Executive Summary

Nothing else has caused greater conflicts among humans than land, which is a product of geologic and geomorphic processes. Land being the primary resource for producing food, the principles relating to its ownership and *usufruct* rights have always drawn attention of the thinkers of all ages. Manu in India or Aristotle in early Greek civilization documented rules on ownership and management of land. In the Egyptian and Sumerian history or in that of the Inca civilization, land related principles abound. In spite of varying degrees of ownership rights on land, the sovereign's right to expropriate land for a greater need of the society (in some cases for the king during the early days) has always been accepted. But in spite of this, expropriation of land always posed many challenges. Conflicts were endemic. Even in today's world the conflicts continue, the norm and forms of acquisition differ between the developed world and the under developed countries but in all cases it is the land losers who are up in arms against the state when it tries to expropriate. Contemporary world irrespective of their political beliefs follow the guidelines as laid down in the legal treatise of *De Jure Belli et Pacis* written by the Dutch jurist Hugo Grotius in 1625. He enunciated the principle of *dominium eminens* (Latin for supreme lordship). He argued that the sovereign power of the state to acquire property for public utility was subjected to making good the loss to those who lost their property. In principle this should put the owner in the same "pecuniary" position, had the land being not taken from her through eminent domain. But what was the right value to make good of the loss incurred remained unresolved. Epstein argued that the amount of compensation should be in consonance with the degree of public interest to make it just. In cases there were lower public interest, the compensation should be higher. (Epstein R. A., 1985). He also brought the tax payer's perspective in the 'takings' when he said that the money raised to finance compensation was a 'taking' from the taxpayers, who received compensation 'in kind' in the form of benefits from the public project. This necessitated the need to balance the compensation to land losers with the loss incurred by payment of higher taxes (Ibid, Ch.18). Subjectivity in determining the amount of compensation to be paid becomes unavoidable as the compensation should at least match the owner's loss rather than the *condemner*'s gain and it is all but natural that different owners put different value tags to the same property depending on their perceived benefits. Based on the owner's loss the market value becomes indeterminant. Absence of any well-defined methodology in the determination of "market value" which is "fair" for paying compensation has

made it often a political process rather than a rational one and varying depending on the bargaining power of the evictee

Real property like land is unique in nature. Its value varies depending on its use and can have unique value to its present owner. As the owner's loss is the focus, it may not be equal to its cost. The value often varies depending on the subjective factors. However, for paying just compensation fair market value of the property is generally perceived as "just". Defining what constitutes fair market value has remained ambiguous. However, judiciaries and assessors bodies across the world have accepted this as what a willing buyer will agree to pay to a willing seller when none of them is in a compulsion to buy or sell. But people had to know the value ever since there was need to exchange goods. It is an ancient art. Valuation, techniques might be abridged and empiric (Stewart, Land Valuation in Germany- Discussion, 1937). Thus there was understanding of the factors that made land prices dynamic. It was understood that the sum and combination of these factors contributed to the determination of the final price. The factors might have been many and their relative weights varied but the social understanding of their value existed even in the ancient times. But those were free sales. But in eminent domain there is no real "market". It's a sale between a willing buyer and an unwilling seller. In such situation valuation cannot be developed using any perfect valuation techniques (Thomas W.Merrill, 2002.).

There are three classical approaches to estimate the property value in Eminent Domain, which includes Comparable sales approach, Income capitalization approach, and the Cost approach. The cost approach is hardly applicable in assessing fair market value in agricultural land. Capitalization approach uses discounted net future incomes for computations. But getting a reliable income and expenditure data for agriculture output is difficult. Same produce fetches different price at different times of the year and it depends on the farmer's ability to hoard and reap the benefit. Similarly it is difficult to get a reliable figure for the family labor to quantify the cost. Comparable sale approach is the most popularly used method to value agricultural land. This assumes the subject property (land) to be similar to some other properties which have been sold in the neighborhood. As an objective working rule the averaging is done to estimate the fair market value of the acquired land. However, the approach demands adjustments for location, size, time, zoning, marketing factors, view and other factors that a buyer would consider

relevant. In comparable sales, the computed value after adjustment will indicate the fair value (Rikon, 2017). In spite of its popularity, success depends on the availability of adequate comparable sales data, which may be used for statistically acceptable averaging and to develop grid matrix for adjustment, which may be used in estimating the fair market value of the acquired land.

Land markets of the western world are active. Prices are concluded when equilibrium is reached between the sell offers and that of the buyers. The sale is at arm's length, where only price governs. In arm's length sale the outcomes are not dependent on the relationship between two transacting parties. But India's agricultural market is not an active market. It is rather thin. In a thin market, there are not enough participants. Buy and sell offers are also not enough. This makes the prices more volatile and assets less liquid. In addition the buyers and sellers are rural and mostly local. They are generally from the same village or nearby locality with many common interests. Their numbers are also limited. This makes arm's length sale almost rare and reported price are not representative. Further, agricultural land market has not yet matured. Because of this when land is acquired for development projects there are sharp rise in the prices of land in anticipation of use change to non-agricultural. This brings another new dimension in estimating the price of the acquired land. There are variations in the prosperity among the rural population in India; it not only varies from region to region but also within the same region based on the local area communication and market access. This makes benefit of development to vary and so also its impact on the adjacent land prices. Local area prosperity also affects rural migration and pressure on land. This becomes an important variable to decide the demand for land and so also its price. . Land losers' perspective of eminent domain and the benefit of development in India are different from advanced countries of the West. It is not logical to assume that all land losers will have the ability to migrate to non-agricultural sectors. In such a situation land losers should be free to choose their livelihood in a post-acquisition scenario and should have the option to continue in agriculture around the same place. One of the most important guiding principles in eminent domain is that the land loser shall not be pecuniary loser due to acquisition. Hence compensation should be sufficient to buy an equivalent replacement land in the same locality. This recognizes the need to map the development induced price changes in addition to estimating the price in a thin land market. The above discussions highlight the inadequacies of averaging past sales data without adjusting for those attributes.

This brings in two very basic research questions

1. Which are the factors that determine the price of agricultural land in free market sale?
2. What will be the suggestive model of fair market value to pay just compensation which is suitable in a thin land market scenario of India?

And sets the following research objectives

Objective 1

To identify factors which determine the agricultural land price in a free market sale.

Objective 2:

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

Valuation of agricultural land has been done for ages and it is market driven. But it evolves out of valuing the attributes of the assets individually and in combinations. Land, as any other asset is also valued by its attributes. However, the relative importance of these attributes change over time as the social and economic priorities also change. Current research focuses on identification of the attributes which are significant in making the land price to change and building a land valuation model. Research treatment is both quantitative and qualitative. Data used are both primary and secondary. To identify factors which determine land prices in India literature review was carried out to identify variables which were to be considered to build models for land valuation. Such modelling studies have so far been mostly carried out in the western world. The variables chosen have been specific to their context. These cannot be replicated directly in the Indian context. Hence, focus group survey was carried out among the subject matter experts to identify variables that could be considered as significant in the Indian context to affect agricultural land price. Both the list of variables emerging from these two sources was reviewed to choose a final list of 31 variables to suit the Indian condition. There was a need to identify the principal components among those variables which could account for most of the variations in land price between the acquired land and the comparable lands sold. Pan-India primary sample survey was carried out based on a sample questionnaire where each of the 31 variables was ranked in a Likert scale of 1 to 5. Sampling locations were judgmental with an eye on getting representative view of target respondent's perception of the significance of the 31 variables in

India's agricultural land pricing. The survey aimed at identifying the latent variables from among the 31 variables using factor analysis.

Factors were identified along with their loadings using Principal Component analysis tool. In selecting the number of factors, Kaiser criterion of selecting the number of factors whose eigenvalues were greater than 1.000 was not followed since the average Communality was just about 0.60. Scree plot was also considered. There were two elbows in the Scree plot and the second elbow with 7 factors was chosen for model building. The factor where the loading had been the highest was chosen as the principal component factor. The seven factors that were identified could well define the 31 variables. The factors were then used for building land valuation model to test its suitability to compute fair market value for paying compensation during expropriation. This requires proxy indices to be developed for each of the factors which could be used to build a mathematical model. The parameters which could measure the factors for building numerical proxy indices of each of the factors were identified. The parameters were from secondary data source identified from the Census data and could be logically converted into numerical indices based on the Census inputs. The 7 factors are given below.

Factor Analysis Results

Sl. No.	Factors Identified
1	**Locational Remoteness of the village**
2	**Local Area Affluence**
3	**Investment in Non-agricultural Sector**
4	**Plot Location**
5	**Non-agricultural use of agricultural land**
6	**Population Growth**
7	**Time Difference**

The data and the results were tested for sampling adequacy. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.856 and was significant. Bartlett's test of Sphericity was 0.000 and was rejected.

Parameters used for each of the factor to build the proxy indices are discussed below.

In **Remoteness of Village location** Bus service, Railway station, Auto/ Modified Auto, Taxis and Vans, Tractors, Cycle rikshaw, Carts driven by animals, Sea/ River Ferry service, Private Courier facilities, Common Service center- Internet were considered as parameters defining remoteness. In the Census 2011 the availability of the services were quantified in terms of Yes- as available within the village, a- Within the 5 Km radius of the village, b- Within 5-10 Km of the village and c- Beyond 10 Km from the village. The same was converted in numerical index of 5 as Yes, 4 as a, 3 as b and 2 as c. **Local Affluence** was measured in percentage of population using different amenities, which included education, medical facilities, drinking water, post office, telephone, transport communication, banks, agricultural credit societies, and approach by pucca road and availability of power supply. The proxy index was built as percentage of population using all the amenities. **Investment in non-agricultural sector** was measured as percentage of population engaged in other jobs in the CD Block from Census data. **Plot specific connectivity** was a measure of the location of the land plot and was measured using the following indices of the proximity. National/State Highway corner plots and Market adjacent -5, National and State/ Municipal Road adjacent -4, Subsequent Plot or beyond 50 meters-3, beyond 150meters 2, and distant fallow land is taken as 1.**Alternative use of agricultural land** was measured as a ratio of area under non-agricultural use to total area of the village (X100). **Population growth** was measured as decadal growth in rural population in the CD Block and **Time Difference** was measured in **y**ear –on- year Inflation rate in percentage.

The qualitative measures of the parameters in the census were thus converted into numerical proxy indices for each of the attributes so that a mathematical model for land valuation could be developed using the indices. In a comparative sales approach the differences in the attributes determined the differences in the price between two assets. The logic was extended to determine the price of the acquired land from the comparable lands sold and their differences in the attributes. The model developed used the difference in the land price as dependent variable and the numerical indices of the 7 identified factors as independent variable. The data used for land price change was sourced from the sale records of the land registration office. The survey was carried out in different districts of West Bengal. Actual sales data and the corresponding indices of the independent variables were judgmental. It was collected from the CD Blocks of different

districts of West Bengal, keeping balance between prosperous and less prosperous villages and also between rurality and industrialization. Linear Regression analysis was carried with 161 field data to build a suitable model of multilinear relationship between the dependent and the independent variables. Linearity was tested between the dependent variable (change in price) with the independent variables (factors) individually and in combination. The collinearity and homoscedasticity were tested and found present. Regression correlation was also strong. Adjusted R^2 value was 0.6. Test of significance showed that 6 out of 7 factors were significant (less than 5% or around).

The linear regression model developed from the regression analysis is given below.

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

Where, **TD-** is Time Difference

LA- is Local Area Affluence

INV- is Investment in non-agricultural sector

PL- is Plot Location

ALT- is Alternative use of Agricultural land

PG- is Population Growth

LR- is Locational Remoteness of the Village

The results of the regression analysis thus obtained, were taken for both quantitative and qualitative validation. For quantitative validation the model was tested in a direct purchase of 225 acres of land involving more than 20,000 land owners for a new industry in the state of West Bengal. The location was close to newly widened national highway. Responses of the land owners in the price offered in the direct purchase were generally positive excepting in a few pockets of hold outs. The model was used to explain the hold outs in an otherwise successful direct purchase project. The research assumed price as the only significant factor determining the land owner's response. With this assumption hold outs were reviewed based on the offered price

vs. calculated value of those plots. The results showed that the hold outs were significantly higher in those pockets of land assembly where the offered price was less than the model based calculated value and the success rate was significantly higher where it was otherwise. This confirmed the model based estimation of fair market value as "just" in the eyes of the land owners. Apart from the quantitative validation, the approach of compensating the land losers based on attribute based fair market value estimation in India was taken up for qualitative validation through a focused group survey. The survey was carried out with six subject matter experts including an industrialist, an evictee, a manager involved in direct purchase of land for an industry, a government official, an academician and a journalist. The consensus view was positive. They are generally in agreement that attribute based computed value would be more acceptable, since the offered price would be closer to the perceived value. However, there was some concern about the feasibility of one India-one formula model for valuation, since the perceived values of land both from economic and social perspectives were different from state to state. The view was to take up this at a later stage and could be viewed as a matter of future study. There was a recommendation which evolved during the focus group survey to build price bands for different zones of agricultural fields rather than for each plot separately. This would be useful in acquisitions where large land areas were required. This would reduce micro-level disputes and would be easier to implement. However, the concept of attribute based computed fair market value would remain as approach.

The results of the current research have number of contributions in the theoretical domain of the land valuation approach. This is discussed herein after, in no particular order. The research has identified the differences that exist in computing fair market value of land in a thin land market compared to thick market. Not much of work has been done so far to map the differences in approach in valuing agricultural land between the two markets. Instead, valuation of agricultural land in India uses the computation methodology of thick market. Thick markets use comparable sales approach and simple average. It is assumed there that micro-variations can be ignored as they get averaged within due to large plot sizes. But in a thin market number of transactions is less. Plot sizes are small and their prices vary depending on their attributes. Lack of adequate data reduces the statistical significance of straight averages. This makes direct use of comparable sales approach inappropriate to use in thin market. Some literatures have recommended the use of income capitalization approach. But the non-availability of reliable income and expenditure

information in agriculture production and sale in India makes the computed value from income capitalization approach unreliable. The research has identified these gaps and has used comparative sales approach with necessary rigor for the model building in Indian condition. The research has further identified the gap in the land valuation models where the valuations were developed using localized parameters and inductive. The current study had used a unique approach to make the model broad based and applicable in the thin market of India. To meet this objective an initial list of important variables through literature review and focus group survey was made. Based on the above study the number of significant variables was found. The research then used principal component analysis to extract latent variables that could be used as factors to build land valuation model in a thin market. The objective was to build a model for agricultural land based on the manageable number of significant characteristics, which would be applicable in a pan Indian perspective. The above was a unique approach to make the model broad based. The other contribution of the current research was to value the acquired land by comparison to make the computational methodology in sync with the legislative guidelines of paying just compensation based on comparable land sales. Developing proxy indices for different attributes based on Census 2011 data made the basis of computation unique and less controversial. The approach to use "changes in the socio-economic conditions" as one of the attributes of land was also new in its concept, as socio-economic changes were not one of the typical characteristics of land, which were used to build land valuation models. But in eminent domain, land acquired for development projects in a developing country like India had multiple socio-economic impacts affecting land price to change. Using them as an attribute of land was a unique departure from the generally used approach in Hedonic pricing. The concept might be extended in its use in other Hedonic demand theory applications and might be considered as a new dimension in this widely used concept.

In the conclusion it is argued that land prices vary based on their qualitative and quantitative attributes. In large plots there is a higher probability of many of the attributes getting averaged within. But in India the plot sizes are small and the prices vary depending on their individual attributes. Hence averaging should be done only after adjusting the sales figures for the differences in the attributes and not a straight average of the local sales. The impact of development projects as measured through the local area developments is also needed to be factored in. This will make computed value closer to that of a comparable land, which the owner

may be able to buy as replacement. This will prevent the affected person's livelihood from worsening. It has been argued here that an arbitrary addition of "solatium" is not logical. This is an ad hoc increase to reduce land owner's resistance to part with the land, not aimed at fair market value. Goal of the research is to move from "assessing" to "computing"; to compute a calculated fair market value which can be logically defended as "just". The research has proposed a generalized model which would help in the computation of logical "replacement cost" of land in a thin land market of India. The computed value will be closer to the perceived values of the land owners and have better acceptance. The model can also be used by industries or the government authorities for budgeting and planning purposes in estimating the cost of land required for the development projects.