

Web Based Land Valuation System in Infrastructure Planning in India: An Approach

Bikram Kumar Dutta

(Bikram Kumar Dutta, Regional Planner, Associate Manager, IL&FS Transportation Networks Limited, L-30, Delta II, Greater Noida, bikramdutta@hotmail.com)

1 ABSTRACT

Government organizations in developing countries all over the world that are responsible for infrastructure development and government is responsible for land acquisition as well as prepare the detailed project report with the help of consultants where as the private sector responsibility is to develop the infrastructure through private public partnership. The infrastructure development may be to build roads, dams, airports etc. The examples of land holding are freehold, leasehold, common hold interests and government holdings. The property interests of land and structure can be compulsorily acquired by government for development activities. Although the matter differs from country to country, if a property owner is affected due to compulsory acquisition, compensation can be claimed for any land acquisition is injurious affection (severance) caused and for disturbance. The legal basis of the right to claim compensation in these respects may differ as the statutory regulations and circumstance prevailed in each country. Proper valuation of and compensation for lost assets are crucially important counteractions to mitigate impoverishment risks for affected persons.

The Government of India recognizes the need to compensation of loss where displacement is inevitable, the need to handle with utmost care and forethought issues relating to Resettlement and Rehabilitation (R&R) of Project Affected Families (PAF) and formulate R&R Policies as named as The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

Now the question is how to value market price. Economic market principles determine what value any commodity will have at a particular point in time. If there is a plentiful supply of a commodity and little or no demand, the price of the commodity is likely to be low, whereas, if there is little supply and a great deal of demand, the price will be higher. In the real estate business it is common to assume that the value and potential of a property is fundamentally determined by its location, access to existing infrastructure and its productivity. Different users of land might be prepared to offer different prices for a piece of land because it offers the potential to earn different amounts of revenue depending on the use to which it is put. So, futuristic usage is also determinants to value the market price. Land values and intensity of land use becomes lower when we move away from the center of the city. With lower land values, there is less pressure for high-rise development to maximize usage of the available sites. Establishing the economic area of land use within which a property is located is an essential factor in understanding the economic, social, political and geographical factors that exist and help determine the levels of supply and demand for a particular property type and thus influence its value.

The principle of comparison underpins all valuation methods but sales comparison is always preferred method of valuation. The sales prices of the properties that are judged to be the most comparable ones tend to indicate the range in which the estimated value for the subject property will fall. The degree of similarity or difference between the subject property and the comparable sales is usually established on the following elements of comparison: property rights conveyed, financing terms, conditions of sale, expenditures made immediately after purchase, market conditions (time), location, physical characteristics, economic characteristics, use (zoning), and non-reality components of value etc. This all determinants can be summarised into well access system to individual when these information would be disseminate through land revenue department in well structured format. Web based land valuation system is information technology based interface developing system where all determinants of land valuation can be calculated with the each and every parcel of land maps in India. This paper has approached to formulate the interface mechanism for valuation of land for infrastructure planning over periods.

2 INTRODUCTION

Compensation in financial form or as replacement land or structures is at the heart of Resettlement and Rehabilitation in infrastructure planning. According to Keith (2007), in developing countries where there is the financial resource limitation, less emphasis should be put on monetary compensation where resettlement

or reinstatement are often the best means of putting the claimant back in the same position as if his/her land had not been taken from him /her. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 has also mentioned to account the market value for compensation mechanism. The fair market value is commonly defined as “the amount that the land might be expected to realize if sold in the open market by a willing seller to a willing buyer.” (ADB, 2007). The underlying reason for adopting the fair market value standard is that the market is an objective gauge for assessing the value of the land. Market value has been the most popular suggestion for calculating compensation payable. The use of market value as measure of compensation that is “just, adequate, full, fair,” etc raises questions because it seems to contradict the basic logic. When the government acquires the land compulsorily and pays compensation, the transacted price cannot be equal to the market value because of the coercive conditions attached to the sale. This equation defeats the very basic rule of a free market, i.e. “free operation” of the transitions. In a free market, market value can only be produced in a situation where willing buyers and sellers of commodities meet and transact freely under market conditions and the price arrived at is supposed to be fair assuming that negotiations were not interfered (Hardwick et.al 1990; cited in E.ndjovu, 2003). It is argued therefore, since there is no freedom of transaction, there is no market as such for the compulsorily acquired property and any attempts to equate “just compensation” to “market value” is incorrect (Eaton, 1995). Market values only provide a useful guide towards determination of the market value case. Now the question is how to determine the market value.

3 DETERMINANTS OF MARKET VALUE

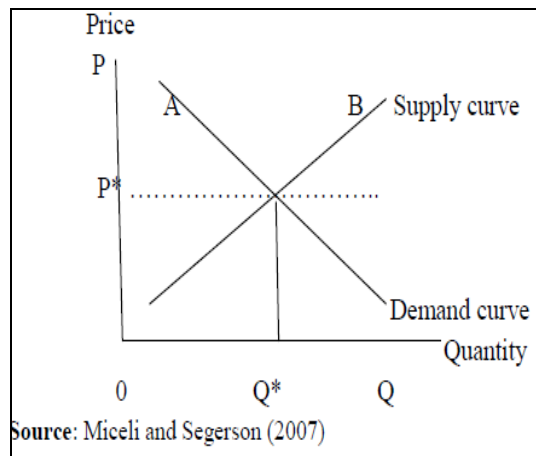
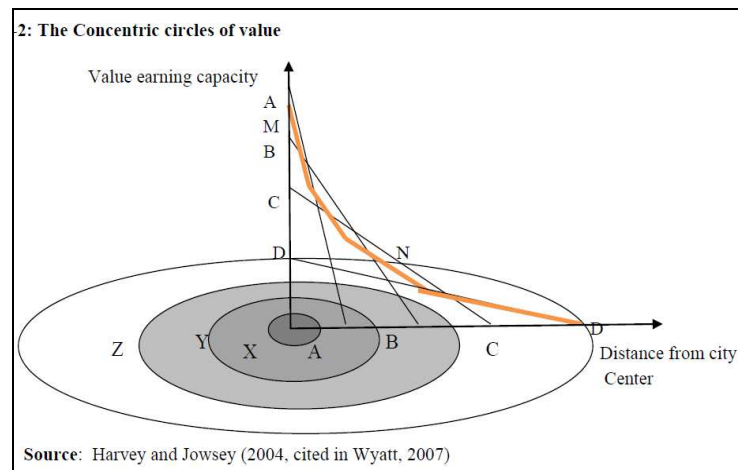
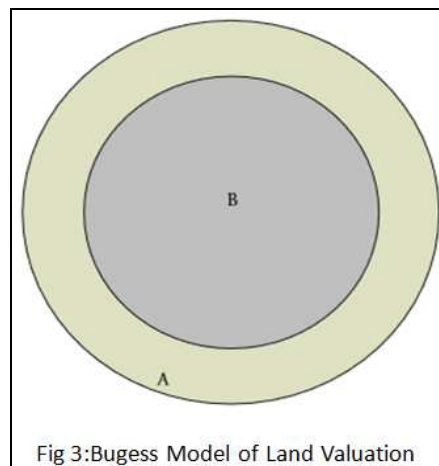


Fig 1: Demand Supply Equilibrium graph

The concept “market value” is not necessarily the equivalent of “just compensation” but rather a useful and generally sufficient tool for arriving at this value. In a compulsory land taking, the government is a willing buyer, but the affected landowners are often not willing sellers. In this sense, fair market value must necessarily undercompensate unwilling sellers (J.Miceli and Segerson, 2007). The idea is illustrated using a simple supply-demand diagram as shown in figure 1. The demand curve represents the marginal private benefit to potential buyers of putting additional land into an alternative land use. It thus gives potential buyers’ marginal willingness to pay for land. The supply curve represents the marginal private cost to current owners of taking additional land out of its current use. It thus gives the owners’ reservation prices; that is, their marginal willingness to accept in compensation in exchange for giving up their land. The equilibrium price in this market, P^* can be interpreted as the market value for this class of property. It represents the price at which those parcels between 0 and Q^* would sell in consensual transactions. In contrast, parcels to the right of Q^* would not sell because the reservation prices of the owners exceed the equilibrium price.



Now the question is how to value market price. Assigning market value to property is always the attempt to anticipate the price which the market will determine. As such, its major tool is market analysis and its result is an estimate of an expected outcome of the interplay of a constellation of price-determining factors. It is – usually a well-founded – guess that whenever property valuers fail to acknowledge and account for the subjective and uncertain nature of their task – which simply stems from the subjective and fluctuating nature of the underlying concept they clearly face the risk of putting the credibility of the valuation profession into question (Lorenz, 2006a). Basically the value of a property is determined by supply and demand. Economic market principles determine what value any commodity will have at a particular point in time. If there is a plentiful supply of a commodity and little or no demand, the price of the commodity is likely to be low, whereas, if there is little supply and a great deal of demand, the price will be higher. In the real estate business it is common to assume that the value and potential of a property is fundamentally determined by its location (Lahoz, 2007). If we compare similar types of properties in different areas, we may discover significant variations in price. The existences of good communication and accessibility have always been important in influencing value. What urban land uses desire is accessibility, not just access to the market (where the customers are) but also access to factors of production and to other complementary land uses. In explaining the cause of different land values within an urban area, Hurd suggested that ‘since value depends on economic rent, and rent on location and location on convenience, and convenience on nearness, we may eliminate the intermediate steps and say that value depends on nearness.’ Theoretically, as Kivell (1993; cited in A.F. Millington, 2000) pointed out, in a monocentric urban area the centre is where transport facilities maximize labor availability, customer flow and proximate linkages, and therefore attracts the highest capital and rental values. Basically greater accessibility leads to higher demand, which, in turn, causes value to rise and land use intensity to increase. The prime location factor revolves around linkages to people and other uses measured in terms of accessibility to market(s) and factors of production (capital and labor). Different users of land might be prepared to offer different prices for a piece of land because it offers the potential to earn different amounts of revenue depending on the use to which it is put. The shaded areas in Fig 2: The Concentric Circle of value above represents value-earning capacity and the sizes of these are maintained for each land use. A value curve MND is derived showing the value for land at different distance from the center of the city. The central area of the city has the highest levels of accessibility and complementarity. It is relatively small sized and, coupled with intense demand from users due to the advantages of its location; it will enjoy peak land values. The scarcity of land together with these high values will produce the greatest intensity of use of land in the center urban area. Land values and intensity of land use becomes lower when we move away from the center of the city. The majority user is residential at moderate densities and associated complementary uses including open space and recreational areas. With lower land values, there is less pressure for high-rise development to maximize usage of the available sites. Establishing the economic area of land use within which a property is located is an essential factor in understanding the economic, social, political and geographical factors that exist and help determine the levels of supply and demand for a particular property type and thus influence its value.



In India's Infrastructure Report, 2009 : Land—A Critical Resource for Infrastructure, ed al, one article has been refereed named as NON-AGRICULTURAL USE CLEARANCE by "Land Markets in India Distortions and Issues" by Sebastian Morris and Ajay Pande. The article has explained through one diagram following Burgess theorem. If B is entirely built up and A is entirely devoted to agricultural use, the value of a unit of land in A (V) is the rental yield of the land in agriculture (Ra) multiplied by the probability of land continuing to be used for agriculture (1-P) plus the rental value of the land in non-agricultural use (Rna) multiplied by the probability of the land being used in non-agriculture (P) use. This is the case when the value of land in agricultural use is less than that in non-agricultural use. Now, P is a function of the area's proximity to B and the growth rate of the urban area. P is typically large in an area in the urban periphery (say 0.5 at the time land is sought for an alternate use) and Rna is typically many times (usually 10–20 times) higher than Ra. Thus, for an annulus like A in the immediate periphery of the built up area, the value of A is determined almost in all cases by the expected rental value in non-agricultural use. Assuming Ra as X, and Rna as 12X, V is $0.5 \cdot 12X + 0.5 \cdot X = 6.5X$. If there is a compulsory acquisition of a portion of the land A and its land use is changed, then its market price would jump close to 2 times (from 6.5X to 12X), the price that would be prevalent in case there were no restrictions on land use. Now consider the situation created by the need for NAC, as in India. Prior to acquisition, the probability P is close to zero, because there is a requirement of NAC, which is granted only after acquisition or after concrete proposals for non-agricultural use are shown to the authorities; the possibility of the latter is generally remote (see below). Therefore, the price that the land holders can realize is a little more than X. Now, post-acquisition, the price would be 12X, which would be realized by the requiring body.

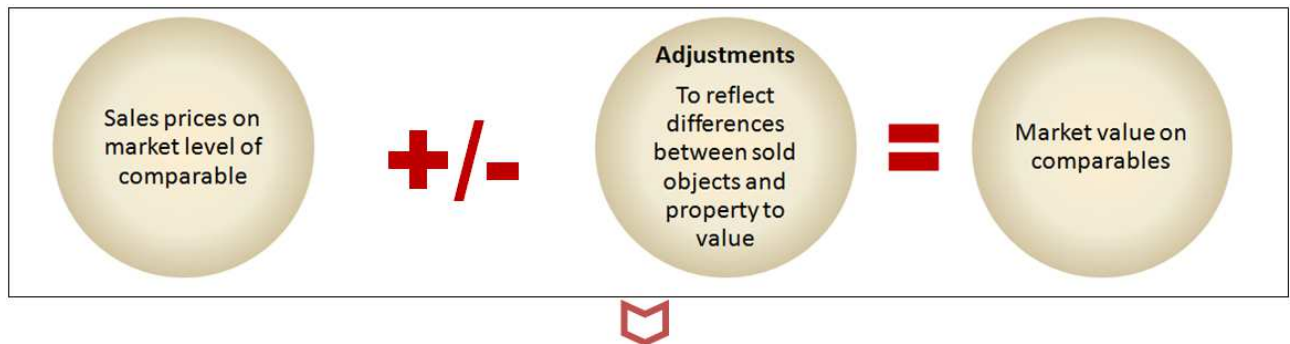
As per 1894 Land Acquisition Act under Section 23rd and 24th date of publication of the declaration of acquisition of land under section 6 market rate shall be given to affected people as compensation. The transaction value of similar type of land on that publication date of Land Acquisition Act in a particular district or region the rate has been considered as market value. Market rate of the land is to be decided basis of its utilisation potentiality i.e. fertility of land in terms of productivity (one time productivity or two time or three time productivity in a year). The usability of the land is another parameter to account its cost. The usage of land has been enlisted in state revenue list. On government record on dated 26.05.1981 Santhal Parganas in West Bengal on Section 794 the Court had declared that the land productivity has enhanced due to use of scientific method of practice in agriculture. As a result the productivity of that District has enhanced from 8 times more. Subsequently all land acquisition had been banned on that region.

Another criteria has been framed by Videh Upadhyay and Chandrima Sinha in their article 'Regulatory and Policy Regime of Land Acquisition: A State-level Perspective'. They stated that the relevant criteria (such as reference date and land usage) for determining the market value of the land for the purpose of compensation under section 23 across states is applicable. For example, in West Bengal, the market value is calculated with reference to the date of taking possession of the land, while in most cases it is calculated with reference to the much earlier date of publication of section 4(1) notification, in line with the Land Acquisition Act. The amendments for Manipur, Maharashtra (Nagpur City), and Maharashtra (Highways) take into account the date of publication of the declaration of acquisition of land under section 6. While the Land Acquisition Act does not specify the land use criteria, most states have added amendments specifying that the market value will be based on the land use as on the date on which market value is to be calculated. However, Bihar (Patna

City) Amendments specify that market value will be according to the use to which the land was put in the preceding five years.

V.K.Sharma and Tarun Choudhary in article “Land Acquisition Process for National Highways Issues and Recommendations” pg 82 stated that The land acquisition act provides for solatium amount (30% to 60% percent of the market value of land earlier and now it is 100%) to those whose land is acquired in consideration for the compulsory nature of acquisition. Besides, landowners receive a payment of an interest (12% per annum on the market value of land) for the period commencing from the date of publication of notification till the award of the collector or the date of taking possession, whichever is earlier. However, no such provision exists in the National Highway Act, 1956. There are three internationally recognized methods of property valuation and they are all based on the principle of market comparison. They are (1) sales comparison; (2) income capitalization; and (3) replacement cost.

Sales Comparison method: The economic rationale of the sales comparison method is that a knowledgeable and prudent person would not pay more for a property than other persons have recently paid for comparable properties given that the general market conditions are the same. When the market is weak and few market transactions are available, the applicability of the sales comparison approach may be limited. For example, the sales comparison method is usually not applied to special – purpose properties because few similar properties may be sold in a given market, even one that is geographically broad in Indian market.



The adjustments derived in comparative analysis and applied to the sale prices of the comparables may be expressed as percentages, as dollar amounts, or in descriptive terms that clearly convey the magnitude of the difference between the comparable and the subjective property in terms of each element of comparison

It can be necessary to find out and give information on both real circumstances and circumstances adjusted to market conditions regarding rents, vacancies, operating and maintenance costs, and their estimated values must be openly showed in one’s calculations.

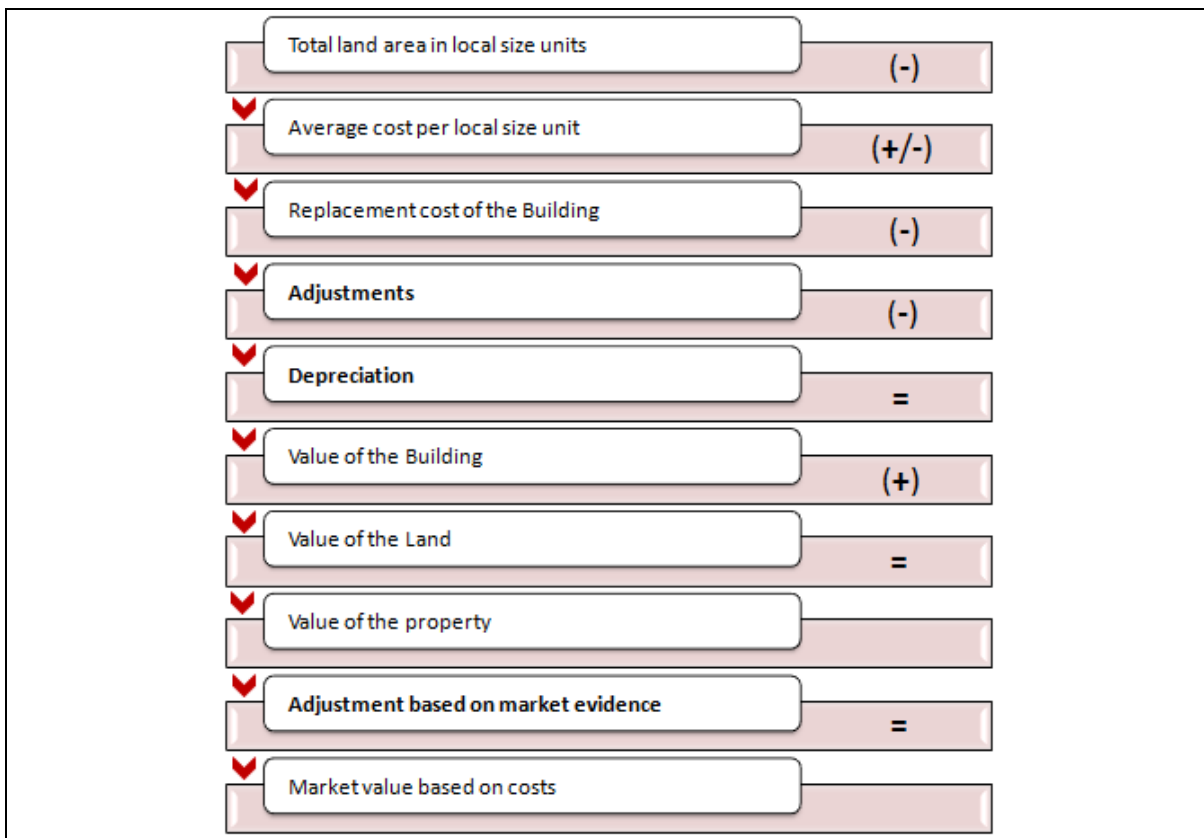
Income Capitalisation

Income method is usually applied for property that is capable of generating rental income and for which and investor is the most likely purchaser. Income methods are based on basic investment analysis methods, which do not mean that the sales comparison and the cost approaches are no good for valuing income properties. The problem with the sales comparison approach lies on the fact that income properties are not frequently traded, so the available sample becomes so small that it is very difficult to apply that method. Due to the characteristics of income properties, the cost approach is also difficult to be applied. In this case, the income approach is the most appropriate method to assessing this type of properties (Lusht, 1997; cited in Hungria-Garcia, 2004). The economic rationale of the income approach for existing properties is that no investor will pay more for a property than he/she will retrieve by holding the property.

Replacement Cost Method

The cost method is used to value specialist properties that are seldom sold because there is no clear market demand. Consequently, there is little or no comparable evidence. A property might be specialist because its use requires it to be constructed in a particular way, including highly production-specific manufacturing plants such as chemical works and oil refineries; public administration facilities such as prisons, schools and colleges, hospitals, town halls, art galleries and court facilities; and transport infrastructure such as airports and railway buildings, etc. (Vos and Have, 1996; Wyatt, 2007). Its economic rationale is that no a rational

person will pay more for an existing property than it would cost to buy the land and to build a new building on it. However, given that construction of buildings needs time and that land for building purposes might not be immediately available, prices and costs will diverge in the short-run. The method is employed when the existing uses of these sorts of properties need to be valued for different purposes, for example, compulsory purchase and compensation. So, mathematical equation of this as:

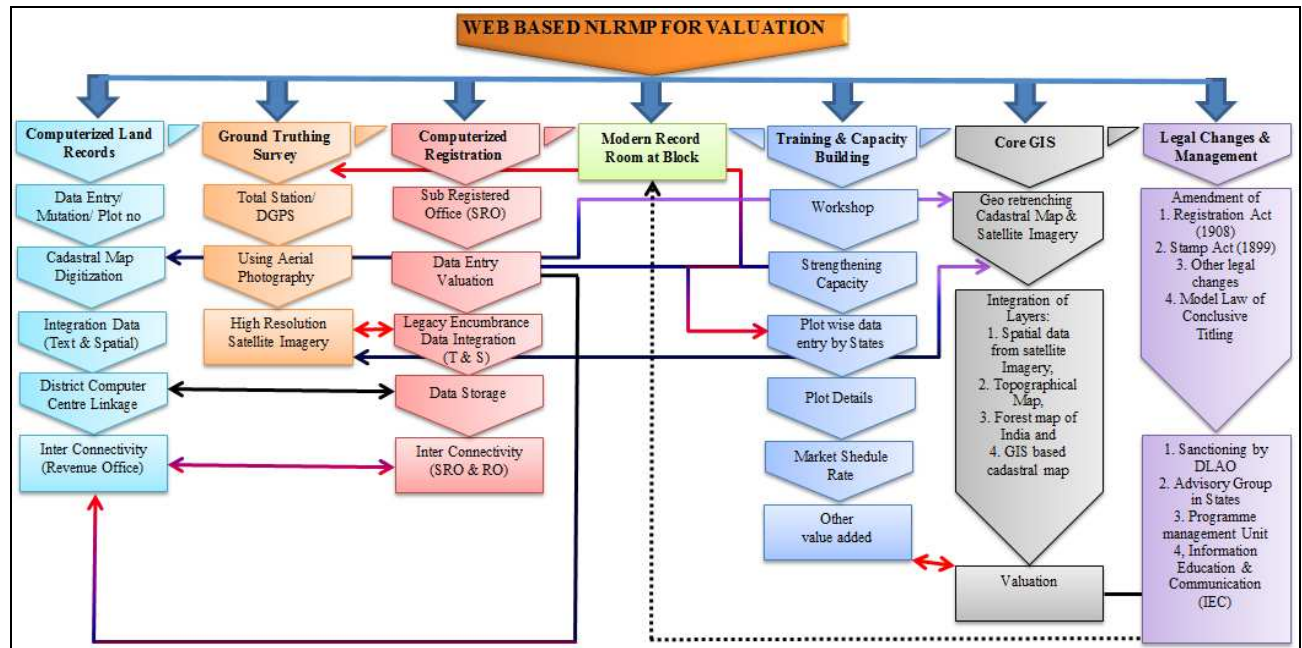


4 WEB BASED VALUATION SYSTEM

To conclude, property valuations are needed for many different purposes and different valuation methods involve valuers making different assumptions and the use of different information. The choice of one method instead of another can result in a different figure of value being produced. The diversity of property makes valuation a difficult task, no two properties are ever the same, yet valuation relies on the comparison of properties to give an indication of value. With the frequently changing economic and property scenarios of the recent years, the choice of the wrong valuation method or the careless application of a chosen method by the valuer could result in a widely wrong valuation figure being produced. It is therefore, stressed that a property valuer can determine the valuation method which is appropriate to value the property based upon the purpose and type of property to be valued. To do this, the valuer must be aware of, and be able to quantify, differences in type, location, legal interest, quality and the state of the market. For this web based management system of Land valuation is essential where buyers are paying less-amount to seller for ‘public purpose’ land acquisition process where market value of that land or asset is almost 10 times more.

The Government of India has decided to implement the Centrally-Sponsored scheme in the shape of the National Land Records Modernization Programme (NLRMP) by merging two existing Centrally-Sponsored Schemes of Computerization of Land Records (CLR) and Strengthening of Revenue Administration and Updating of Land Records (SRA&ULR) in the Department of Land Resources (DoLR), Ministry of Rural Development. The integrated programme would modernize management of land records, minimize scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the country. The major components of the programme are computerization of all land records including mutations, digitization of maps and integration of textual and spatial data, survey/re-survey and updation of all survey and settlement records including creation of original cadastral records wherever necessary, computerization of registration and its integration with the land records maintenance system, development of core Geospatial Information

System (GIS) and capacity building. The following is an outline of the components and activities to be taken up under the NLRMP as shown in following flow chart.



Summary of procedure adopted for land valuation and acquisition plan are followed:

- (1) **Project Initiation:** The user agency shall issue letters to concerned district administration, acknowledging them about the project and the district administration shall appoint district land acquisition officer (DLAO). DLAO is notified post by the state government and under entire process of land acquisition has been done.
- (2) **Identification of alignment:** This process is done by user agency by superimposition alignment plan on web base interfase for identification of project affected rural and urban areas.
- (3) **Collection of revenue maps, 3 year registry/deed rates and circle rate:** After the identification of villages, the user agency shall approach respective revenue department website to download project affected rural and urban area and by using GIS software affected plots can be identified and registry or deed value of affected plots can be downloaded through sub registree website for last three years and there after download, there after prevailing circle rate can also be downloaded.
- (4) **Overlapping of Revenue Maps and calculation of average deed value:** Once after getting all the revenue Maps, the proposed widening plan should be superimposed on the revenue maps with the help of GIS software. Highest 50% of the deed/registry value has been taken for last 3 years in each village to calculate the market price of the land.
- (5) **Identification of Affected Plots and collection of circle rates:** The exercise of overlapping could bring out specifically the affected plots. Such affected plots have been marked out and also collect information regarding circle rate from sub registry office or from the deputy commitioner office.
- (6) **Demarcation:** After identification of affected plots, the specific area of the affected plot could be demarcated on ground and land schedules have been prepared.
- (7) **Collection of Land Records:** On demarcating the affected area, land records would be collected from Revenue Officer. This could fulfil the requirements of section 3A notification.
- (8) **Compilation:** After collecting land records for all the plots and sub plotes are been jointly mesurement along with user agency and revenue department on ground and collected ditales for ownership and all the details are been cross checked with revenue racords collected from record room and objection filed by the affected people from respective Revenue Officer, the same has been sorted out for affected plots under section 3D notification.
- (9) **Final Land Acquisition Plan:** All the information collected from Revenue Officer has been worked out with respect to proposed widening plan there after the final land Acquisition Plan as well as valuation of land was prepared and estimates are prepared (in the estimates costing has been take for

Land+Solatium+Structure+aminities (trees, wells, animan shed, tube well ect.)+intrest are been calculated and submitted to user agency and demand note) which is also known as section 3G notification.

(10) Valuation of affected plots: Each plot has been marked in web based system. User agency has authority to edit the data. Any one can view the plot/ location which are to be acquired through web based land system. Now the cost of each plot of last 3 years or circle rate which ever is highest shall be taken and have been marked and tabulated on the basis of schedule of rate of area and valuation khatian has been prepared and land owners has surved notices to collect money form revenue department under section 3H process.

(11) Handing over and Taking over land: After 80% pament to affected persons land is handed over to the user agency by revenue department. All data has to be tabulated in different Colums which will multiply the sales deed price of existing year and will give total market value of that plot.

5 CONCLUSION

Modern web based integrates various kinds of advanced, dynamic, multi-layered, time series data and graphical information which transform the tedious data analysis job to a faster, dynamic and realistic exercise. Regular updation of information makes the monitoring and management of land parcel in records more transparent and realistic approach towards any infrastructure development. This information system can be used as a tool disseminating information and valuation of land in open platform. As well as it can also be a useful support system for change of ownership, land value evaluation and ultimately land acquisition in fare compensation method.

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