

Comparative Analysis of Land Acquisition Acts Using Analytical Hierarchical Process (AHP) : A Questionary Survey

Vikas Tyagi*, Rahul Shinde

Department of Civil Engineering, RMD Sinhgad Institute of Technology, Savitribai Phule University, Pune , Maharashtra, India

ABSTRACT

This research aims to comparative analysis of land acquisition acts framed by government of India by using Analytical Hierarchical Process (AHP). In this research AHP was applied to decide the superior act out of different land acquisition acts to make it more preferable. The superior act was chosen on the basis of that it fits to government land acquisition planning strategy and willingness of people systematically; this method helps to formulate the goals, identifying certain factors (objectives and sub-objectives). Formatting and weighing the hierarchy of the factors, calculating AHP, and deciding alternative. The main concern is to select a superior act was based on five main features of land acquisition acts which were selected by percentage method based on views of people. The hierarchy of chosen act was shown from its score in which the superior act holds the highest score. The result showed that the most preferable act is 2015.

Keywords: Comparative, Analytical, Hierarchical, Weighing, Preferable

I. INTRODUCTION

Land Acquisition in India refers to the process of land acquisition by the central or state government of India for various infrastructure and economic growth initiatives. Several controversies have arisen with claims that land owners have not been adequately compensated. Land acquisition in India is governed by The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, which came into force from 1 January 2014.¹ Till 2013, land acquisition in India was governed by Land Acquisition Act of 1894. On 31 December 2014, the new government in India passed an ordinance with an official mandate to "meet the twin objectives of farmer welfare; along with expeditiously meeting the strategic and developmental needs of the country". The government passed Land Acquisition Amendment² Bill in Lok Sabha on 10 March 2015^[1].

In India, after every five or ten years a new government came with its new provisions and amendments in the land acquisition bills. But it becomes a very big problem and acceptable solution was not provided yet. The

people got confused to decide which act is better because every act has new provisions some are acceptable and some are not acceptable. This research helps to find a preferable act so that both government and public satisfied.

This research aims to find superior act by using AHP method. The best act which satisfied all the features and economically and socially beneficial for the people impacted. AHP has preferred capability to decide the best alternative from a series of hierarchy solution [3, 4, 5]. In this research, AHP was applied to decide the superior act that fits to the government land acquisition planning strategy willingness of people.

In this research we studied different land acquisition acts and identify all the important features such as, consent from affected people (CFAP), social impact assessment (SIA), compensation, return of land if left unused for five years (ROL), consideration of food security (CFS), role of panchayat (ROP), land acquisition can be done by government or private sector and we compare different land acquisition acts such as 1894, 2013, 2014 and 2015, according to these features as stated in table 1.

Table 1. Comparative study of land acquisition acts in India.

Features	1894 law	2013 Act	2014 Ordinance	2015 Act
Consent From Affected People	No Provision	Mandatory consent of owners of the land – 70% for private projects and 80% for public projects which could be raised to 100% by state governments.	Not required for defence, security, rural infrastructure, social infrastructure and industrial corridors.	Not required for defence, rural infrastructure, affordable housing, industrial corridors and infrastructure projects including (PPP) projects where government owns the land. But compulsory employment to one member of the affected family of farm labourers.
Social Impact Assessment (SIA)	No Provision	Compulsory SIA for every acquisition	Not required for defence, security, rural infrastructure, social infrastructure and industrial corridors.	Not required for defence, rural infrastructure, affordable housing, industrial corridors and infrastructure projects including (PPP) projects where government owns the land.
Compensation	No Provision	4 times the market rate in rural area. 2 times in urban area.	4 times the market rate in rural area. 2 times in urban area.	4 times the market rate in rural area. 2 times in urban area.
Multiple Crop Land	No Provision	Only in extreme situation, with an upper cap of 5% acquisition of multi crop land per district.	Not required for defence, security, rural infrastructure, social infrastructure and industrial corridors.	Not required for defence, rural infrastructure, affordable housing, industrial corridors and infrastructure projects including (PPP) projects where government owns the land.
Return of Land If Left Unused for 5 years	No Provision	Clause present	No provision	If an award had been made five years earlier and compensation had not been paid or possession not taken. The bill exempts any period when a court has given a stay on the acquisition while computing the five years period.
Consideration of Food Security	No Provision	Clause present	No provision	No provision
Role of Panchayat	No Provision	Requiring public hearing and gram sabha	No provision	Panchayat’s nod may mandatory for acquiring tribal land
Land Acquisition Can be done by	Public Sector	Public sector and private sector	Public sector, private companies and private entities (including proprietorship, partnership, and NGOs)	Government bodies, corporation

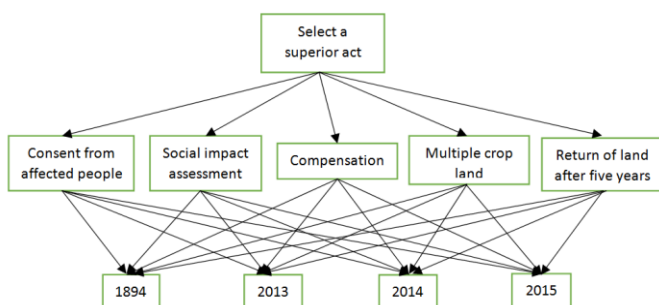


Figure 1. AHP model for certain factor identification and characterization

II. METHODS AND MATERIAL

A. Research Methodology

The methodology of the work consists of three step model. The first step is comparative study between different land acquisition bills, according to features.

The second step is collect the data from government employees, farmers, private companies and identified the five important features. The third step is applying the AHP method on five important features as stated in fig 2.

B. Data Collection and Analysis

The number of persons interviewed is 40. From 40 occupants only 25 occupants responded for the interview. The persons who were interviewed are from government organisation, private firms and land owners. The table 1 shows the details of questions asked to respondents and percentage wise analysis of data collected during the interviews. The views of authors have been described in discussion section of paper.

I have carried out a questionnaire survey on various features of different land acquisition acts. They gave their reply in number of variances and I have converted into percentage of each questions replied by them. Then I have create table of all questions and what they replied. And all the result of questionnaire are mentioned in table

1. The features which they replied having more percentage are following:

- Social impact assessment
- Consent from affected people
- Compensation
- Multiple crop land
- Return of land is left unused for 5 years

Table 2. Percentage wise Analysis of Data

S.No.	Features	No. of (V.I)	No. of (I)	Total	Formula	% of (V.I)	% of (I)
1	Consent from affected people	16	9	25	$(X/25) \times 100$	64%	36%
2	Social impact assessment	18	7	25	$(X/25) \times 100$	72%	28%
3	Multiple crop land	14	11	25	$(X/25) \times 100$	56%	44%
4	compensation	15	10	25	$(X/25) \times 100$	60%	40%
5	Return of land is left unused for 5 years	13	12	25	$(X/25) \times 100$	52%	48%
6	Consideration of food security	5	20	25	$(X/25) \times 100$	20%	80%
7	Role of panchayat	2	23	25	$(X/25) \times 100$	8%	92%
8	Land acquisition can be done by government bodies or private sector	6	19	25	$(X/25) \times 100$	24%	76%

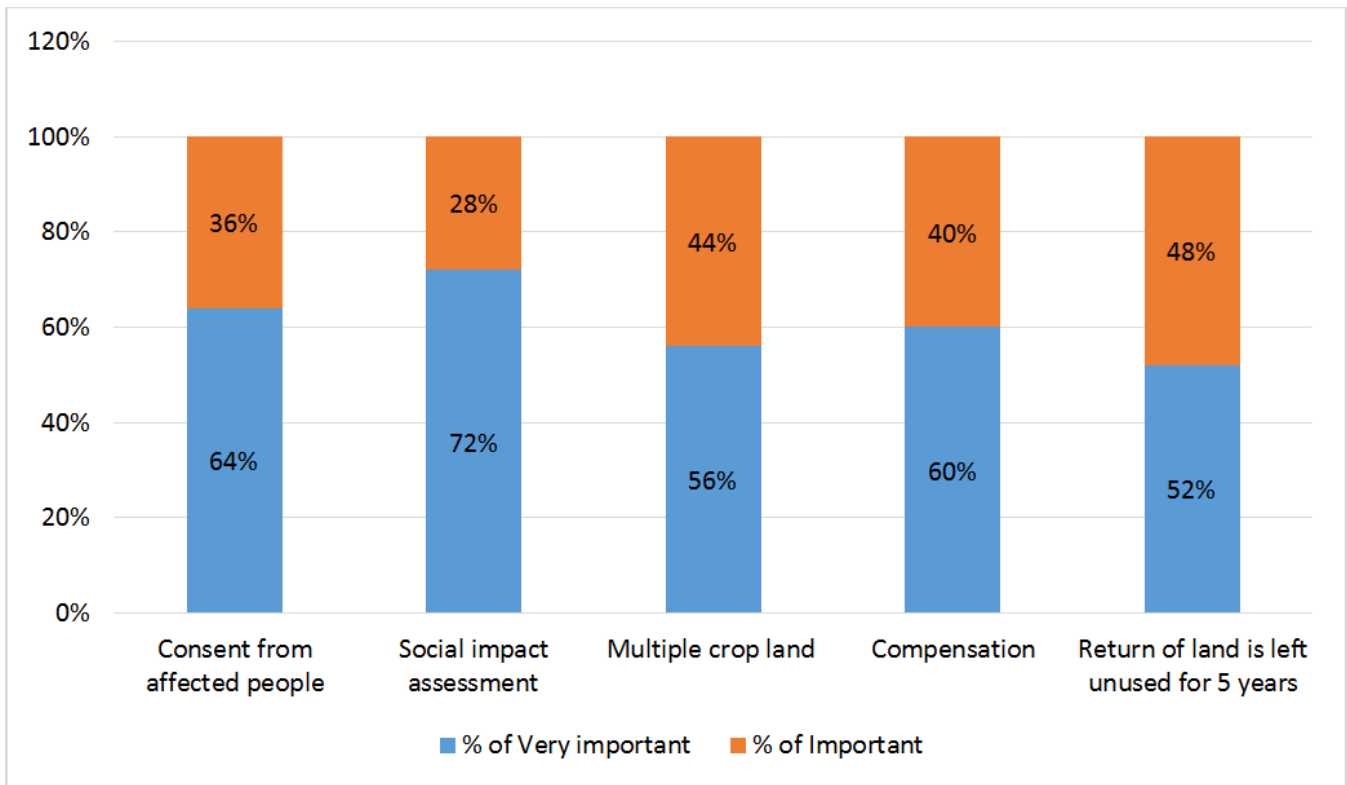


Figure 2. Importance of features of land acquisition acts as per Author Analysis

C. the AHP formulation

Systematic steps of the AHP formulation began with formulating the main goal, identifying certain factors, hierarchy formation and assessment, and alternative solution. The main goal of this analysis was to decide superior act. It should be decide between four alternative acts i.e. 1894, 2013, 2014 and 2015. The factor considered were consent from affected people, social impact assessment, compensation, multiple crop land and return of land after five year. The coding for these factors were, F1.1, F1.2, F1.3, F1.4 and F1.5 respectively.

Nomenclature

F1	Main goal for selecting superior act
F1.1, F1.2, F1.3, F1.4, F1.5	Five important features of land acquisition acts
EV	Eigen vector
VP	Vector priority
$EV_{h1}, EV_{h2}, EV_{h3}, EV_{h4}, EV_{h5}$	Eigen vector for main goal , objective

The factors derived from each aspect of the goal was then set into objectives and sub objectives level of hierarchy. The identification of these factors can be seen in Fig.2 Then these factor were weighed using F code as the hierarchy formation and assessment of AHP calculation. Weighing was based on its level of importance. At the goal factor, the level was basically the same so weighing for each factor was 1. The next coding series were set as function of graded objective and sub-objective as is shown in Fig.2. Weighing for objective and sub objective consideration from the researcher's point of view.

AHP calculation covers matrix development, calculating Eigen vector (EV) and vector priority (VP) in Fig.1

The Eigen vector value was then used to calculate vector priority (VP). The $h_1, h_2,$ and h_3 represented the level of main goal, sub objective respectively. Vector priority value was then characterized into 5 interval classes showing the level of importance on sub objective level, importance classification was shown in Table 3.

Table 3. Importance classification for sub objective level

Importance classes	Value
Less importance	<0.0155
Moderate importance	0.0155 – 0.0525
Strong importance	0.0525 – 0.0895
Very importance	0.0895– 0.1265
Extremely importance	> 1.265

Alternatives to select a superior act were based on so that it fits to the government land acquisition planning and willingness of people. People’s opinion to decide the superior act was delved in public consultation held in 3 cities that would be impacted. The calculation result and classification of sub objective level was shown in column 13 at Fig.3.

$$M = \begin{matrix} \begin{matrix} F1/F1 & F1/F2 & F1/F3 & F1/F4 & F1/F5 \\ F2/F1 & F2/F2 & F2/F3 & F2/F4 & F2/F5 \\ F3/F1 & F3/F2 & F3/F3 & F3/F4 & F3/F5 \\ F4/F1 & F4/F2 & F4/F3 & F4/F4 & F4/F5 \\ F5/F1 & F5/F2 & F5/F3 & F5/F4 & F5/F5 \end{matrix} & \begin{matrix} \text{Eigen vector (EV)} \\ \text{EV} = (\sqrt[n]{N_{11} \times N_{22} \times N_{33} \times \dots \times N_{nn}}) \\ \text{Where: } i = 1, 2, 3, \dots, n \\ \text{Vector priority (VP)} \\ \text{VP}_i = \frac{EV_i}{\sum EV} \end{matrix} \end{matrix}$$

Figure 3. AHP calculation formulas: matrix development, Eigen vector (EV), and vector priority (VP).

The Eigen vector value was then used to calculate vector priority (VP). The h1, h2, and h3 represented the level of main goal, sub objective respectively. Vector priority value was then characterized into 5 interval classes showing the level of importance on sub objective level, importance classification was shown in Table 2.

Table 2. Importance classification for sub objective level

Importance classes	Value
Less importance	<0.0155
Moderate importance	0.0155 – 0.0525
Strong importance	0.0525 – 0.0895
Very importance	0.0895– 0.1265
Extremely importance	> 1.265

III. RESULT AND RECOMMENDATION

Alternatives to select a superior act were based on so that it fits to the government land acquisition planning and willingness of people. People’s opinion to decide the superior act was delved in public consultation held in 3 cities that would be impacted. The calculation result and classification of sub objective level was shown in column 13 at table 4.

Table 4 : Sheet of AHP calculation

GOAL				OBJECTIVE				SUB OBJECTIVE				Importance Level
Factor	Weight	EV	VP	Factor	Weight	EV	VP	Factor	Weight	EV	VP	
1	2	3	4	5	6	7	8	9	10	11	12	13
F 1	1	1.00 0	1.00 0	F.1.1	9	0.30 9	0.30 9	F.1.1	1	0.03	0.00	Less importance
								.1	7	0.22	0.04	Moderate importance
								.2	5	0.10	0.02	Moderate importance
								.3	1	0	0	Extremely importance
				F.1.2	9	0.47 9	0.47 9	F.1.1	9	0.63	0.12	Extremely importance
								.4	7	0.07	0.02	Moderate importance
								F.1.2	1	0.04	0.00	Less importance
								.1	3	0.08	0.01	Moderate importance
F.1.2	5	0.13	0.02	Moderate importance								
.2	0	0	0	Extremely importance								
F.1.2	7	0.27	0.05	Strong importance								
.3	8	0.08	0.01	Moderate importance								
F.1.2	7	0.54	0.10	Very strong								
.4	7	0.10	0.01	Moderate importance								

						.4		8	9	importance		
				F.1.3	7	0.130	0.130	F.1.3.1	1	0.045	0.009	Less importance
								F.1.3.2	7	0.318	0.063	Strong importance
								F.1.3.3	7	0.318	0.063	Strong importance
								F.1.3.4	7	0.318	0.063	Strong importance
				F.1.4	5	0.055	0.055	F.1.4.1	1	0.059	0.011	Less importance
								F.1.4.2	3	0.038	0.007	Less importance
								F.1.4.3	5	0.287	0.057	Strong importance
								F.1.4.4	7	0.614	0.122	Extremely importance
				F.1.5	1	0.024	0.024	F.1.5.1	1	0.067	0.013	Less importance
								F.1.5.2	9	0.688	0.137	Extremely importance
								F.1.5.3	1	0.067	0.013	Less importance
								F.1.5.4	3	0.177	0.035	Moderate importance

Table 3. Priority vector calculation result for features of different land acquisition acts

Objective Sub objective	Consent from affected people	Social impact assessment	Compensation	Multiple Crop land	Return of land after five years	Score
	0.309	0.479	0.130	0.055	0.024	1.000
1894	0.035	0.043	0.045	0.059	0.067	0.042
2013	0.225	0.130	0.318	0.038	0.688	0.191
2014	0.101	0.278	0.318	0.287	0.067	0.223
2015	0.637	0.548	0.318	0.614	0.177	0.538

Scoring of sub-objective criteria for each act was obtained from a series of questionnaires arranged upon governments land acquisition planning and willing of the people impacted. Alternative solution were decided on the total score of each act, resulted from multiplying each Eigen vector value of objective with each Eigen vector value of sub objective, and separately adding of each alternative or sub objective. The best alternative act was one with the highest score. Priority vector score of each act was the total score of sub objective criteria. The calculation result of priority vector for each act can be seen in Table 4.

IV. CONCLUSION

The best act was chosen from the alternatives on the basis of AHP formulation was 2015 (0.538). The 2015 act is the best alternative because it satisfied government land acquisition planning and public. It also satisfies most of the features of different land acquisition acts.

V. ACKNOWLEDGEMENTS

Great thanks to district development authority employees and the impacted farmers to support for this research.

VI. REFERENCES

- [1] https://en.wikipedia.org/wiki/Land_acquisition_in_India.
- [2] Evangelos Triantaphyllou, Stuart H. Mann. Using the analytical hierarchical process for decision making in Engineering application. IJIE Publication; 1995.
- [3] Saaty, T.L. The Analytical hierarchical Process: Planning, Priority Setting, Resource Allocation. McGraw-Hill, New York; 1980.
- [4] Saaty, T.L. Models, Method, Concept & Applications of the Analytic Hierarchy Process, Kluwer Academic; 1991.
- [5] Saaty, T.L. Fundamentals of Decision Making and Priority Theory with the Analytical Hierarchical Process. RWS Publication, Pittsburgh; 1994.