Chapter 9

9.0 To build a model of fair market value computation to pay compensation in a thin land market of India

9.1 Indian context

None of the valuation theories was developed to address the concern of paying just compensation during expropriation of land. State sponsored development projects bring rapid socio-economic changes through collateral investments. This increases livelihood opportunities and resultant population growth. This increases demand for land and its price. In India where 70% of the population lives in villages and depends directly or indirectly on agriculture it is not logical to expect them to be able to migrate to non-agricultural livelihood immediately. To keep their economic and social future fully restored the compensation should be on replacement value. There has not been much work in estimating value of acquired land where socio-economic changes and non-agricultural investments are also factored in. This study makes a small step towards that taking lead from the theoretical premises of the earlier land valuation models, especially the hedonic regression model.

9.2 Literature Review- Land Valuation Models

9.2.1 Extant literature review to identify the most suited valuation model which may be used for land valuation in a thin land market is discussed below.

"The Valuation of a particular interest in land is normally made by reference to its tenure, its use and its income producing capacity" (Scarrett, 1991). Value can be calculated from the sum of benefits that a willing purchaser may get from the ownership of the interest. In actual practice it is assessed not calculated by the purchaser based on his intuitive estimate of the benefit. "Land has value because it gives rise to a stream of future tangible or intangible earnings; those define its exchange value in a functional market. In modern societies the exchange value is usually associated with price, and the exchange is operated through a money transfer. Price is thus a parameter to express the (exchange) value of an object or property, and in this respect it is the generally accepted means to compare values in a market" (Verheye, 2017 (Accessed)) .

Studies reveal the use of either Net Present Value (NPV) model or Hedonic regression model to determine the value of land.

In **NPV model**, the present and discounted future stream of earning from the land is considered to value the land. Ricardian land rent theory can be interpreted as a NPV model. The value can be determined by summing up the discounted value of the rent received minus the cost incurred. This considers only the stream of earning but does not consider the effect of the demand from the competing non-agricultural users of the land.

Hedonic regression model uses Lancster's consumer theory which assumes that every piece of product is a sum of characteristics and the consumer pays for the bundle of characteristics which value them. Thus agricultural land price also can be determined by the sum of its characteristics (Salhofer, The Valuation of Agricultural Land and the Influence of Government Payments, 2011). One of the most critical issues in hedonic pricing model is the choice of the functional form. This can be linear, semi-log or log-log form. Rosen has postulated a non-linear relationship between the price of goods and their attributes. A non-linear price function implies that the implicit price functions are not constant. Since this depends on the specification of the attributes in the quantitative and qualitative form, misspecification of variables may not be avoidable (Chau Kwong Wing, 2003).

The other model is based on **Comparable sales approach** where the market value is defined based on past sales data and adjusting the same with the parametric differences between the comparable plots. Data reliability is an issue here especially when it relates to agricultural land whose transaction data are less. Reliability of the sales data as a true representation of the market value in a rural area is also an issue. This complicates the whole process (Demetrioua, 2016) .

Computer-assisted mass appraisal (CAMA) approach coupled with **GIS** (Geographic Information System) tools has facilitated the estimation of the effect on location on parcel value.

Replacement cost model which considers the cost of the replacement land rather than the cost of the land acquired can be considered for the purpose of fair market value estimation in eminent domain. This may be used in conjunction with the hedonic pricing model which is better suited to estimate the value for the bundle of characteristics that govern the price of the agricultural land. This is more relevant in Indian context where the agricultural land market is thin and yet to mature. Cost of a replacement land is significantly different than the average past sales figures. World Bank uses this model to make the project affected person financially as good as if the land was not taken. This makes the valuation of the replacement land subjective as it depends on owner's loss rather than acquirer's gain. India's rural urban boundaries are fast receding and its impact on agricultural land price is tremendous. All these need to be mapped to get a proper estimate of the price of an expropriated land in a compulsory purchase to ensure just compensation is paid to the land losers. No such work has been done in this direction. Current research aims to fill this gap.

From the earlier discussions, it transpires that the hedonic pricing model when used to objectively quantify the replacement cost can be considered to be most suited approach to estimate the fair market value of agricultural land in eminent domain. In the current research the valuation model is built using linear regression model. The model uses objectively determined seven attributes of land as independent variable and the price change as dependent The seven factors used, has been identified in the factor analysis technique in Chapter 8.

9.3 Building land valuation model which may be used to pay just compensation in a thin land market

Fair market value to pay just compensation in eminent domain considers average of comparable lands sold around the same period when the acquisition has taken place. In an active land markets with large land plots the average of comparable land sales data is considered as fair. But the same is unlikely to be valid in a thin land market with inadequate sale information and smaller plots of India. Because of India's rural demographic pattern the sales are generally not arm's length sale where the sale prices are in many cases not without bias. This requires sales data to be adjusted to make them comparable before averaging to compute fair market value for paying just compensation. Solatium if any remains a policy decision and remains ad hoc. The research proposes to use comparable sales approach where necessary adjustments for time and attribute differences are made to make the sale values comparable with the acquired land. The approach uses the consumer theory of hedonic regression model where the difference is computed from the set of characteristics including time for adjustment in the earlier sale prices. The model aims to build a multilinear relationship for land price change with the statistically significant attributes of qualitative and quantitative characteristics of land. Every land piece is unique and it is more so in a highly fragmented land holding of India. These are generally sold by comparison. During comparison the future use and the neighborhood changes are also considered in deriving the price expectations. With time the land price increases. Study reveals that with high inflation it increases faster. Factor analysis results in Chapter 8 have identified these parameters as attributes to affect the land price change. To build the model it was necessary to get the price for the comparable lands. In India the price recorded in the registered sale deeds are generally under reported. The study recognizes the reality. It is difficult to get any trend of such under reporting. Even Government circle rates suffer from the same deficiencies. In view of this, information was collected from the sale registration office and was cross checked with the sellers in case any abnormality. Apart from the current price the information was also collected from the seller for the earlier sale at which this was last transacted to get the figure for price change per year. When the land was inherited and the past sale price was not directly available, sales price of the adjacent land were used, which the owner had benchmarked to fix her current target price. The location of the plot is available from the revenue survey maps. However, the locational features which had affected the price changes were collected from the seller..

To make the change figures comparable the absolute changes were converted to the percentage of price change per year figures. All the 7 factors derived in the factor analysis in the Chapter 8 are independent variables in the hedonic regression. Proxy indices in numeric values were suitably rationalized for decimals for the convenience of computation. Inflationary changes in CPI between the years were used directly from the government published data. Proxy indices for the location of the plot were calculated using ranking scale of 1 to 5 for distance from the road and/or commercial activities.

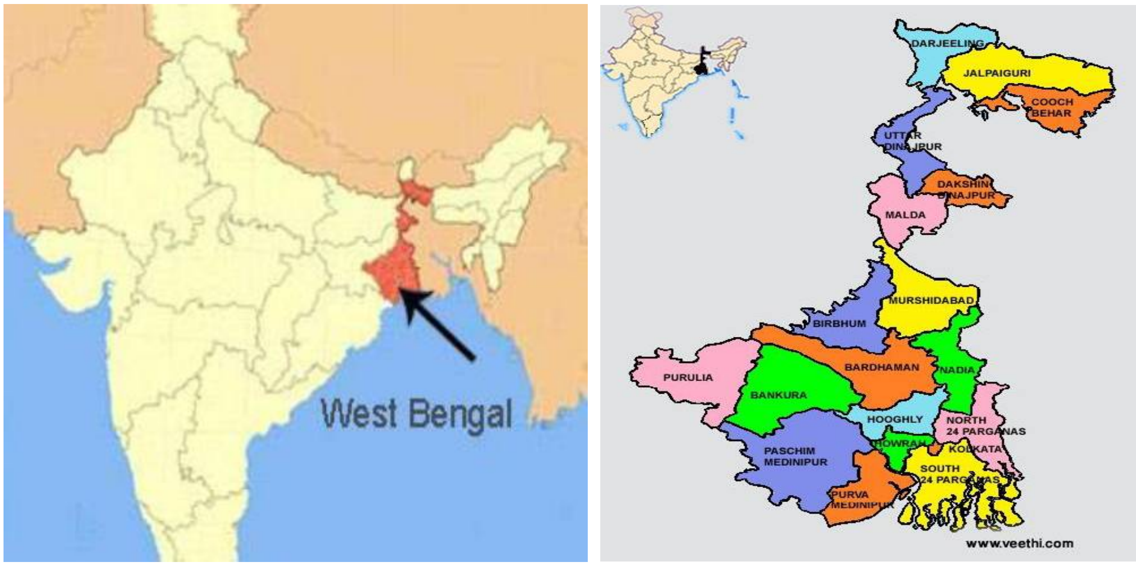
Model building steps are classified into the followings-

1. Data Collection
2. Testing the data suitability for multiple regression in SPSS
3. Testing linearity to build model using multiple linear regression analysis
4. Interpretation of results
5. Building mathematical Model

9.3.1 Data collection

Based on the approach as discussed above, the data was collected from the state of West Bengal in India .The sampling locations in choosing districts and CD Blocks were judgmental to represent various economic segments of India. The objective is to receive a general acceptability of the model which is built using those data. Industrialization in West Bengal could not look up due to various socio-political reasons including the post-independence migration of over 10 million refugees from East Pakistan (now Bangladesh), nearly one third of state's own population. Influx also caused high population density at the rural Bengal, resulting in acute pressure on rural economy. Over time fragmentation of land holding took place reducing its viability as an economic unit. Average size of operational holding for kharif season in India is 1.1 ha as against that in West Bengal of 0.4 ha (Planning Commission.nic.in., 2006).

Figure 9.1: India & West Bengal Map



Source – Google Map

Because of the demographic peculiarity of the state, it has a large number of agriculture labors who do not own land but earn their living directly or indirectly from agriculture. Most of the rural populations do not have the necessary skill of the industry to get readily absorbed. This increases apprehension. In the recent past when the state government went overbearing to acquire lands for industry through eminent domain route, it faced resistance from the land owners and agricultural labors. Confrontation on TATA car factory land is just one of the many such happenings. Major concern remained the compensation and rehabilitation. Smaller plots with fragmented ownerships provide bigger challenge for price negotiations and settlements. Kolkata being the largest commercial hub in the eastern India, there is a continuing pressure to widen the highways and state roads for better communication with the city. Land is being acquired to widen the roads. In some they are being halted for higher compensation.

Table 9.1: Survey Locations

District	CD Blocks	Level of Industrialization/ Prosperity of the CD Block
Paschim Midnapur	Midnapur Kharagpur-1 Kharagpur-II Keshpur	Prosperous/Agribased Prosperous/Industrialized Prosperous/ Industrialized Less Prosperous/Agri-based
Uttar Dinajpur	Itahar	Less Prosperous/Agri-based
Hugli	Singur	Prosperous/Agri-based
Barddhaman	Raina-1	Prosperous/Agri-based
Haora	Uluberia	Prosperous/Industrialized
South Twenty Four Paraganas	Budgbudge Sonarpur Falta Magrahat I	Less Prosperous/Industrialized Prosperous/Agri-based Less Prosperous/ Agri-based Prosperous/Agri-based

Higher agricultural dependencies have aided resistance movements. With population pressure agriculture has been losing continuously to residential and commercial use for land. This has not only increased the price of agricultural land in the peri-urban boundaries for non-agricultural use but also in the deep field for agricultural use. With widening of highways and roads the use of adjoining lands are changing faster. This has made estimation of fair value of acquired land difficult. Paying more through ad hoc increase in solatium cannot address the micro-variations and the discontent. This requires a rational basis to compute fair value of land. To provide for a rational basis, wider economic base was necessary in selecting the districts/ CD Blocks. Based on this perspective districts and CD Blocks were chosen with wider levels of economic prosperity. Some were prosperous with agriculture based economy. Some districts or CD Blocks had a very low income, comparable to any other poor districts/ CD Blocks of India. In some, there were industries, economies were vibrant and some were not.

Table 9.2: Demographic break-up of Survey locations

CD Block-wise Data Break-up		
District	**CD Block**	**Number of Observation**
Paschim Midnapur	Midnapur	4
	Kharagpur-1	42
	Kharagpur-II	9
	Keshpur	4
Uttar Dinajpur	Itahar	63
Hugli	Singur	6
Barddhaman	Raina-II	13
Haora	Uluberia	6
South Twenty Four Paraganas	Budgbudge	6
	Sonarpur	4
	Falta	3
	Magrahat-1	1
Total		161

While choosing the CD Blocks and the Districts attempt was made to keep a fair balance among the economic segments. Benefit of development projects had not been uniform and so also the rise in agricultural land price. The Survey locations and their demographic patterns are given in Table 9.1, 9.2 and 9.3.

Table 9.3 : Survey Locations and Prosperity level

Prosperity level and No. of Observation	
Prosperity level	**No. of Observation**
Prosperous/Agribased	28
Less Prosperous/Agribased	70
Prosperous/Industrialized	57
Less Prosperous/Industrialized	6
Total	161

Villagers who came to register their land were random, as was also the villages of the CD Blocks. Plots were naturally more random in their locations. Some of the sale figures were same as the sale deed figures, in some they were higher. Where ever there were abnormalities (either high or too low) the figures were cross checked for due rationalization for the purpose of the model building.

Factor Indices were prepared based on Census data. Computation methodologies used for each of the indices are shown in the Appendix

9.3.2 Testing the data suitability for multiple regression analysis

The data compiled for multiple regression analysis to build the valuation model needs to meet the following assumptions.

- Dependent variable should be in continuous scale. In the current study we have considered Dependent Variable (DV) as Price change per year measured as % of the base year price.
- .- Independent variable should be either continuous or categorical. There are 7 Independent Variables, out of which one is in Ordinal scale and others are continuous variable.
- There should be independence of observation. Result of the Durbin-Watson test is 1.732. This is less than 2.0 and acceptable.
- There should be linear relation between the dependent and independent variables. This is tested using scatter plots and partial regression plots. This is dealt in separately later in the discussion.
- Data confirms homoscedasticity. This is confirmed in the test for Homoscedasticity Chart.
- Multicollinearity should not be there. The VIF value less than 10 (Myers, 1990) and tolerance more than 0.2 (Menard, 1995) is well accepted results.
- Significant outliers and high leverage points should be absent. Cook's Distance, of 0.862 as maximum (less than 1.0) (Weisberg, 1980),confirms the compliance.
- Residuals (errors) should be approximately normally distributed. Tested and confirmed..

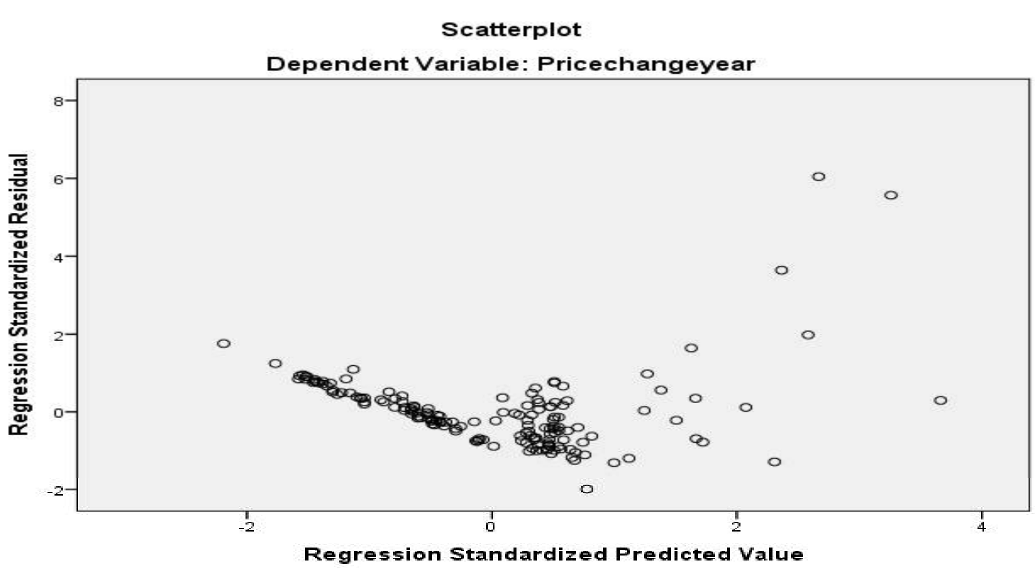
9.4 Testing linearity for multiple linear regression analysis

Linear Regression analysis is carried out with 161 field data to build a suitable model of multilinear relationship between the dependent and the independent variables. Linearity is tested for (a) the differences in dependent variable with the independent variables individually and collectively. In hedonic regression Rosen has assumed to have non-linear relationship between property values and its characteristics. But here in this study the dependent variable is the difference and not the absolute values. The difference, increase or decrease has been assumed to be linear with the change in the values of the independent variables, even if the relationships with the absolute values are nonlinear. The Linearity and Homoscedasticity were tested and found present. This is tested using scatter plots and partial regression plots as given below-

9.4.1 Test of Homoscedasticity

Scatterplot of Residual vs. Predicted value of the Dependent Variable (DV) (Price Change per year).

Chart 9.1: Test of Homoscedasticity



Charts- Linearity Diagnostic: To test each of the IV (Independent Variable) to be linearly related to DV (Dependent Variable), Partial Regression Plots are used to test the linearity. In this two sets of residuals are plotted. Mathematically it plots $Y_{.[i]}$ versus $X_{i.[i]}$

Where,

> $Y_{.[i]}$ is the residuals from regressing the dependent variable, Price change per year (Y) against all the independent variables excepting the Time difference, X_i .
>
> On the other hand
>
> $X_{i.[i]}$ represents the residuals from the regressing Time difference, X_i against all the other independent variables.

The simple correlation between the two sets of residuals when plotted becomes equal to the partial correlation between the dependent variable and the independent variable $X_{i.}$ Thus partial regression plots will show the correct strength of the linear relationship between the dependent variable and the independent variable $X_{i..}$ Other independent variables were also plotted to test the linearity.

9.4.2 Test of Linearity

Chart 9.2: Dependent Variable (DV) – Price Change/year vs. Time Difference (IV)

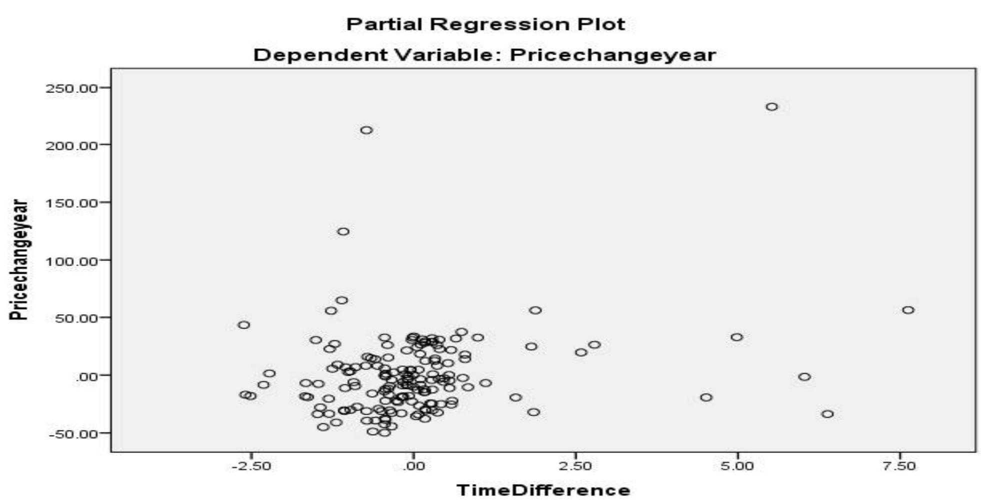


Chart 9.3: Depenedent Variable (DV) –Price Change per Year vs. Local Affluence (IV)

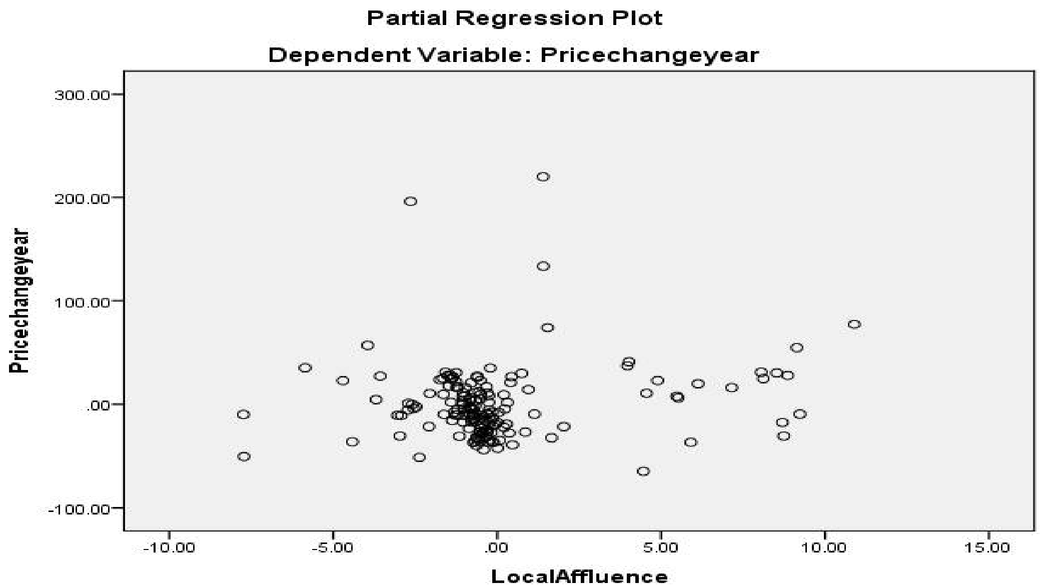


Chart 9.4: Dependent Variable (DV) – Price Change per Year vs. Investment in Non-agricultural sector (IV)

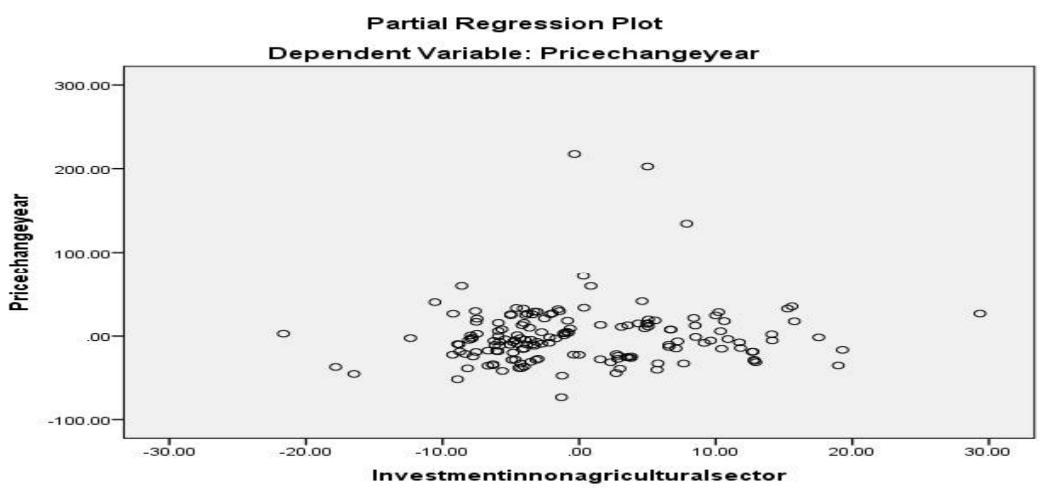


Chart 9.5: Dependent Variable (DV) – Price Change per Year vs. Plot Location (IV)

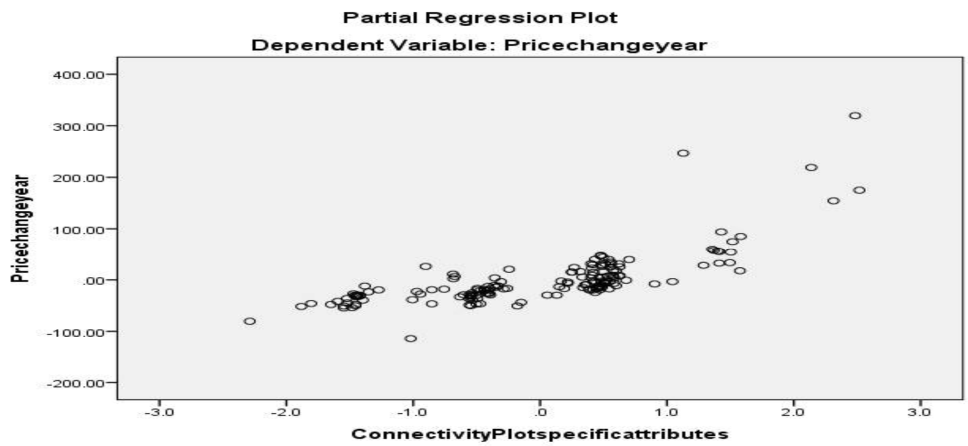


Chart 9.6: Dependent Variable (DV) – Price Change per Year vs. Alternative Use of Agricultural Land (IV)

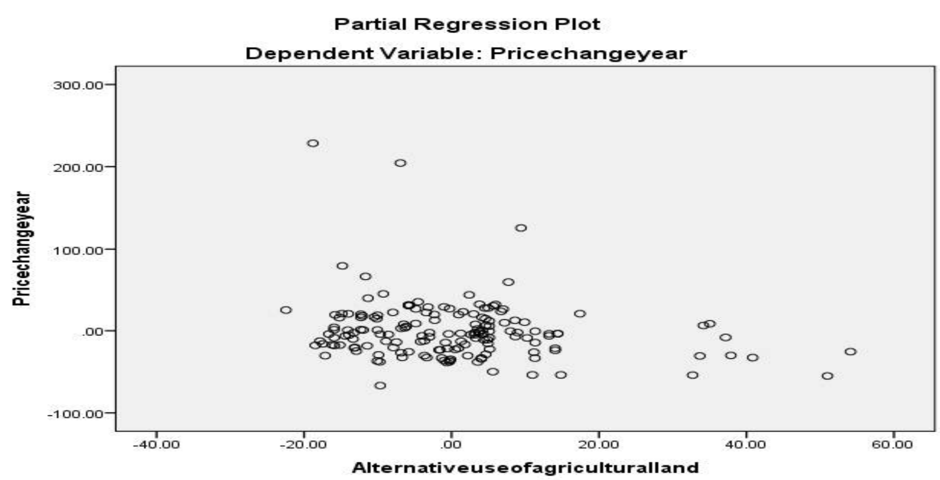


Chart 9.7: Dependent Variable (DV) – Price Change per Year vs. Population Growth (IV)

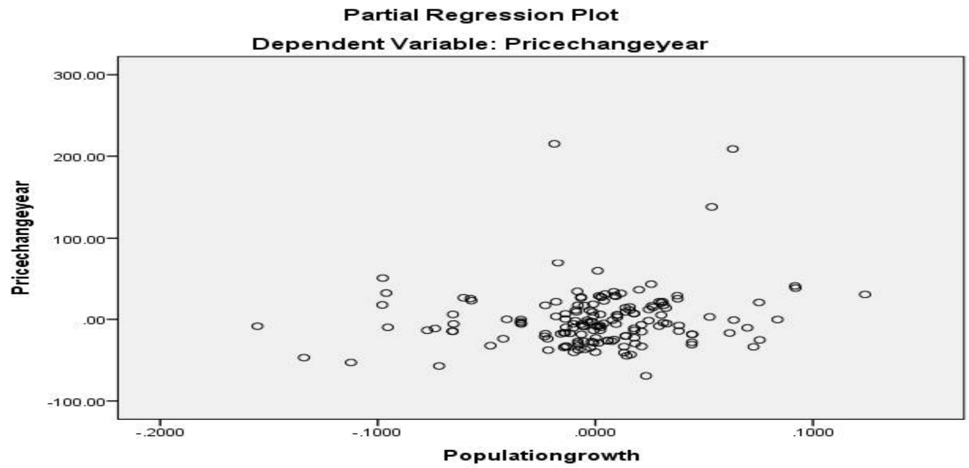
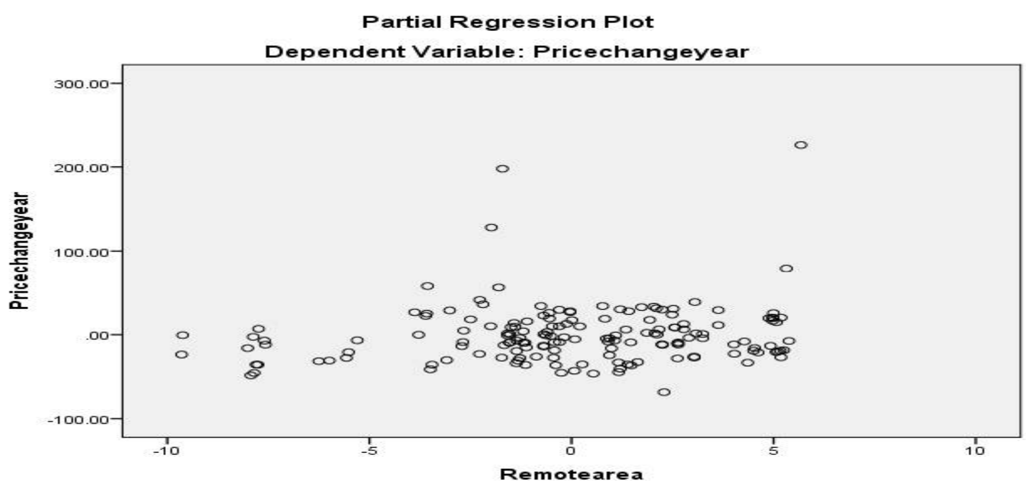


Chart 9.8: Dependent Variable (DV) – Price Change per Year vs. Remote Area (IV)



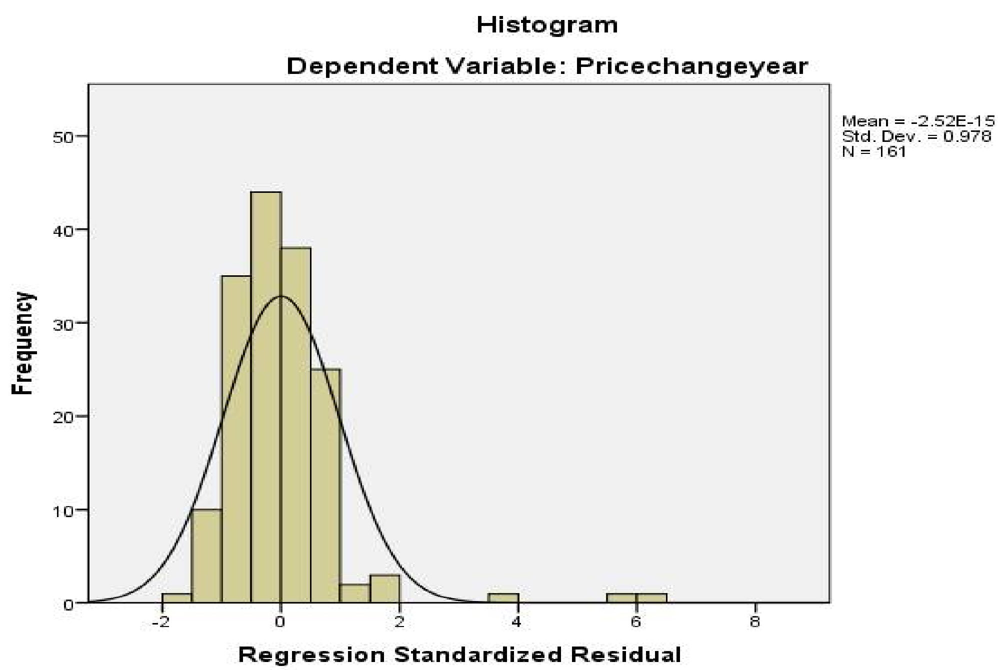
Results of all the Partial Regression Plots above between the Dependent Variable and the Independent Variables are linear. This confirms the linearity in the relationships.

This Chart below also confirms the normally distributed error in the Histogram below where the Regression Standardized Residuals show a normal distribution and the Observed Cum Probability of the Price change per year when plotted against the Expected Cum Probability follows generally the diagonal line.

9.4.3 Test of normality of error

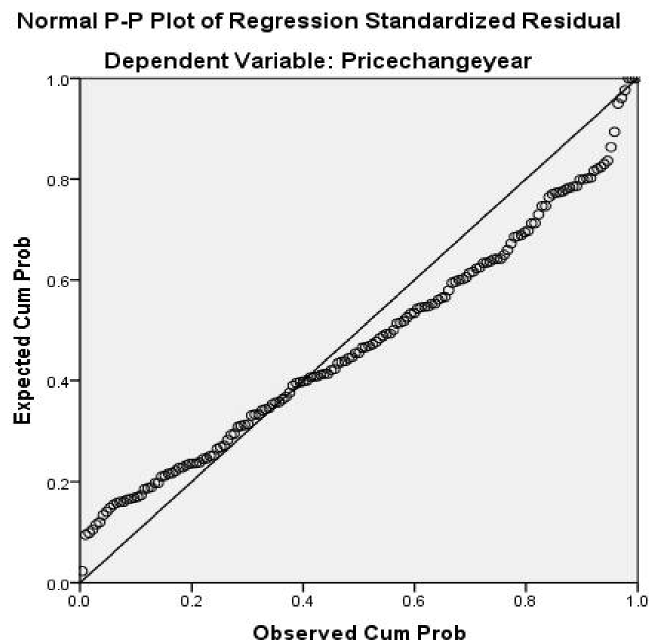
The assumption that the sample data are drawn from normally-distributed population is confirmed by visual inspection of the histogram of the same data and is given below. Here is a histogram of the residuals which look close to normal confirming normality of error.

Chart 9.9: Normal PP Plot :



To check for normality of residuals with a normal P-P plot, Expected Cum. Probability is plotted against Observed Cum. Probability which shows that the points generally follow the normal (diagonal) line with no strong deviations. This confirms that the residuals are normally distributed.

Chart 9.10: Normality of Error



9.5 Interpretation of Results of the Analysis

Results of Multiple Linear Regression are given below

Table 9.4 Descriptive Statistics

	Mean	Std. Deviation	N
Price change per year	*43.1040*	*56.93498*	*161*
Time Difference	*2.0353*	*1.65476*	*161*
Local Affluence	*2.1017*	*3.38096*	*161*
Investment in non-agricultural sector	*31.2809*	*16.34353*	*161*
Plot Location	*2.478*	*.9880*	*161*
Alternative use of agricultural land	*17.6849*	*14.12330*	*161*
Population growth	*1.121354*	*.0850595*	*161*
Remote area	*27.89*	*3.838*	*161*

Table 9.5: Model Summary[b]											
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.786[a]	.618	.600	35.99146	.618	35.341	7	153	.000	1.736

a. Predictors: (Constant), Remote area, Plot Location, Population growth, Alternative use of agricultural land, Local Affluence, Time Difference, Investment in non-agricultural sector

b. Dependent Variable: Price change per year

The correlation between the observed and the predicted values measured in the R value (0.786). R^2 (0.618) and the "adjusted R^2" (0.60) are acceptable. The value of "adjusted R^2" of 0.600 is very close to the value of R^2.The difference is 0.018 which is 2.9%. This shrinkage accounts for approximately 2.9% less variance in the outcome for the use of sample instead of population.

The F-test (value 35.341) is highly significant, thus we can assume that the model explains a significant amount of the variance of the dependent variable, which is Price change per year.

Table 9.6: ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	320460.773	7	45780.110	35.341	.000[b]
	Residual	198193.921	153	1295.385		
	Total	518654.693	160			

a. Dependent Variable: Price change per year
b. Predictors: (Constant), Remote area, Plot Location, Population growth, Alternative use of agricultural land, Local Affluence, Time Difference, Investment in non-agricultural sector

Table 9.7: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-269.065	84.471		-3.185	.002	-435.946	-102.184					
	Time Difference	5.992	1.973	.174	3.037	.003	2.094	9.889	.265	.238	.152	.760	1.316
	Local Affluence	1.656	.958	.098	1.729	.086	-.236	3.547	-.045	.138	.086	.772	1.295
	Investment in non-agricultural sector	.438	.363	.126	1.208	.229	-.279	1.155	.039	.097	.060	.230	4.346
	Plot location	41.182	3.073	.715	13.400	.000	35.110	47.253	.747	.735	.670	.878	1.139
	Alternative use of agricultural land	-.569	.215	-.141	-2.643	.009	-.995	-.144	-.062	-.209	-.132	.875	1.143
	Population growth	132.962	69.938	.199	1.901	.059	-5.208	271.131	.105	.152	.095	.229	4.371
	Remote area	1.495	.824	.101	1.814	.072	-.133	3.122	.081	.145	.091	.810	1.235

In the above Coefficient table B, there are both positive and negative values indicating positive and negative correlations. The Beta value is associated with a Standard error indicating the variations. B values have different units and are not comparable with each other. The standardized β (Beta) values are measured in standard deviations to make all the figures comparable to find their impacts in the model . The results indicate that apart from Investment in non-agricultural sector, all other variables (factors) have significant correlation with the Price change per year. Though VIF and the tolerance values indicating multicollinearity are well within the acceptable range, there is some correlation between the Investment in non-agricultural sector and Remote area is indicative of higher correlation among them. In the Residual statistics, as discussed earlier the Cook's Distance less than 1.00 is acceptable

Table 9.8: Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-54.9503	207.0328	43.1040	44.75355	161
Std. Predicted Value	-2.191	3.663	.000	1.000	161
Standard Error of Predicted Value	4.398	18.841	7.516	2.816	161
Adjusted Predicted Value	-61.7978	203.0263	42.8054	44.36671	161
Residual	-71.92339	217.52238	.00000	35.19534	161
Std. Residual	-1.998	6.044	.000	.978	161
Stud. Residual	-2.217	6.309	.004	1.026	161
Deleted Residual	-88.51599	237.92378	.29851	38.77411	161
Stud. Deleted Residual	-2.246	7.310	.017	1.104	161
Mahal. Distance	1.395	42.850	6.957	6.613	161
Cook's Distance	.000	.862	.014	.078	161
Centered Leverage Value	.009	.268	.043	.041	161

a. Dependent Variable: Price change per year

9.6 Building mathematical Model

Mathematical model for the valuation of land by comparison was built up using Unstandardized B Coefficients in a linear regression as is given below

$$Y = B_0 + B_1 * X_1 + B2 * X2 + \ldots + B_n * X_n$$

Where B_0 is the intercept and $B_1 \ldots B_n$ are the coefficient of all the variables.

Regression Equation:

Land price change is given by

Price change per year as percentage, Y = -269.06 + 5.992 Time difference + 1.656 Local Area Affluence + 0.438 Investment in non-agriculture sector + 41.182 Plot location attribute + (- 0.569) Alternative use of agricultural land + 132.962 Population growth + 1.495 Locational Remoteness

This may be written in an equation form as

Price change per year as percentage,

Y = -269.06 + 5.992 TD + 1.656 LA + 0.438 INV + 41.182 PL + (- 0.569) ALT + 132.962 PG + 1.495 LR

NB- Data source- Census 2011, excepting Inflation % is based on published CPI and Plot specific attributes on actual location graded in 1 to 5 scale.

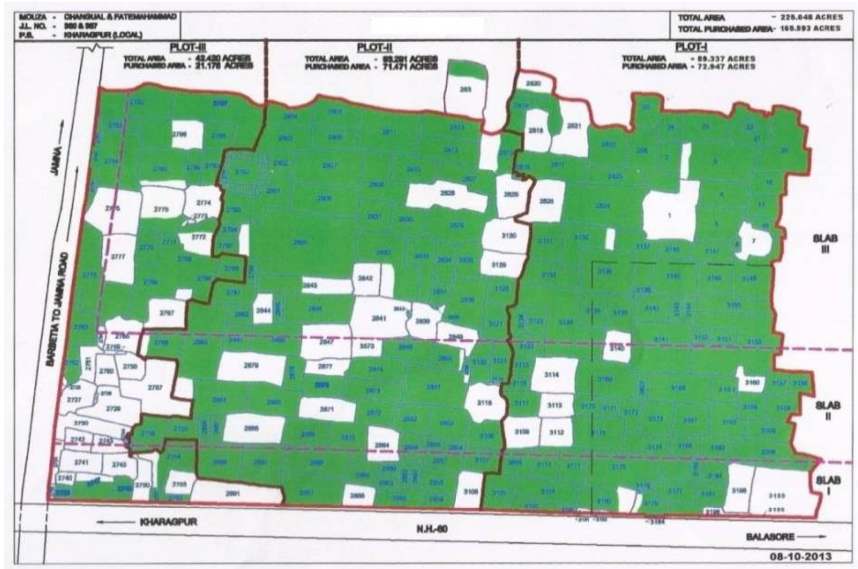
This may be used to get the replacement cost of a land plot based on the comparable sales figure of an earlier sale value to pay just compensation.

9.7 Quantitative and qualitative validation of the model to test its applicability in Indian context.

9.7.1 Validation Test- Quantitative

Model thus developed was tested for quantitative validation based on the success of direct purchase at mutually agreed price and the hold out the company face in their well-planned initiative to purchase 205 acres of land for their new factory in a village near Kolkata, West Bengal. Company went for one to one negotiation initially through local agents and then finally involved local people representative and opinion makers for collective negotiations. To make the deal workable, the company split the total land into 3 price zones, which was generally accepted, barring a few land owners in some pocket area. Number of incumbents involved in the negotiation was more than 2000; some were very active, some not. Generally the children were more enthusiastic in getting the deal settled with a hope of getting employment. Land was spread along the National Highway with about 1.2 Km frontage and 0.7 Km depth.

Figure 9.2: Land for Direct Purchase –Case study



The land plot is located within the Kharagpur-I CD Block. The plot and its location is given above.

Table 9.9: Hold out Plots

Hold out land in Zone 0			
Plot No.	Area(acres)	Plot No.	Area(acres)
2725	0.13	2750	0.77
2727	0.67	2753	0.5
2728	0.03	2754	0.5
2729	1.21	2757	1.92
2730	0.86	2758	0.59
2734	0.14	2759	0.05
2735	0.21	2760	0.54
2736	0.21	2761	0.22
2739	0.09	2764	0.13
2740	0.09	2765	0.88
2741	0.08	2767	0.12
2742	0.47	2768	0.39
2743	0.44	2776	1.63
2745	0.035	2777	1.28
2747	0.36		
		Total area	14.545

There is a state highway on another side of the planned plot. Out of 205 acres of land 40 acres of land was hold out. Interestingly out of the 40 acres, more than 14.545 acres are held up in a square area of 500mX 200m i.e. from within about 24.7 acres. This may be of interest to note that most of the hold out lands was from near the corner of the two roads (National Highway and State Highway). The model was used to test this behavior of the land owners.

Further analysis reveals that the hold out percentage in the corner area of 500meter by 200 meter is about 60%, where as in the rest of the targeted land it is about14%. The land plot was divided into 4 zones and the current market value was estimated based on the average past sales price data and adjusted for the varying attributes for the different zones.

For the valuation purpose using the model, Zone 0 was considered as Corner Plots, Zone I was lands adjacent to National Highways. Zone II was beyond 2nd plot or 50 meters away, up to 150 meters. Lands adjacent to State roads were also considered in the Zone II. Land plots further away from the roads were considered in Zone III. In the negotiations Zone 0 was not recognized and there were only 3 price zones, starting from Zone I to Zone III.

When the model was applied on different zones for valuation it showed the following results-.

<u>Zone 0-Corner Plots</u>

Price computation is shown below

Y1= *-269.06 + 5.992 x1.89 + 1.656 x0.6421 + 0.438x21.03 + 41.182 x5 + (- 0.569) 13.23 + 132.962 x1.1335 + 1.495x19* = 130.02%. With base figure of 1.2 Lakhs in 2005, the computed value works out to be 1.2* 1.30* 8 + 1.2 =12.48+ 1.2Lakh= 13.68Lakhs

Offered price in the negotiation 11.1 Lakhs

Zone I pricing

Price computation is shown below

Y1= *-269.06 + 5.992 x1.89 + 1.656 x0.6421 + 0.438x21.03 + 41.182 x4 + (- 0.569) 13.23 + 132.962 x1.1335 + 1.495x19* = 88.84% With base figure of 1.2 Lakhs in 2005, the computed value works out to be 1.2* .89* 8 + 1.2 =8.54+1.2 Lakh = 9.74 Lakhs.

Negotiated amount was 11.1Lakhs.

11.1 L was paid for the Zone I and used as reference for other plots further away from the National Highway.

Zone II pricing

Price computation is shown below

Y2= *-269.06 + 5.992 x1.89 + 1.656 x0.6421 + 0.438x21.03 + 41.182 x3 + (- 0.569) 13.23 + 132.962 x1.1335 + 1.495x19* = 47.66% per year, equivalent value will be 1.2*47.66%*8 1.2=5.81 L

For Plots beyond 50 meters and up to 150 meters from the Highway and/or adjacent to State road the price offered was 9.1 lakhs.

Zone III pricing

Price computation is shown below

Y3= *-269.06 + 5.992 x1.89 + 1.656 x0.6421 + 0.438x21.03 + 41.182 x2 + (- 0.569) 13.23 + 132.962 x1.1335 + 1.495x19* = 6.48% per year, equivalent value will be 1.2*6.48*8 +1.2= 0.62+1.2= 1.82Lakhs

For plots beyond 150 meters from the Motorable road and/or Market place, the equivalent price works out to be 1.82 Lakhs based on the Model.

Offered price is 7.1 Lakh

Comments:-

Most disputed lands are near the State metal roads and near the crossing of the National Highway and State road.

As per our model Corner plots intersecting National Highways with another motorable road is priced higher.. State Highways/roads are motorable roads and agricultural land adjacent to the state roads need to be priced at par with the land adjacent to National Highways for pricing in land acquisition.

Most disputes were recorded in the Corner plots where the calculated price (13.68L) based on the model shows higher value than the offered price of 11.1 Lakhs. Least disputes were recorded in the zones away from the roads or National highways, where offered prices were more than the computed price based on model. This confirms the validity of the model as a logical base to compute current land price.

Calculated value of Zone III is significantly low. In the calculation gravitational pull of National highway was considered which influenced the land price in Zone III. But the lands further away, were closer to a village on the other side. This also had to be considered.

The above findings corroborate the model which can indicate the logical price of the agriculture land based on its known earlier transaction price along with the plot location and socio-economic considerations.

9.7.2 Validation Test- Qualitative

The model was then tested for its qualitative validity. Six eminent/ subject matter experts were interviewed. Their opinions were audio taped, memoing and coding were carried out to test the validity of the process and the results achieved. During interactions the applicability of the attribute base land valuation in government acquisition of agricultural lands was reviewed. The considered opinion

Figure 9.3: Results of Qualitative Survey

Which emerged from deliberations indicate that there was a need to review LARR 2013 to make it rational so that the land giver can correlate the compensation amount with her reserved price better. There was a general unanimity that an attribute based compensation model was a better option of paying compensation. In fact this can work better not only with the evictee but also with the government and industry who have to bear the cost. However, there was some concern on one valuation model for India. India might be considered as a country of 30 different nations with as many social customs and value base. The priorities would be different. The land wsa more than an economic entity to many societies. Making one model for all might not be feasible. There was a need to relook at the valuation model from this angle. However, this could be a matter of future challenge. Again plot specific compensation might be too complex from the operational perspective. The recommendation by the experts was to build price bands for different zones of agricultural field rather than for each plot separately. This would reduce micro-level disputes and would be easier to implement.