longer association are likely to demand a lower compensation. This could imply that both the groups might be expecting second round employment benefits. In fact, while clientelism could work in case of new entrants those that have been in the network for a sufficiently long period might have better access to information regarding public projects and schemes. Alternatively his response could also be reflective of his altruistic motive that comes after longer association with social network.

One way to account for this behaviour would be to compare the earnings from the ongoing public employment program across the social network groups. We hypothesize that earning potential might be correlated with present earning levels. We report the average earnings from MGNREGA in the study area a year prior to Aila and the period after Aila till the survey period across the two social network measures (See Table 4).

Table 4 : Social Network and Employment Generation in MGNREGA

Social Networks	Average Employment Days in MGNREGA	
	Before Aila	After Aila till the survey
Non-Member of Political party	4	8
POL1 (1=member of political party for less than 7 years, 0 otherwise)	8	8
POL2 (1=member of the political party for more than 7 and less than 15 years, 0 otherwise)	15	12
POL3 (1=member of the political party for more than 15 years and less than 20 years, 0 otherwise)	11	5
POL 4 (1=member of the Political party for more than 20 years)	5	14
Non relative of Panchayat	7	7
Near Kin of Panchayat	6	25
Distant Relative of Panchayat	8	19

In terms of employment days inclusion in the political network irrespective of the time of association promises higher earning potential. However, in terms of income smoothing after the disaster event highest benefit accrues to the households that have the longest duration of association with the political network. Thus, our explanation of

higher private returns from public projects augurs well for old members but is ambiguous for new entrants and needs to be probed further. We explored another measure of the impact of political network as the amount of relief that households reported they received after the incidence of Aila till the survey period. Here, the median figure for the monetary amount of self-reported relief figures are higher for the members of the political network compared to the non-members and it is highest for the new entrants (INR 1600). In contrast, the old members receive the lowest amount of relief among those in the political network. In fact, compared to relatively new entrant older members might have higher social concerns and may not use the network to usurp a disproportionate share of public alms. We show this by examining the association between the extent of damage in livestock (evaluated at standard livestock unit) in the post-Aila period with the reported relief that is obtained by the household. The non-members have a negative and insignificant association with the damage and relief amount. All the households with members of political party irrespective of the time of association have positive association but it is highest and significant for only the households with old members in the network (.60).

On the other hand for kinship network the result shows that favouritism are at work in time of income shock and clearly relatives earn significantly higher than non-relatives from the wage employment program. It then comes as a surprise why the distant relatives are asking for higher price and are willing to sale more land. One clue to this apparent puzzle lies in the nature of landholdings of the households in kinship network. In terms of aquaculture plots the distant relatives have higher average landholding that adjoins the embankment and are more risky in nature¹². At the same time as average land holdings in the interior for distant relatives are smaller the benefits from flood protection are likely to be lesser for them. Thus, they might require a higher amount to compensate them for the land acquisition even after accounting for the potential gain in employment were this public project are to be executed. However, further analysis is required to assess the differential response across the social network members to validate such claims.

8. Conclusion

¹² The average aquaculture landholdings of the distant relatives that adjoins embankment are 24 bigha compared to 19 and 8 bigha for blood relation and non-relatives.

This paper analyses the effect of land use and network membership on one's decision to sell land for public works. We find that households having lands with higher returns viz., aquaculture are more likely to be active in the negotiation process. However, the pattern of distribution of land holdings would result in lower price sensitivity for those with interior lands and higher holding up behaviour for households with lands closer to the embankments. Networks, on the other hand, can assume different forms ranging from political parties to kinship with local governments. Networks, in our analysis affect one's decision through two major channels – they provide information regarding the implementation of the project and opportunity to participate in the public works for which the land is being acquired. Hence, network membership critically influences one's participation constraints for the land sales activity. Our empirical analysis shows that political party members are more likely to sell their land at the market price for the building of a public project and this remains significant across specifications. In the theoretical analysis we argue that political party members are more likely to sell their land because besides getting the first round public good benefit they also get a second round income generation by participating in the process of public goods construction. This happens because of favoritism towards the political party members in public project implementation. However, if this second round income generation can be freed from political favoritism and be given to the general section of the society then the government can generate across the board support for the land acquisition process. This can emerge as an important policy instrument because unlike the first round public good benefit, the second round income generation process does not suffer from the free riding problem – one can only be allowed to get a job in the construction phase if she had given land in the first phase.

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