Land Acquisition and Compensation
What Really Happened in Singur?

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This paper reports results of a household survey in 12 Singur villages, six in which lands were acquired for the Tata car factory, and six neighbouring villages, with random sampling of households within each village. The results show that (a) the size of plots acquired were non-negligible; (b) the majority of those affected were marginal landowners engaged in cultivation; (c) the government's compensation offers were approximately equal to the reported market values of acquired plots on average, but the inability of the official land records to distinguish between plots of heterogeneous quality meant that a substantial fraction of farmers were under-compensated relative to market values; (d) those under-compensated were significantly more likely to refuse the compensation offers, as were those whose livelihoods were more dependent on agriculture; (e) incomes and durable consumption of affected owners and tenants grew slower between 2005 and 2010 compared with unaffected owners and tenants; (f) earnings of affected workers fell faster than unaffected workers. Therefore, land acquisition resulted in substantial economic hardship for large sections of the rural population, for many of whom compensation offered was inadequate.

The web version of this article corrects errors that appeared in the print edition. There has been a renumbering of two tables and a new table that was not printed has been included. Please see Tables 3a and 3b (page 35).

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Introduction

Disputes over compensation of rural communities that are displaced for the purpose of industrialisation have become widespread in India as well as various countries in Asia and sub-Saharan Africa (Cao et al 2008 and FAO 2009). While the events of Singur in West Bengal are well known from media reports, there is substantial disagreement regarding the underlying causes. Critics of the erstwhile Left Front government argue that the livelihoods of large numbers of poor cultivators and agricultural workers were imperilled by the land acquisition; the government did not pay adequate compensation for the lands acquired; under-compensation and adverse economic impact explains (and thus justifies) the refusal of many landowners to accept offered compensation. The opposite point of view is that the refusal to accept compensations by some landowners and the uprisings in the local community were politically motivated rather than justified by adverse economic impact or under-compensation (see, for example, Ghosh 2012).

This paper reports the results of a household survey carried out in the affected areas of Singur to address the following questions: (a) Whose lands were acquired: poor cultivators or wealthier landowners/non-cultivators? How much land was acquired: was it large relative to lands owned previously for the majority of affected landowners? (b) Did the government offer compensation at the market value of lands acquired, as required by the 1894 Land Acquisition Act. If not, why not? (c) Could the decisions of landowners to refuse the government's offer be explained by under-compensation, and/or the extent to which their livelihoods were affected? (d) What was the impact of the acquisition and compensation offered on incomes, consumption and assets of those whose lands were acquired, as well as tenants and workers that had previously been employed on acquired lands?

While plot-wise data is available from the official land records pertaining to the acquisition, such data is inadequate to answer the questions addressed above. These require us to know the total land-owned by someone whose land was subject to acquisition, over and above the size of the plot being acquired and the offered compensation. Additionally, we need to know other details of household demographics, occupations, agricultural activities, employment, incomes and assets. Such information can only be obtained through a detailed household survey.

The surveys were conducted in the six villages of Singur, where land had been acquired, and included both households

whose lands were and were not acquired. We also conducted similar surveys in six neighbouring villages not subject to any land acquisition to use a standard of comparison to assess the impact on those whose lands were acquired.

The sample additionally included tenant households and those whose primary occupation is agricultural and non-agricultural work, in order to gauge the effect of the acquisition of these groups. Approximately, one out of every six households was selected for the survey, using a stratified random sampling scheme. This scheme was based on a prior listing exercise in which a shorter questionnaire was administered to the entire population. Our methodology of estimating acquisition impacts involves comparing changes between 2005 (prior to the 2006 acquisition) and 2010 (after the departure of Tata Motors) in the relevant outcome variables between affected and unaffected households within the same village, and across affected and neighbouring unaffected villages.

Section 1 provides a brief overview of the Singur episode. Section 2 explains the design of the survey and the nature of the data collected. Subsequent sections describe what we learnt with regard to each of the four questions listed above. Section 7 concludes with a summary of the main findings, and implications for design of future land acquisition policy.

1 The Singur Episode: A Short Summary

In the second half of 2006, the West Bengal government acquired 997 acres of prime agricultural land in order to enable Tata Motors, a leading industry house in India, to build a factory for Nano, its new model for a small and cheap car. In order to do so, the state government used its power of eminent domain under the aegis of the 1894 Land Acquisition Act. In order to woo Tata Motors away from other Indian states offering favourable tax concessions, the West Bengal government allowed Tata Motors to specify the location of its factory, and offered it a long lease on favourable terms. Tata Motors chose an area in Singur located on the Durgapur Expressway about 90 km from Kolkata. The West Bengal government subsequently decided to acquire the area required for the factory and offer compensation to those whose lands were being acquired as required by the 1894 Act.

The local community of Singur was incensed by this action, generating resistance from households facing forced acquisition. This resistance soon snowballed into a protest movement, which the main opposition party, the Trinamool Congress (TMC) subsequently galvanised. The state government subsequently offered to improve the terms of compensation, including 25% compensation for tenant farmers engaged in cultivation of acquired plots. No plans were offered to compensate agricultural workers claiming to have lost employment on acquired lands. As time went by and Tata Motors started building its factory, some of those who had originally agreed to the compensation changed their mind and joined the ranks of the protesters. The TMC demanded that the government return the lands of those who refused the compensation. Local outbreaks of violence occurred, and the protests acquired national and international media attention. Eventually, two years later, Tata Motors decided to withdraw from West Bengal, and took the Nano car factory to Gujarat.

2 Survey Design and Data

The survey was conducted in the year 2011 in 12 villages in the census town of Singur in West Bengal. Six of these villages – Bajemelia, Beraberi, Gopal Nagar, Joymolla, Khaserbheri and Singherberi – were affected by the land acquisition for building the Tata Nano factory. The unaffected villages were Anandnagar, Baharampur, Ghanshyampur, Jompukur, Raghunathpur and Simulpukur.

At the first step, we carried out a household listing exercise, enumerating all households in a door-to-door survey and asking some questions concerning demographic details of each household, its landholdings and whether it had been affected directly by the land acquisition. Table 1 provides aggregate statistics from the listing data for the six affected villages. There were 5,056 households residing in these villages. Over 90% of these households were either landless or marginal landowners. One in 10 households was headed by someone who was a "pure owner cultivator", i e, someone engaged in cultivation and not leasing in any land. One per cent of the households were headed by someone cultivating land that was wholly or partially leased in. However, many households headed by workers also owned land and included other members who were cultivators. There were only 146 households that leased in some land, constituting 2.9% of all households, who leased 7.2% of total cultivable area.

One in three households was directly affected in the sense that agricultural land they owned was acquired (with the corresponding proportion of affected households for all types of land acquired was 46%). Thirty-eight per cent of agricultural

Table 1: Distribution of Households in Acquired Villages: Population

Primary Occupation of the Head of Household (HH)	Total Number of HH	Total Agricultural Land Owned in 2005	Number of HH for Which Agricultural, Fallow or Homestead Land Acquired	If Owned Agricultural Land Acquired		If Barga Land Acquired		No of Households for Which Homestead Area Acquired	No of HHs for Which Hired Workers Affected
				No of Households Affected	Total Area Acquired (Acres)	No of Households Affected	Total Area Acquired (Acres)		
Pure owner cultivator	568	493.16	321	300	159.35	3	10.33	2	127
Pure tenant cultivator	7	0.60	4	3	0.42	3	0.18	0	2
Mixed tenant cultivator	42	53.24	40	27	10.01	25	14.86	0	22
Agri wage labourer	1,577	294.26	888	394	148.65	45	45.37	16	734
Non-agri wage labour	1,361	331.23	551	437	135.67	24	62.64	7	303
Other	1,501	474.23	495	427	168.36	24	58.82	1	161
Total	5,056	1,646.99	2,300	1,589	623.09	124	192.20	26	1,349

land was acquired from resident households; 12% of lands acquired were leased in by 2.4% of households and 27% of households had members who had been hired to work on acquired plots at the time of the acquisition. Clearly, in the aggregate, a substantial proportion of people and land in these villages were directly affected by the acquisition. In this paper we shall focus only on acquisition and compensation of agricultural plots.

Table 2 provides a summary of the sample data, for households providing complete answers to the main questions. There are 733 households from the affected villages. Of these 311 had some plots acquired, while 71 had been leasing in plots that were acquired. There are a total of 1,127 plots that were acquired, covering 178 acres (18% of total land acquired in these villages). In approximately 60% of these, the compensation offers were rejected.

Table 2: Household Distribution in Acquired Villages: Sample Data

Main Occupation of Head of Household		No of Households	No of HH Where Other Adult Members Cultivators or Cultivation Secondary Occupation of Head	If Owned Agricultural Land Affected		If Leased in Agricultural Land Affected		Number of Agricultural Plots Acquired (Owner-Cultivated and Leased-in) Rejected	Number of Agricultural Plots for Which Offered Compensation	Total Area Rejected (Acres)
				No of Households Land Acquired	Total Area Acquired (Acres)	No of Households Land Acquired	Total Area Acquired (Acres)			
Cultivator	Classification of HH according to current landholdings	372	79	190	88.92	21	15.74	696	378	55.26
	Pure owner cultivator	320	67	160	81.43	13	10.73	601	317	48.55
	Pure tenant cultivator	4	0	4	0	0	0	0	0	0
	Mixed tenant cultivator	45	12	23	7.49	8	5.01	95	61	6.71
	Unknown	3	0	3	0	0	0	0	0	0
Labourer	Classification of HH according to principal source of wage earnings	201	201	51	13.44	28	11.48	159	99	17.26
	Agricultural labourer	139	139	26	6.96	24	9.92	97	71	12.4
	Non-agricultural labourer	62	62	25	6.48	4	1.56	62	28	4.86
Other		160	160	70	34.54	22	14.3	272	171	26.66
Total		733	440	311	136.9	71	41.52	1,127	648	99.18

The household sample was drawn using multistage stratified random sampling without replacement. The plan was to select a total of 600 cultivators and 200 non-cultivators in the acquired villages, using the principal occupation of the household head. The 600 cultivators in turn were to be divided between owner cultivators and tenants in a ratio of 4:1.[1] Within each category, half were to be selected from those directly affected by the acquisition, and the remaining half from those unaffected directly. These were stratified according to the landownership distribution across size classes in the population. The actual sample with completed responses ended up including 436 owner cultivators (with 227 affected and 209 unaffected) and 98 tenants (60 affected and 38 unaffected).

The sample also included 200 non-cultivator households divided equally into 100 affected and 100 unaffected, with two-thirds of each group drawn from agricultural workers and one-third from non-agricultural workers. These groups were deliberately under-sampled relative to their weight in the population owing to the expectation that such groups would be less affected by the land acquisition. The definition of "affected" for these groups used the criterion whether anyone in the household had their residence or workplace displaced owing to the acquisition.

In the unacquired villages we included 125 households from a previous survey, and 225 newly surveyed households, yielding a total of 350. Both samples were stratified by landholdings. In total we ended up with a sample of 1,101 households, approximately three-fourths of which were from the acquired villages (where they constituted one-sixth of the entire resident population).

In order to assess the impact of acquisition on households affected, we compare them with those whose lands were not subject to acquisition. This is appropriate under the assumption that the two groups were otherwise similar. To check the plausibility of this assumption, we check similarities between households that were and were not affected by the acquisition. The location of the Tata factory was on one side of the Durgapur Expressway, with a boundary drawn that cut through six different villages. Those areas falling within the factory site were acquired. Our inspection of the premises did not indicate any distinct features of the areas included in the site, compared with neighbouring farm areas. Table 3a compares demographic characteristics and plot characteristics of affected and non-affected households in the six affected villages. The last column indicates no significant differences in terms of the distribution of household sizes, education, religion, caste and occupation of the head.

Table 3b (p 35) examines differences of household characteristics between acquired and unacquired villages. Here we do see some significant differences: the acquired villages have more scheduled tribes (STs), Other Backward Classes (OBCs) and Hindus. We also found significant differences in land prices and wage rates across villages. Hence cross-village comparisons are more tenuous than within-village differences.

Table 4 (p 36) gives characteristics of landlords in the sample. The majority of landlords reside inside the village. The average size of the plot that these landlords lease out was 0.28 acre, significantly larger than the average owner cultivated plot (0.16 acre). The predominant form of contract between landlords and tenants is sharecropping with majority of sharecroppers being unregistered and receiving more than 50% share.

Table 3a: Comparing Household Characteristics Within Villages from Sample Data

Variable	Acquired Villages										Testing for Difference in Average between Columns (5) and (10) (T-Statistics)
	Affected Households					Unaffected Households					
	Owner Cultivator (1)	Mixed Tenant (2)	Agri Labour (3)	Non-Agri Labour (4)	All HH (5)	Owner Cultivator (6)	Mixed Tenant (7)	Agri Labour (8)	Non-Agri Labour (9)	All HH (10)	
Household Characteristics											
Number of households	167	21	87	30	389	153	24	52	32	346	
Household size											
Number of adults in HH	3.1	3.1	2.7	2.7	3.0	3.1	3.6	2.7	2.7	3.1	-1.2
	(1.04)	(1.15)	(0.97)	(0.71)	(1.05)	(1.04)	(1.97)	(0.93)	(0.99)	(1.17)	
Number of children	0.6	0.8	1.2	0.8	0.7	0.6	0.7	1.3	1.0	0.7	0.0
	(0.86)	(0.89)	(0.98)	(0.82)	(.92)	(0.85)	(0.96)	(1.09)	(1.14)	(0.96)	
Education level of head of household	8.64	6.9	9.75	8.57	9.26	7.96	6.54	7.63	8.5	8.61	1.6
	(3.95)	(3.3)	(6.95)	(6.29)	(5.5)	(4.49)	(2.94)	(5.69)	(5.89)	(5.46)	
Religion: % of HH that are Hindu	0.97	0.95	0.97	0.97	0.97	0.986	0.92	0.96	0.97	0.98	-0.8
	0.17	0.29	(0.18)	0.18	(0.17)	(0.11)	(0.28)	0.19	(0.18)	(0.15)	
Caste											
% of HH that are SC	0.05	0.14	0.43	0.23	0.18	0.06	0.29	0.46	0.22	0.2	-0.7
	(0.21)	(0.36)	(0.5)	(0.43)	(0.39)	(0.23)	(0.46)	(0.5)	(0.42)	(0.4)	
% of HH that are ST	0	0	0.08	0	0.08	0	0	0	0	0	-
			(0.27)		(0.27)						
% of HH that are OBC	0.06	0.05	0	0.07	0.05	0.05	0	0.02	0.06	0.04	0.6
	(0.24)	(0.22)		(0.25)	(.23)	(0.2)		(0.14)	(0.25)	(0.19)	
Plot characteristics											
Average size of current owner cultivated plots	0.164	0.08	0	0.3	0.18	0.12	0.12	0.09	0.08	0.12	7.4
	(0.15)	(0.02)		(0.25)	(0.16)	(0.1)	(0.15)	(0.07)	(0.05)	(0.11)	
Percentage of plots that are Irrigated	0.81	1	0	0.93	0.84	0.91	0.78	0.88	0.9	0.89	-2.3
	(0.39)	0		(0.25)	(0.37)	(0.28)	(0.41)	(0.32)	(0.3)	(0.21)	
Percentage of plots that are sali	0.42	1	0	0.6	0.47	0.42	0.49	0.37	0.42	0.44	1.0
	(0.5)	0		(0.5)	(0.5)	(0.49)	(0.5)	(0.48)	(0.5)	(0.5)	
Average yield per acre of Aman Crop	1342.5	1500	0	1308	1346.2	1371	1406.573	1369.9	1359.8	1376.2	-2.6
	(205)	0		(106.9)	(190.4)	(156)	(222.4)	(152.3)	(137.4)	(157.9)	

Standard deviation in parentheses.

Table 3b: Comparing Household Characteristics across Villages from Sample Data

Variable	Acquired Villages					Unacquired Villages					Testing for Difference in Average between Columns (5) and (10) (T-Statistics)
	Owner Cultivator (1)	Mixed Tenant (2)	Agri Labour (3)	Non-Agri Labour (4)	All HH (5)	Owner Cultivator (6)	Mixed Tenant (7)	Agri Labour (8)	Non-Agri Labour (9)	All HH (10)	
Household Characteristics											
Number of households	320	45	139	62	735	149	29	40	44	366	
Household size											
Number of adults in HH	3.1	3.4	2.7	2.7	3.0	3.1	3.1	2.9	2.6	3.0	0.0
	(1.04)	(1.6)	(0.95)	(0.86)	(1.11)	(1.07)	(0.86)	(0.98)	(0.69)	(1.08)	
Number of children	0.6	0.7	1.2	0.9	0.7	0.8	0.8	1.0	1.4	0.9	-3.0
	(0.85)	(0.92)	(1.02)	(0.99)	(0.94)	(1.12)	(0.94)	(1.14)	(1.43)	(1.18)	
Education level of head of household	8.32	6.7	8.96	8.53	8.95	7.39	10.45	9.85	7.14	8.85	0.3
	(4.22)	(3.08)	(6.57)	(6.04)	(5.49)	(5.12)	(7.17)	(7.31)	(5.03)	(6.24)	
Religion: % of HH that are Hindu	0.98	0.93	0.96	0.97	0.97	0.79	0.83	0.83	0.77	0.81	9.4
	(0.15)	(0.25)	(0.19)	(0.18)	(0.16)	(0.41)	(0.38)	(0.38)	(0.42)	(0.4)	
Caste											
% of HH that are SC	0.05	0.22	0.44	0.23	0.19	0.14	0.34	0.3	0.09	0.17	0.8
	(0.22)	(0.42)	(0.5)	(0.42)	(0.39)	(0.35)	(0.48)	(0.46)	(0.29)	(0.38)	
% of HH that are ST	0	0	0.05	0	0.05	0	0	0.025	0	0.025	1.9
			(0.22)		(0.22)			(0.16)		(0.16)	
% of HH that are OBC	0.05	0.022	0.007	0.065	0.05	0.013	0	0	0.02	0.014	3.0
	(0.22)	(0.149)	(0.08)	(0.25)	(0.21)	(0.12)			(0.15)	(0.12)	
Plot Characteristics											
No of current owner cultivated plots	1,494	149	73	65	2,260	566	67	16	51	911	
Average size of current owner cultivated plots	0.12	0.12	0.09	0.13	0.13	0.14	0.12	0.11	0.11	0.14	-3.3
	(0.10)	(0.14)	(0.07)	(0.16)	(0.12)	(0.10)	(0.07)	(0.05)	(0.07)	(0.11)	
Percentage of plots that are irrigated	0.91	0.79	0.88	0.91	0.89	0.93	0.91	0.94	0.98	0.94	-4.6
	(0.29)	(0.4)	(.33)	(0.29)	(0.32)	(0.26)	(0.29)	(0.23)	(0.12)	(0.24)	
Percentage of plots that are sali	0.42	0.51	0.37	0.46	0.44	0.50	0.57	0.88	0.58	0.53	-5.1
	(0.5)	(0.5)	(0.49)	(0.5)	(0.5)	(0.5)	(0.5)	(0.32)	(0.5)	(0.5)	
Average yield per acre of Aman Crop	1,367.9	1,410.3	1,369.9	1,347.9	1,373.4	1,316.0	1,264.2	1,327.5	1,300.2	1,316.1	8.6
	(162.3)	(218.7)	(152.3)	(132)	(161.5)		(185)	(211.8)	(117)	(163)	(187.4)

Standard deviation in parentheses.

3 How Much Land Was Acquired Per Household?

Which Households Were Affected?

Table 5 provides a breakdown of landowners in our sample that were subject to acquisition by the size of land acquired (Panel A), of land-owned in 2005 (Panel B) and occupation (Panel C). Panel A shows the size of plot acquired was evenly spread across different size categories with thresholds of 0.08, 0.16, 0.33, 0.5, and 1 acre. Seventy-two per cent of the land acquired involved plots larger than a half acre, and 42% was above 1 acre, the average landholding per household in 2005. Therefore, unlike Ghosh (2012) we do not find that the majority of plots acquired were less than 0.08 acre in size: these tiny plots accounted for only 15% of affected landowning households. Moreover, the average proportion of land owned in 2005 that was subject to acquisition was 55%, i e, acquired lands were a non-negligible proportion of owned lands for the affected owners. The proportion was smaller (27%) for the smallest acquisitions involving plots smaller than 0.08 acre. But for acquired plots above 0.08 acre they accounted for more than half of all landowned in 2005. For those unwilling to accept compensation,

Table 4: Characteristics of Landlords in Sample

Variable	Affected Landlords		Unaffected Current Landlords in Acquired Villages		Unaffected Current Landlords in Unacquired Villages	
	LL Resides Outside Village	LL Resides Inside Village	LL Resides Outside Village	LL Resides Inside Village	LL Resides Outside Village	LL Resides Inside Village
No of plots leased in	27	92	34	94	13	38
Total land-owned by LL	2.76 (3.25)	2.68 (2.28)	1.5 (1.47)	0.96 (0.79)	1.04 (0.57)	3.23 (6.52)
Average size of the plot leased-in	0.28 (0.16)	0.25 (0.19)	0.23 (0.16)	0.18 (0.13)	0.26 (0.10)	0.25 (0.14)
Main occupation (% of HH)						
Cultivation	29.63	53.26	29.41	25.53	23.08	42.11
Business	14.81	18.48	17.65	3.19	0	15.79
Private service	29.63	9.78	5.88	31.91	53.85	15.79
Government service	25.93	17.39	47.06	36.17	23.08	18.42
Housework	0	1.09	0	1.06	0	0
Labour	0	0	0	2.13	0	7.89
Contract form						
No of plots with fixed rent	1	1	2	14	2	28
No of plots with sharecropping	26	91	32	80	11	10
If sharecropper, is tenant registered?						
No plots where tenant registered	1	25	7	8	1	4
No plots where tenant unregistered	25	66	19	73	10	6
If sharecropper, average share of tenant in output	44.63 (17.9)	65.39 (14)	59.63 (33.72)	66.07 (20.34)	72.72 (7.54)	75.00 (0)

Standard deviation in parentheses.

Table 5: Acquisition Details, Breakdown by Total Land Acquired, 2005 Landholdings and Occupation of Head

	Panel A								
	All Farmers				Unwilling Farmers				
Size of Total Land Acquired	No of Households	Aggregate Land Acquired in the Category	Average Holding per HH in 2005	Acquired Land as a Share of Owned Land	No of Households	Aggregate Land Acquired in the Category	Average Holding per HH in 2005	Acquired Land as a Share of Owned Land	Testing Difference between (4) and (8) (P-Values for Alternate Hypothesis Ha: (4) -(8) < 0)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<= 0.08	54	2.88	0.35	0.27	16	0.92	0.34	0.27	0.52
0.08 to 0.16	66	8.36	0.44	0.47	31	4.13	0.50	0.41	0.79
0.16 to 0.33	56	13.52	0.65	0.56	32	7.9	0.51	0.64	0.096
0.33 to 0.50	61	24.04	0.77	0.65	36	14.31	0.81	0.63	0.63
0.50 to 1.00	73	54.78	1.33	0.67	38	28.79	1.21	0.75	0.04
> 1.00	41	74.77	2.78	0.71	27	50.56	2.48	0.76	0.13
Total	351	178.35	0.98	0.55	180	106.79	1.00	0.61	0.02
Size of Landholdings in 2005				Panel B					
<0.5	140	23.79	0.28	0.62	65	12.52	0.30	0.67	0.19
0.50 to 1.00	102	38.8	0.77	0.49	57	24.74	0.76	0.57	0.08
1.00 to 2.00	74	56.79	1.43	0.52	39	32.74	1.45	0.57	0.18
2.00 to 3.00	18	27.07	2.48	0.61	11	18.93	2.39	0.73	0.12
3.00 to 5.00	14	22.56	3.86	0.41	7	13.79	3.97	0.50	0.26
> 5.00	3	9.34	6.55	0.53	1	4.07	5.47	0.74	-
Total	351	178.35	0.98	0.55	180	106.79	1.00	0.61	0.02
Occupation				Panel C					
Pure owner cultivator	166	92.16	1.18	0.43	74	50.26	1.24	0.48	0.07
Mixed tenant	25	12.5	0.89	0.52	13	8.3	1.02	0.60	0.19
Agricultural labourer	47	16.88	0.45	0.82	29	12.5	0.52	0.86	0.32
Non-agricultural labourer	29	8.04	0.48	0.73	15	4.86	0.64	0.74	0.48
Business or pvt service	34	17.22	0.87	0.62	20	9.55	0.73	0.66	0.3
Govt service or pension	8	5.4	0.87	0.82	5	4.51	1.15	0.77	0.61
Other	40	24.92	1.26	0.52	23	16.26	1.22	0.55	0.35
Total	349	178.35	0.98	0.55	179	106.24	1.00	0.61	0.02

the average proportion of land acquired was higher (61%, compared with 55%), the difference being statistically significant at the 5% level.

Panel B examines whether the acquisition affected poor or wealthy landowners, with wealth measured by 2005 landholdings. Sixty-nine per cent of affected owners owned less than an acre of land (the mean landholding) in 2005. Nearly 40% owned less than half an acre; within this group 62% of land-owned was acquired. The proportions were somewhat higher for households unwilling to accept compensation. Clearly, the majority of those affected were marginal landowners. Within this group more than half the lands owned were subject to acquisition.

Table 6: Land Rates Approved by the Government of West Bengal

Classification of Land	Approved Rate (Rupees per Acre)
Sali land	6,01,718
Sona land	8,80,029
Homestead	18,04,431
Shop or cold storage	14,43,545
Bamboo garden	7,04,023
Temple	6,01,718
Burial ground	6,01,718
Canal	3,61,030

Panel C examines the occupational characteristics of affected owners. Slightly less than half were households headed by owner cultivators, and 54% households headed by owner cultivators or tenants. These two groups accounted for 58% of the land acquired. Another 21% of affected households were headed by workers, and they accounted for another 14% of land acquired. Hence, nearly three-fourths of acquisition affected households headed by cultivators or workers.

4 Did the Government Offer Compensation at the Market Rate?

In this section we examine the evidence concerning compensations offered by the government for the acquired plots. We use two sources of evidence here: (1) the state government's own statements and records of compensation offered, and (2) household reports of the compensation offers they received. For (1) we use compensation policies specified in state government orders, and records of the special land acquisition office at Hooghly district concerning compensations and relevant characteristics of all plots acquired.[2] For the second source, we rely on responses of households in our survey, concerning characteristics of their plots that had been acquired and the compensations they had been offered. We were unable to match the two sources of data for plot-wise compensation. We shall, therefore, compare the corresponding averages for compensation of different grades and check if they are consistent.

Government's Stated Compensation Policy: Under the provisions of the 1894 Land Acquisition Bill, compensations are to be based on the market value of land at the time of acquisition. The West Bengal Government's Order No 1705-LA-3M-07/06 dated 6 June 2006 gives "guidelines to be followed in the matter of assessment of market value of land". Paragraph 3 of this order prescribes standard average prices of land classified according to (1) whether land is irrigated or not; (2) whether it is single cropped or double/triple cropped agricultural land; (3) whether it is homestead land or fallow land or whether there are water bodies, etc; (4) proximity to state/national highways or other strategic locations.

Using these principles the government approved a set of market-based rates for different categories of land. These are provided in Table 6. The two kinds of agricultural land are called *sali* and *sona*, respectively. Sali denotes single-cropped low land that does not receive assured irrigation from state canals. Sona is multi-cropped land on a higher level receiving assured irrigation. There are further gradations within sali and sona plots with regard to elevation. These definitions of the type of land are not watertight, in more senses than one. Sona plots tend only on average to be more irrigated and multi-cropped than sali plots. The type of plot can be changed over time with suitable investments in water access and multi-cropping arrangements. The land records describe whether any given plot is sali or sona, presumably based on an inspection carried out by land assessors. The land records could be out of date, as land that was previously sali may have been converted to sona as a result of investments made by the owner, after the last inspection. The owner is supposed to apply for a redesignation of the plot from sali to sona in such cases. In practice, this is often not done owing to the time and cost associated with any such redesignation.

In any case, the government order stated rates payable on compensation of sali and sona lands at different rates, with sona lands to be paid a considerable premium. The order did not describe how these rates were decided. The government order also mentioned a number of possible modifications to these rates: (1) compensation for the value of structures built on the land; (2) solatium of 30% on and over the basic market value of the land and value of things attached to land;

Table 7: Summary of Compensation Paid by Government (Official Land Records)

Type of Land	Total Area of Land Acquired (Acres)	Total Number of Plots	Total Compensation Offered by Government (Rs Crore)	Plots for Which Land Value Assessed				Plots for Which Positive Solatium Paid		
				Number of Plots	Mean (Rs Lakh)	Median (Rs Lakh)	Standard Deviation (Rs Lakh)	Amount That Was Declared by the Government (Rs Lakh)	Number of Plots	Proportion (%) of Plots Where Government Paid Solatium @ 30% as Declared
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sali	873.2	16,925	68.8	12,851	6.0	6.0	1.8	6.0	12,837	97
Sali plots near highway	21.2	453	2.1	330	6.6	6.6	0.5		328	95
Sona	35.4	1,030	3.5	779	8.6	8.8	2.5	8.8	779	95
Sona plots near highway	1.0	53	0.2	26	9.7	9.7	0.0		26	100

(a) For columns 1 and 2, we exclude outliers: plots of size exceeding 50 acres.
Also, we only look at those plots for which a non-zero land value compensation is offered.
(b) In columns 3-10, we also exclude outliers: plots with compensation per acre above 40 lakhs.

(3) value of trees according to age and kind of trees on the property; (4) damages for the standing crop at the time the land was acquired; and (5) additional compensation at the rate of 12 % pa for the period from the date of notification till the award was declared. These components were to be paid over and above the land value.

A subsequent governor's Order No 1703-LA-3M-07/06 detailed procedures to be followed by those who have ownership rights for the land acquired and file a claim for compensation. It asked claimants to make claims about the market value of their land, incorporating details such as distance, irrigation, the solatium of 30% (plus interest at 12% pa for delayed award payments), and allowed scope for bargaining across the table.

Hence, the government order allowed scope for variations in the actual compensations based on claims made by affected owners. But all such modifications would have served, if at all, to raise actual compensations offered.

An examination of the detailed plot-wise records of the special land acquisition office in Hooghly district reveals that the majority of sali and sona plots were paid as per the stated rates in Table 6. These records are summarised in Table 7 (p 37). Approximately, one quarter of all plots were not assessed a positive land value, so these owners were offered zero compensation. However, handwritten corrections were later inserted for some of these, perhaps as a result of appeals made by the concerned owners. On the three quarter of the plots that were assessed at a positive value, land rate was paid at declared rate for sali. Solatiums were offered for the vast majority of these at the stated 30% rate.

What Was the True Market Value of Land? The first step in evaluating the government's stated compensation policy is: how did the stated valuations of sona and sali land relate to their market values? Some critics of compensation policies based on market valuation assert the difficulties in assessing market values, owing to a variety of reasons. First, land markets are believed to be thin in developing countries, so data concerning market prices are not readily available. Second, officially recorded market prices may deviate from true market prices owing to transaction costs involved in recording market transactions. Many market transactions are never recorded officially, and even for those that are recorded the stated price understate the true price in order to reduce stamp and registration duties payable to the government. Third, the exact time at which market prices are assessed can matter in periods of substantial inflation in real estate values. Going by past transactions may then understate the true market price at the time of acquisition.

Table 8: Average Market Valuations and Compensation Offers Reported, by Land Type

Land Type	Compensation Offered (Rs Lakh)			Reported Mkt Price at the Time of Acquisition (Rs Lakh)		
	Observations	Mean	Std Deviation	Observations	Mean	Std Deviation
Sona high	174	8.8	0.5	174	9.0	3.2
Sona low	71	8.3	1.6	71	8.7	2.6
Sali high	266	8.8	1.3	266	8.6	5.7
Sali low	170	9.0	2.4	170	8.3	2.7
All land types	681	8.8	1.5	681	8.6	4.2

Surveyed households whose lands were acquired were asked what the market value of their acquired property was at the time of acquisition. These assessments were on the basis of their knowledge of comparable properties that had been transacted recently. While there may be some bias and imprecision in owners' own beliefs concerning what their properties would have commanded on the market, it has a number of advantages over relying on prices of actually transacted properties. First, data is available on all plots rather than just those which were actually transacted. This avoids the bias associated with selection of properties that were actually transacted. It expands the number of observations considerably, relieving the problem of market thinness and smallness of the sample. Moreover, these valuations are assessed for the same year 2006 of acquisition, thus, obviating the need to extrapolate from past years and adjust for inflation in property values. Another advantage of using this data is that it provides us an idea of what landowners perceived concerning the valuation of the acquired properties, which may help in explaining how they reacted to the compensations offered.

Nevertheless, it is possible that owners may tend to exaggerate the market value of their properties. We shall, therefore, check consistency of stated land values with estimated income losses resulting from acquisition.

Comparing Self-Reported Market Values and Offered Compensations: Table 8 provides averages of market values and compensation offers reported by households, classified into the four different types of land. We see that high lands commanded a premium of about Rs 30,000 per acre among both sali and sona lands. The average reported market value of sona high land was Rs 9 lakh per acre; for sali high land it was Rs 8.6 lakh per acre. This implies that the government's offered rate (inclusive of the 30% solatium) were substantially above the market value of sona land, but somewhat below that of sali lands. Inclusive of solatium, sona lands were offered Rs 11.44 lakh per acre, while sali was offered Rs 7.8 lakh per acre. This suggests that sona land was overcompensated, while sali was slightly under-compensated relative to market values.

However, looking at the compensation offers reported by the households themselves, we obtain exactly the opposite conclusion. Table 8 shows that both sona and sali high

Table 9: Comparing Government Records and Household Responses

Type of Land	Official Land Records Data: Agricultural Plots				Sample: Owned Agricultural Plots			
	Number of Plots Acquired		Area Acquired		Number of Plots Acquired		Area Acquired	
	No Plots (1)	% of Total (2)	Area (3)	% of Total (4)	No Plots (5)	% of Total (6)	Area (7)	% of Total (8)
Sali	12,980	94.3	873.2	96.1	570	61.0	82.32	62.1
Sona	788	5.7	35.4	3.9	365	39.0	50.15	37.9
Total	13,768	100	908.6	100	935	100	132.47	100

(a) For Official Land Records data, we include plots smaller than 50 acres that were offered non-zero compensation.
(b) Due to lack of data on soil type for leased in land, we only include owner cultivated plots in this table.

landowners reported receiving compensation offers of Rs 8.8 lakh per acre, in contrast to the Rs 11.4 lakh and Rs 7.8 lakh figures contained in the government order and in the official land documents. Comparing the reported compensation offers with the reported market valuations, we see that sona high owners were under-compensated (average offer of Rs 8.8 lakh as against the market valuation of Rs 9 lakh per acre) and sali high owners were overcompensated (average offer of Rs 8.8 lakh compared with a market value of Rs 8.6 lakh per acre.)

Discrepancy between Compensation Offers Reported by Households and Government Records: The large discrepancy between official documents and household reports of compensations offered is striking. It is not just a case of households tending to under-report compensations offered generally, since sali owners reported compensation offers that were larger (Rs 8.8 lakh per acre) than what the government records (Rs 7.8 lakh, inclusive of solatium) indicate. Perhaps this was a result of additional adjustments over the announced rates made on the basis of structures, trees, location of sali properties, and some degree of bargaining that the government order allowed. But then why would the same not happen in the case of owners of sona lands, who reported being offered Rs 8.8 lakh on average rather than the Rs 11.4 lakh mandated by the government order inclusive of solatium? The standard deviation of reported compensation offers is Rs 0.5 lakh per acre, so it is unlikely that the discrepancy of Rs 2.6 lakh arose on account of sampling error. A statistical test of the hypothesis that the discrepancy arose owing to sampling error is decisively rejected at practically any level of significance.

Table 10: Land Types and Plot Characteristics Reported by Households

Type of Land	Total Plots	No of Plots				% of Plots That Were Improved in Last 10 Years
		Irrigated and Multi-Crop	Irrigated and Single Crop	Non-Irrigated and Multi-Crop	Non-Irrigated and Single Crop	
Sona high	239	234	3	1	1	58.3
Sona low	120	114	6	0	0	25.8
Sali high	364	186	127	4	47	12.9
Sali low	202	14	52	1	135	3.9

In order to unearth the source of this discrepancy, we interviewed local farmers, residents and government officials. The most likely explanation is that the government land records and household responses disagree substantially about the classification of land type. The definition of sona land provided to us by local residents is that there should be assured access to water from state canals, and the land should be capable of being multi-cropped. Neither of these characteristics are immutable. Farmers can make investments to connect their plots to feeders from state canals, and in soil preparation needed to plant different kinds of crops. Government land records are based on plot characteristics at some past point of time, following inspection by land assessors. In the meantime, farmers may have upgraded their lands from sali to sona, but may not have succeeded in getting this change to be noted in the official land records. This is a process which involves petitioning land officers for a reassessment which is time-consuming and complicated.

Hence, plots that were historically sali may have been converted into sona by farmers, but this did not get incorporated in the official land records. Many plots that the owners reported as sona, were actually recorded as sali on official documents, and offered compensation at sali rates.

To check the plausibility of this hypothesis, we compare the proportions of lands acquired that were listed as sona on government records, with what households reported as sona. Table 9 (p 38) provides the results of this comparison. We restrict attention to 96% of the agricultural plots that were assessed a positive market value in the government records. It turns out that 4% of acquired areas (and 5% of such plots) were listed as sona in the government records. But in the household sample, 37% of areas acquired (and 32% of plots acquired) were described by their owners as sona.

This explanation can indeed explain most of the discrepancy in compensation offers. The hypothesis suggests that plots classified by owners as sali must also be classified as sali in the land

Table 11: Heterogeneity of Reported Market Values and Compensation Offers

Variables	Reported Market Value at Time of Acquisition (1)	Compensation Offered (2)	Reported Market Value at Time of Acquisition (3)	Compensation Offered (4)
Sona low	-33,300	-48,598	24,575	-82,645
	(101,681)	(34,016)	(145,892)	(55,817)
Sali high	-123,964	-4,909	-119,609	-30,131
	(67,396)	(18,060)	(98,577)	(28,122)
Sali low	-94,563*	18,819	-164,852**	53,920
	(46,339)	(31,612)	(53,663)	(53,690)
Whether plot is irrigated			-79,420	-3,658
			(71,668)	(13,768)
Whether rice grown for more than one season			397,365**	63,027
			(140,953)	(47,546)
If multiple crops grown in a year			-13,495	3,071
			(79,907)	(15,904)
Land improvement			69,163	-4,983
			(101,417)	(30,778)
Distance from highway			208,185	65,692
			(136,212)	(104,383)
Distance from closest railway station			-36,472	8,094
			(61,493)	(11,229)
Paddy (aman) yield per acre			173.7	-39.20
			(187.6)	(46.23)
Selling rights			116,599*	-19,199
			(53,484)	(13,237)
Total land-owned by HH in 2005			13,753	-14,043
			(28,658)	(8,464)
Education level of HOH			1,636	8,930
			(4,082)	(9,342)
Whether HOH owns a business			-1,618	-123,735
			(97,519)	(75,554)
Constant	960,474***	881,718***	240,191	780,178**
	(40,821)	(3,708)	(300,762)	(317,570)
Observations	679	679	446	446
R-squared	0.133	0.020	0.237	0.136
Village fixed effects	Yes	Yes	Yes	Yes
F Test for village fixed effects (P values in parentheses)	890.29	26.47	151.1	5.52
	(0.000)	(0.000)	(0.000)	(0.028)

Village-Clustered Standard Errors in Parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

records. If all plots listed as sali in the official records were offered compensation at the same average rate, 96% of areas acquired were offered Rs 8.9 lakh per acre on average by the government. With the remaining 4% being officially classified as sona and offered Rs 11.4 lakh per acre, the average compensation across all agricultural plots according to the official documents was Rs 9.0 lakh per acre. In contrast, the compensation reported by owners when averaged across all types of land amounts to Rs 8.75 lakh per acre. The discrepancy is well within one standard deviation of the reported compensations.

Are the owners' declaration of their land types as sona consistent with their reports of irrigation and multi-cropping status (referring to whether crops apart from rice such as potatoes, jute and sesame are grown) of the acquired plots? The answer is yes. Table 10 (p 39) provides data concerning irrigation and multi-cropping status of acquired plots. Ninety-seven per cent of plots reported by owners as sona were both irrigated and multi-cropped. In comparison about half of sali high plots and less than 7% of sali low plots had this feature. The majority of sali high plots are irrigated, but it is possible that the irrigation source for these is not state canals.[3] Our questionnaire did not include questions regarding the source of irrigation. Consistent with the hypothesis that the misclassification arose owing to land improvements made by owners, 58% of sona high lands were improved since 2000, with the corresponding proportions for sona low and sali lands being 25% and 10%, respectively.

Table 12: Patterns of Under-Compensation across Plot Types

	Dependent Variable: Reported Market Value – Portion of Compensation Given for Land Value		
	(1)	(2)	(3)
Sona low	-5,113	30,043	40,137
	(111,126)	(120,595)	(110,251)
Sali high	-121,117	-143,896*	-131,754
	(66,708)	(69,349)	(68,618)
Sali low	-105,479*	-151,747*	-151,674*
	(45,679)	(65,556)	(67,036)
Constant	449,077***	436,619	352,017
	(42,149)	(483,202)	(495,128)
Observations	679	673	666
R-squared	0.125	0.175	0.190
Other plot characteristics	No	Yes	Yes
Household characteristics	No	No	Yes
Village fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes

Village-Clustered Standard Errors in Parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

We conclude that averaging across all types of plots, compensations offered by the government for agricultural plots were close to their market values; however, there was a systematic under-compensation for sona plots and overcompensation for sali plots. Sona plots which were under-compensated accounted for about one-third of the land acquired and of owners affected. The most likely explanation for this is the failure of the official land records to incorporate accurate information concerning plot characteristics: specifically, failing to identify their irrigation and multi-cropping status correctly.

Inability of Compensation Offers to Incorporate Land Heterogeneity: The preceding results indicate the need to focus on heterogeneity of market values of plots acquired, and the inability of government compensation offers to incorporate this heterogeneity. This is the pertinent question rather than how the compensation offered related to market values on average.

Table 11 (p 39) reports regressions of reported land values on their types as well as a number of other characteristics. Column 1 shows variations based on sali vs sona, in addition to whether the plot was on high or low land, after controlling for village dummies. We see sali plots are priced below sona plots located within the same village by around Rs 1 lakh per acre, the difference being significant at 10%. High plots were priced approximately Rs 30,000 higher per acre for both sali and sona plots. Column 2 shows no corresponding variation in offered compensation rates between sali and sona lands: indeed, sali low plots were offered higher compensations on average compared with sona high plots!

Table 13: Determinants of Probability of Owners Accepting Compensation Offers

Variables	Dependent Variable: Whether Compensation Offer Was Accepted		
	Logit (1)	Logit (2)	Logit (3)
Reported under-compensation	-0.0328**		-0.0293
	(0.0153)		(0.0181)
Sona low		0.0579	0.187**
		(0.154)	(0.0737)
Sali high		0.0746	0.157
		(0.0911)	(0.152)
Sali low		0.288***	0.268**
		(0.0744)	(0.125)
Whether owned land was irrigated			-0.147
			(0.106)
Whether rice grown for more than one season			-0.381***
			(0.127)
Whether land improvement done			0.192
			(0.158)
Distance from highway			0.101
			(0.173)
Distance from nearest railway station			-0.314**
			(0.135)
Percentage contribution of agric in HH income			-0.578***
			(0.212)
Total land-owned by HH in 2005			-0.00461
			(0.0678)
Reported change in agricultural income (Rs lakh)			0.384
			(0.267)
Education level of HOH			0.00122
			(0.0153)
If land was inherited			0.222***
			(0.0856)
Whether owner had selling rights			-0.0751
			(0.100)
Hyperbolic discounting			0.0658
			(0.0792)
Percentage of adult members of HH engaged in cultivation			-1.894
			(1.562)
Percentage of adult members of HH engaged in labour			-3.240**
			(1.296)
Percentage of adult members of HH engaged in business			-1.327
			(1.411)
Observations	687	687	675
Village fixed effects	Yes	Yes	Yes

Coefficients are marginal effects. Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Column 3 of Table 11 includes a host of additional plot characteristics that could conceivably affect market values. We see significant positive effects of the owner having selling rights, and whether rice is grown more than once. After controlling for these, the sona premium expands to Rs 1.6 lakh per acre, statistically significant at 5%.

Column 4 of Table 11 shows the corresponding regression for offered compensation rates. These failed to vary with characteristics that were significant determinants of market values. The R-squared for the compensation regression was 13%, as compared with 24% for the market value regression. Sali low plots continued to be offered higher compensations than sona high plots. Compensation offers thus failed to incorporate heterogeneity of market values.

Table 12 (p 40) regresses the perceived under-compensation, defined by the extent to which the market price exceeded the compensation offer as reported by each owner on different plot types, after controlling for village dummies in column 1, additionally for plot and owner characteristics in columns 2 and 3. After controlling for plot characteristics, we see a significant difference in the extent to which sona plots were under-compensated compared with sali plots, by approximately Rs 1.5 lakh per acre. Hence, compensation offers failed both to incorporate soil types that ought in principle to have been observed by government authorities, as well as other characteristics of plots and owners that are harder to incorporate in calculations of market land values used in governmental compensation formulae.

5 Explaining Household Decisions to Accept Compensation Offers

The preceding arguments suggest that a significant proportion of owners (approximately one-third) were under-compensated. We now test the hypothesis that under-compensation was responsible at least in part for refusal of concerned owners to accept the offered compensation. The hypothesis would imply that those households experiencing greater under-compensation would be more likely to refuse.

Table 13 (p 40) presents marginal effects of various determinants of the likelihood of an owner accepting a compensation offer, based on logit regressions (with village fixed effects, i e, these are based on within-village variations of acceptance decisions).[4] Column 1 shows an increase in under-compensation (relative to market value) by Rs 1 lakh per acre resulted in a 3.2% lower likelihood of acceptance, and this effect was significant at 5%. We have seen earlier (e g, Table 12) that undercompensation was greatest for sona high plots, followed by sona low plots. Sali plots were overcompensated, especially sali low plots. We would expect then that the probability of acceptance would be highest for sali low, followed by sali high, then sona low, with sona high plots least likely to be accepted. This prediction is borne out, as shown in column 2. Sali low plots were more likely to be accepted by about 29% than sona high plots in the same village: this difference was statistically significant at 1%.

Column 3 adds various plot characteristics that are potentially verifiable by government authorities. The effect of under-compensation continues to be about 3% though less significant; sali low plots in the same village were 27% more likely to be accepted. Sona low plots were also about 19% more likely to be accepted than sona high plots, after controlling for undercompensation relative to market value and various plot characteristics. Plots that were irrigated, located closer to a railway station, and allowed rice to be cultivated more than once, were less likely to be accepted, after controlling for soil type and under-compensation relative to market value.

These considerations suggest role for other owner characteristics that would affect their reservation values and consequently their acceptance decisions, after controlling for under-compensation relative to market values. The last column of Table 13 includes as additional determinants measures of education, occupation, total land-owned (apart from acquired plots), fraction of total household income accounted by agricultural income, whether the household owns exclusive selling rights, whether the land was inherited, and some aspects of the household head's preference between current and future consumption as revealed by responses to hypothetical choices concerning timing of cash receipts).[5] Some of these characteristics played a significant role in their decisions to accept, controlling for the extent of under-compensation relative to market value, beside plot characteristics. Households for whom agriculture played a larger role in income and those with a larger fraction of adult members who were workers were less likely to accept. This points to the role of income security as an important consideration, besides the role of complementarity of land with farming skills. Somewhat surprisingly, those who inherited the plot were more likely to accept, compared with those who purchased the plot. Selling rights, education and total land-owned, or hyperbolic discounting preferences did not significantly affect acceptance decisions.

Table 14: Were Absentee Landlords More Likely to Accept Compensation?

Variables	Probit	Logit	Linear Probability Model
	(1)	(2)	(3)
Landlord who monitors and stays inside village	-0.00619	-0.0171	-0.00782
	(0.224)	(0.220)	(0.211)
LL who does not monitor but stays inside village	-0.255***	-0.250***	-0.243**
	(0.0903)	(0.0888)	(0.0930)
LL who does not monitor and stays outside village	-0.352***	-0.338***	-0.351***
	(0.0563)	(0.0571)	(0.0697)
Whether land was irrigated	-0.242***	-0.251***	-0.208**
	(0.0807)	(0.0818)	(0.0756)
Distance from highway	0.196*	0.202*	0.186*
	(0.111)	(0.112)	(0.0934)
Distance from nearest railway station	-0.112**	-0.107**	-0.0994*
	(0.0548)	(0.0544)	(0.0423)
Constant			0.518**
			(0.200)
Observations	1,124	1,124	1,124
R-squared			0.180
Village fixed effects	Yes	Yes	Yes

Observations here refer to number of plots.
Village-Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 14 (p 41) examines differences between landlords and other types of owners with regard to acceptance decisions. We see that absentee landlords (those living outside the village, or those not monitoring their tenants) were significantly less likely to accept compensation than owner cultivators. This contrasts with the pattern above within owner cultivators, wherein those whose livelihoods were less tied up with cultivation of acquired plots were more likely to accept compensation. However, as seen previously, tenanted plots formed a minority within the set of acquired plots. Such landlords were likely to be more motivated by financial considerations, as would those who had purchased the plot rather than inheriting it. For this group refusal to accept compensation may have related to speculative motives.

6 Impact on Subsequent Incomes and Assets

Table 15 examines the impact of the acquisition on incomes of different households classified according to the principal occupation of the household head, and whether or not they were directly affected by the acquisition of lands they owned or cultivated.

Table 15: Impact of Acquisition on Income of Households

	(a) % Change in Crop Income		
	Affected Owner Cultivator	Unaffected Owner Cultivator	Difference: T- Statistic (P-Value in Parentheses)
Average	-12.74	17.99	-8.82
Standard deviation	(39.63)	(27.96)	(0.000)
	Affected Mixed Tenants	Unaffected Mixed Tenants	Difference: T- Statistic (P-Value in Parentheses)
Average	4.78	20.42	-1.47
Standard error	(37.26)	(38.36)	(0.073)
	(b) % Change in Total Labour Income		
	Affected Agri Labour	Unaffected Agri Labour	Difference: T- Statistic (P-Value in Parentheses)
Average	-22.30	-13.98	-1.85
Standard error	(34.25)	(29.87)	(0.033)
	Affected Non-Agri Labour	Unaffected Non-Agri Labour	Difference: T- Statistic (P-Value in Parentheses)
Average	33.57	30.12	0.574
Standard error	(29.23)	(24.34)	(0.716)

Affected owner cultivators whose lands were acquired saw their crop incomes fall by 12.7% between 2005 and 2010, in contrast to unaffected owner cultivators whose crop incomes grew by 18%. The difference was highly statistically significant. A regression (not shown) of changes in crop income between 2005 and 2010, and the proportion of the household's land in 2005 that was acquired after controlling for village dummies, showed a coefficient of -0.83 on the latter, significant at 1%. This implies that acquisition of half an owner's land was associated with a 40% lower rate of growth of crop income.

Affected tenants experienced 4.8% growth in crop incomes, in contrast to unaffected tenants whose incomes grew by 20%. This difference of 15.2% was significant at the 10% level. The effect on incomes of tenants was therefore approximately half that for owner cultivators, implying that the 25% compensation rate for tenants resulted in under-compensation.

Panel B shows affected agricultural workers (i e, those previously hired to work on plots that were acquired) experienced a 22% decline in employment earnings, compared with a 14% decline for unaffected agricultural workers. This difference was significant at 5%. Non-agricultural workers, on the other hand, experienced a growth of employment earnings by over 30%, with no significant difference between those directly affected or not. Hence, the acquisition had dramatically different consequences for agricultural and non-agricultural workers, a natural consequence of the shift away from agricultural to non-agricultural employment as a result of construction related to the Tata factory. Table 1 earlier showed that affected agricultural workers constituted a large fraction of the population in the six villages concerned, and were the single largest affected group. Unlike owners and tenants, there was no compensation available for those who lost employment.

Table 16 examines the impact of the acquisition on growth in the value of various kinds of household assets between 2005 and 2010. The survey asked respondents to list household assets owned in 2005 and subsequent changes in these until 2010. These assets were valued using prices prevailing in each village in 2010. The main regressor here is the annualised income shock associated with the acquisition. For owner cultivators and tenants this is defined as the sum of change in crop income and interest income on compensation (computed at an annual rate of 6.5%, the rate on bank fixed deposits), less the average change in crop income of unaffected households in the same village. For workers we use the difference between change in employment earnings and the average change for unaffected workers. We see a significant impact of the income shock only on changes in the value of consumer durables. For owners we obtain similar results using the extent of under-compensation as an analogous measure of a wealth shock

Table 16: Impact of Acquisition on Change in Asset Holdings (2005-10)

Variables	Percentage Change in Value of Livestock	Percentage Change in Value of Farm Machines	Percentage Change in Value of Consumer Durables	Percentage Change in Value of Business Assets
	(1)	(2)	(3)	(4)
Wealth shock	-0.0870	0.399	1.543**	-0.0533
	(0.182)	(0.256)	(0.581)	(0.0464)
Total land-owned by HH in 2005	0.0168	-0.0396	0.200	-0.0226
	(0.0328)	(0.0359)	(0.130)	(0.0294)
Total compensation received	-0.0215	0.0278	-0.0885*	0.00380
	(0.0265)	(0.0338)	(0.0489)	(0.00461)
Constant	0.585	0.0472	2.204***	0.0636*
	(0.490)	(0.0540)	(0.720)	(0.0350)
Observations	1,098	1,098	1,098	1,098
R-squared	0.051	0.078	0.095	0.086
Village FE	Yes	Yes	Yes	Yes
Control for HH characterisitcs	Yes	Yes	Yes	Yes

(a) Wealth shock is defined as: (i) For Cultivators= Interest Income + Change in Crop Income – Average change in Crop Income for Unaffected HHs
(ii) For Tenants = Interest Income*0.25 + Change in Crop Income – Average change in Crop Income for Unaffected HHs
(iii) For Labour = Change in Labour Income – Average Change in Labour Income for Unaffected Labourers
(b) Wealth shock and total compensation are in Rs lakh.
(c) Tenants interest income in a(ii) calculated on the basis of plot compensation equal to reported market value.
Village-Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

(market value of land minus compensation offered): the only significant impact of this wealth shock was on acquisition of consumer durables, the value of which decreased by 25% more following Rs 1 lakh under-compensation.

One final question concerns whether the interest earned on compensations offered was sufficient to overcome the loss in crop incomes of affected cultivators. This is analogous to computing the corresponding wealth shock defined as undercompensation, based on the difference between offered compensation and reported market value of land. This is one way of evaluating the reliability of the reported land market values, by checking its consistency with the estimated income shocks.

Table 17: Comparing Compensation with Changes in Agricultural Income Due to Acquisition

Panel A: Simple Averages

	Average Annual Interest Income on Compensation(Rupees) (1)	Average Change in Crop Income Due to Acquisition (Rupees) (2)	Net Gain (P-Values for T-test in Parentheses) (3)
Affected owner cultivator	9,184	-8,228	956
	(9,589)	(30,064)	(0.006)
Affected tenant	2,240	-3,134	-894
	(2,766)	(9,139)	(0.000)

(a) Standard errors in parentheses for columns I and II.
(b) Annual interest income is calculated using annual interest rate of 6.5%.
(c) Change in Crop Income Due to Acquisition= Change in Crop Income for Household – Average Change in Crop Income for Unaffected Households in the Village.

Panel B: Regression on Type of Plot Acquired

Variables	Dependent Variable: Change in Crop Income Due to Acquisition – Annual Interest on Compensation for HH		
Sona low	-4,301	-7,058	-5,174
	(18,324)	(17,894)	(15,504)
Sali high	11,724	7,178	3,783
	(9,217)	(8,688)	(8,521)
Sali low	17,650*	13,419	16,073**
	(7,038)	(8,038)	(4,882)
Constant	-20,733**	-64,135	-75,059
	(5,641)	(37,613)	(45,545)
Observations	382	381	372
R-squared	0.336	0.354	0.554
Other plot characteristics	No	Yes	Yes
Household characteristics	No	No	Yes
Village FE	No	No	Yes

Village-clustered standard errors in parentheses. Plot type is available only for owner cultivated plots.
*** p<0.01, ** p<0.05, * p<0.1

Our survey shows that the majority of compensation recipients deposited the compensation money in the bank. This enables us to work out the interest income from the compensation, assuming they were invested in bank fixed deposits at an annual interest rate of 6.5%. Table 17 compares the average annual interest on compensation with the change in crop income for affected owner cultivators and tenants, respectively. Averaging over all affected owner cultivators, Panel A shows the interest on compensation exceeded the loss in crop income by Rs 956 per year. This is roughly what one would expect from the fact that offered compensation rates were slightly above the market value of land, averaging across all affected owner cultivators. In contrast, tenants received compensation which was substantially smaller, while experiencing crop income drops of a similar magnitude, so that their net incomes decreased by Rs 894 annually. Panel B examines the corresponding net change in income for owner cultivators across the different types of plots acquired. The change is significantly higher for sali owners compared with sona owners, confirming our earlier assessment based on reported land values that the former were overcompensated while the latter were under-compensated.

7 Conclusions

Our main findings concerning the four questions posed in the Introduction can be summarised as follows:

(a) How much land was acquired, and from whom? The majority of plots acquired were non-negligible in size, compared to the average in Singur. Most of the land was acquired from marginal landowners, and from those engaged in cultivation on the acquired plots. For most affected owners, more than half the land they owned in 2005 was acquired.

(b) Did the government offer compensations at the market value of the lands acquired? While this was true on average, a significant fraction of landowners were under-compensated owing to misclassification of their plots as sali rather than sona in the official land records, besides inability of the latter to incorporate other sources of plot heterogeneity. That this could be a general problem, is indicated by recent news reports which suggest that in the Nandigram area of West Bengal, which earlier saw violence related to forcible land acquisition under the Left Front government, farmers have protested land acquisition by the current government for the purpose of building roads because of what they perceive to be unfair and ad hoc treatment of different types of land in terms of the compensation rates.[6]

(c) What explains decisions of owners to accept the offered compensations? Owners with under-compensated types of plot were significantly more likely to reject the compensation offer. Those whose livelihoods were more tied up with cultivation and those with possible speculative motives (absentee landlords or those who purchased the plots rather than inheriting them) were more inclined to reject.

(d) What was the impact of the acquisition on incomes and assets of those affected? Acquisition of land resulted in 40% lower income growth for owners and half that for tenants. Consumer durables grew more slowly for

under-compensated affected owners, compared to others in the same village. Agricultural workers that were directly affected experienced significant reductions in employment earnings compared with unaffected agricultural workers, who in turn, experienced smaller earnings growth compared with non-agricultural workers.

Hence, land acquisition in Singur imposed significant economic hardships on a large fraction of affected owners, tenants and workers. A large fraction of owners were under-compensated relative to market values. Tenants were under-compensated and agricultural workers were not compensated at all. While it is difficult for us to say how much local reactions were politically motivated, these economic hardships provide a plausible explanation for some of the observed refusals and protests.

An obvious implication for future land acquisition policy is the need to base compensation on better measures of land values than is permitted by official land records. Getting the soil grade right will reduce the incidence of under-compensation, chances of rejection and subsequent protest significantly. Displaced tenants and workers who constitute the poorer sections of these rural communities also need to be compensated in some way to avoid undesirable adverse impacts on their livelihoods, as well as to minimise any political fallout.

Another difficult issue concerns the principle of basing compensations on market values. Many owners value their land more than their market values on account of other attributes of land, such as financial security, complementarity with farming skills, locational factors, or considerations of identity or social prestige. That is why long-standing owners have not exercised the option to sell their land at market prices. To ensure that such owners are adequately compensated would require raising compensations above market values.[7] What makes this difficult to achieve in practice is that valuations of land have an inherently subjective nature varying from owner to owner. Current land acquisition bills in the Indian Parliament and state legislatures have pegged compensations at arbitrary ratios of market value: four times in the case of acquired rural properties in the former.

These ratios have been pulled out of thin air. Yet getting them right is critical. Setting the compensation too low, risks providing inadequate compensation to large numbers of owners, with an induced bias in favour of excessive industrialisation at the expense of expropriated farmers, and the likelihood of a political backlash of the kind witnessed in Singur. Setting them too high risks unduly lowering the pace of industrialisation and overall economic growth. These problems could motivate the use of more reliable means of assessing values imputed by their owners such as auctions, as argued by Ghatak and Ghosh (2011).

Even if market values are used, our results indicate greater need to carry out surveys of the affected properties to evaluate their current characteristics, and use the results of such surveys to value the lands, instead of relying on official land records which are in poor shape in many parts of India. To the extent the panchayats are involved in this, it would allow using local information as well as give the process greater legitimacy. Such surveys could be combined with compensation offers for a random sample of owners, in order to estimate the sensitivity of their acceptance decisions to the offers made. The results of such studies could be used to estimate the compensation offers that need to be made to increase the likelihood that a large majority of the owners would be inclined to accept. Attempts to gather such information could significantly minimise the risks of setting either too high or too low a compensation rate.

One issue we did not discuss here concerns the design of the appropriate form of compensation. Households in our survey exhibited considerable preference in being compensated in alternative ways that incorporate their concern for financial security, time preference and pattern of skills. These concerns exhibited considerable diversity, with a corresponding diversity of preferences over alternative forms of non-cash compensation. Hence, a menu of alternative compensation packages ought to be offered, to cater to this diversity. Creating a more well-informed and flexible way of compensating displaced landowners can go a long way in ensuring fast growth along with an equitable distribution of its benefits.

NOTES

1 This resulted in some oversampling of tenant households. The reason for this is to enable a large enough sample size for tenants to allow statistical inference of effects on such households.

2 These detailed plot-wise records were procured by Atmaran Saraogi using the Right to Information Act.

3 Bardhan et al (2012) find in a land survey for all rural West Bengal villages in 2004 that the most frequent source of irrigation was tube wells, followed by riverlift and ponds, with state canals being the least important.

4 Very similar results were obtained using a probit regression and a linear probability regression.

5 This captures both impatience as well as present bias. The former refers to how the next period is discounted relative to the previous period at any given time period, and the latter refers to degree to which all future periods are discounted with respect to the present.

6 Yet other rationales for overcompensation, such as deleterious effects of insecurity of cultivators on their incentives to improve land quality, have been provided by Ghatak and Mookherjee (2012).

7 See *Anandabazar Patrika*, 20 February 2013 and *The Times of India*, Kolkata edition, 19 February 2013 available at http://www.anandabazar. com/archive/ 1130220/20med1.html and http://articles.timesofindia.indiatimes.com/2013-02-19/kolkata/37178513_1_land-rates-land-acquisition-nandigram-block.

REFERENCES

Bardhan, Pranab, Dilip Mookherjee and Neha Kumar (2012): "State-led or Market-led Green Revolution? Role of Private Irrigation Investment vis-à-vis Local with Government Programs in West Bengal's Farm Productivity Growth", *Journal of Development Economics*, 90, 222-35.

Cao, Guangzhong, Changchun Feng, Ran Tao (2008): "Local Land Finance in China's Urban Expansion: Challenges and Solutions", *China and World Economy*, 16(2), 19-30.

FAO (2009): "Land Grab or Development Opportunity? Agricultural Investment and International Land Deals in Africa", FAO-IED-IFAD Report.

Ghatak, Maitreesh and Parikshit Ghosh (2011): "The Land Acquisition Bill: A Critique and a Proposal", *Economic & Political Weekly*, 8 October, Vol XLVI, No 41.

Ghatak, Maitreesh and Dilip Mookherjee (2012): "Land Acquisition for Industrialisation and Compensation of Displaced Farmers" forthcoming, *Journal of Development Economics*.

Ghosh, Buddhadeb (2012): "What Made the 'Unwilling Farmers' Unwilling? A Note on Singur", *Economic & Political Weekly*, 11 August, XLVII (32), 13-16.